CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

WILL THE JOBS OF THE FUTURE SUPPORT AN OLDER WORKFORCE?

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CRR WP 2022-2
March 2022

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Abstract

Retirement ages in the United States have been rising for decades but the continuation of this trend depends on employers in the future looking to fill jobs that older workers can do. This study considers whether the occupations that are projected by the Bureau of Labor Statistics to grow faster by 2030 are those that are suitable for older workers. Using a variety of different metrics for suitability, the analysis finds only weak evidence that the occupations most suitable for older workers are projected to grow particularly slowly.

Introduction

Retirement ages in the United States have been steadily rising over the past few decades, a welcome trend as life expectancy increases, requiring individuals to finance longer retirements. However, this trend may begin to run into headwinds in the coming years. On the supply side, many workers may be reaching the physical limits of working into older ages.[1] But even if workers are willing to work longer, they must find employers willing to hire or retain them in positions that match their skills. This paper explores the future demand for older workers, asking whether the jobs of the future will support our aging workforce.

The Bureau of Labor Statistics (BLS) projects job growth by occupation over the next decade. This paper aims to link those projections to various measures of how well-suited older workers are to different occupations. This analysis uses three complementary approaches: first, it considers whether occupations in which older workers are currently employed are projected to grow in the coming years. Second, to also incorporate occupations older workers *could do*, rather than only those they are doing now, occupations are evaluated by how old their retirement ages tend to be in practice; how likely workers are to file for disability; and the extent to which the required skills for the occupation decline with age. These three characteristics capture different dimensions of older workers' ability to do different occupations. Each characteristic is then correlated with projected job growth to assess whether older workers will be able to do the jobs of the future. Finally, to estimate a simpler and more statistically powerful model, the three characteristics are combined into a single index of suitability of occupations for older workers and the analysis estimates the association of this index with future job growth.

The first set of results indicates that the occupations currently employing large shares of older workers are projected to grow more slowly than other occupations. However, this negative finding may not be as bad is it seems at first blush, because the next set of results shows that the projected job growth of occupations is not strongly related to the characteristics of jobs older workers are capable of doing. This finding holds for both the analysis of the different occupation characteristics on their own and for the summary index. While the index is strongly correlated with occupations where older workers are clustered today, it is essentially uncorrelated with predicted job growth over the next decade.

[1] See Quinby and Wettstein (2021).

The rest of the paper proceeds as follows. The next section summarizes the literature on the demand for older workers. The third section describes the methods of the analysis. The fourth section presents the results. The final section concludes that occupations with more older workers today are projected to decline, but that the outlook for occupations that older workers could comfortably work in is less negative.

Background

The trend of rising retirement ages in the United States has been reassuring to those worried about Americans' retirement security. Many studies have found that postponing retirement is one of the best ways of ensuring individuals have sufficient savings to support themselves after leaving the labor market (Munnell and Sass 2009; Bronstein et al. 2019; Rutledge and Wettstein 2020). The rising Social Security Full Retirement Age (FRA) has also been associated with later retirement, as workers need to postpone claiming benefits to retain the same level of payments, relative to their income, that previous generations enjoyed (Deshpande, Fadlon, and Gray 2020; Cosic and Steuerle 2021).

The fly in the ointment is the worry that the future prospects for working longer could be constrained by two factors. First, employees can only work when employers are willing to hire them. Second, workers' ability to perform their jobs may be limited by the very process of aging. Of course, these two issues are linked, with employers potentially concerned about age-related declines in productivity, and thus less willing to hire older workers.

The question of whether robust demand for older workers exists has been explored in several recent papers. This literature generally finds that employers say they want to hire older workers for a relatively broad range of jobs, despite moderate concern about their productivity and, even more so, their relative cost (Munnell and Wettstein 2021). However, expressing a willingness to hire and actually hiring are different things, and perhaps these cost concerns explain recent evidence on the persistence of age discrimination (Neumark, Burn, and Button 2016).

On the ability of older workers to work, a few recent studies have raised some concern.[2] Quinby and Wettstein (2021) found a great deal of heterogeneity in the expected ability of

[2] For example, Munnell, Soto, and Golub-Sass (2008) and Coile and Duggan (2019) consider the prevalence of work-limiting disability.

workers to extend their working life to older ages. For highly educated white workers, the vast majority can expect to be physically capable of work until at least the FRA of 67. However, for low-education and Black workers, working life expectancy has stagnated, and large shares of these demographic groups will be incapable of working until age 67.

These studies look at broad trends in the population. At a more granular level, some studies have examined which individual capabilities grow or hold steady to older ages, and which decline. For example, capabilities that depend on accumulation of knowledge (for example, verbal abilities) tend to increase with age.[3] Conversely, capabilities that require fluidity (such as memorization) tend to show early declines (Belbase, Sanzenbacher, and Gillis 2017).[4] These insights yielded the CRR's Susceptibility Index of which occupations rely on tasks that become more difficult as workers age.

Bringing together the questions of supply and demand for older workers, this analysis explores whether the occupations that are projected to experience increased demand in the coming years are a good match for the occupations that older workers are likely capable of doing. The next section describes how the projected number of jobs in each occupation is acquired, and how occupations are classified with respect to the ability of older workers to engage in those jobs.

Data and Methods

The goal of the analysis is to consider the projected number of jobs in different occupations in the U.S. economy alongside how well older workers can engage in those occupations. To this end, a number of different measures of each occupation are brought together to assess how many jobs each occupation is projected to have in 2030, on the one hand, and to generate an index of older workers' ability to perform each occupation, on the other.

The projected number of jobs in each occupation comes from the Bureau of Labor Statistics' (BLS) occupational projections. The BLS reports, for each occupation, how many

[3] On the physical side, abilities like explosive strength or flexibility are known to decline during the early 60s (Spirduso, Francis, and McRae 2005). On the cognitive side, "fluid" abilities such as episodic memory, working memory, and inductive and deductive reasoning – which people need to acquire new information and make decisions – steadily decline with age starting in a worker's 20s or 30s (Singh-Manoux et al. 2012; Salthouse 2012; and Gross et al. 2011).

[4] While workers generally experience declines in fluid cognitive ability, considerable variance exists between workers, as in Ylikoski et al. (1999).

jobs existed in 2020, how many more jobs it projects will be created by 2030, and various characteristics of the typical job in the occupation, such as median wages. The total number of jobs in 2030 and the change in jobs between 2020 and 2030 are our main outcome variables.

Are the Jobs Older Workers Doing Now Projected to Grow?

The most direct way to gauge the future demand for the labor of older workers is to examine whether the jobs they are currently performing are projected to be in high demand in the future. Answering this question is straightforward. Using the *Current Population Survey* (CPS), we estimated the share of each occupation's workers who were over age 55, and then correlated it with the projection of future jobs in each occupation.

A major limitation of this approach is that it captures the prospects of the occupations which *currently* employ many older workers, but not necessarily the occupations of those who *will be* older workers in ten years. For example, it may be the case that many older workers currently work in office administration jobs (which are projected to decline by 2030). However, the workers who will be over age 55 in ten years may not be working in those jobs. Furthermore, even those who are currently working in occupations projected to grow slowly may be able to transition to higher-demand occupations – if they can perform those tasks. The analysis therefore assesses the prospects of occupations classified not by their current share of older workers, but rather by the occupations' amenability to older workers.

Workers' Ability to Do the Work

The analysis considers three indicators of workers' ability to do work in an occupation: 1) CRR's Susceptibility Index; 2) rates of applications for disability within an occupation; and 3) average retirement age within an occupation.[5] The first indicator – CRR's Susceptibility Index – measures how likely the abilities important to an occupation are to decline with age, and is taken

[5] Two other measures were considered but were not included in the final analysis. First, the relative unemployment and discouraged worker rates for older versus younger workers yielded weak correlations, often with the "wrong" sign, likely because older workers experiencing an unemployment spell are more likely to simply retire than younger workers (thus not being counted as unemployed). Second, the rate of wage growth for older workers was considered; however, this measure is selected since those experiencing slow wage growth are likely to retire earlier than those with fast wage growth. A Heckman selection model was used to try to account for this, with either state income tax rates or the age gap with individuals' spouse as excluded variables. However, neither of these instruments proved sufficiently predictive in the first stage, failing to reach statistical significance.

directly from Belbase, Sanzenbacher, and Gillis (2017). Higher values of the index indicate occupations reliant on abilities that are more likely to decline with age.

The rate of disability applications is taken as a measure of the riskiness of occupations. The assumption is that risker occupations are particularly risky for older workers, who may be less physically robust and experience longer recovery times following injury.[6] This measure is calculated from the *Survey of Income and Program Participation* (SIPP) in the years 2004-2008.

The final measure is the average retirement age within occupations. The assumption here is that workers vote with their feet, and occupations where workers tend to remain until older ages are suitable for such long careers. The variable comes from the *Health and Retirement Study* (HRS) in the years 2004-2016.[7]

Classifying Occupations

The three measures of the suitability of jobs for older workers are estimated using disparate datasets, which have their own classification systems for occupations. The analysis therefore requires a set of occupations that are harmonized across the different data sources. To that end, the analysis divides all occupations into 26 categories.

This classification process has multiple objectives. First, it is partially determined by the crosswalks between different occupation classification systems. Different classification schemes in the different datasets constrain the ability to separate workers doing different jobs. Thus, the final classification is, in a sense, the "lowest common denominator" of the different classification systems.[8]

Second, some similar occupations with few workers were combined to ensure each occupation in the final analysis had sufficient sample size to calculate the various measures with

[6] Rutledge, Zulkarnain, and King (2019) found that jobs that require physical strength are most likely to lead to SSDI applications for older workers, indicating an inability to do the work safely.

[7] A few decisions were made regarding the precise definition of this variable. First, individuals who report multiple different occupations over the course of their involvement in the HRS were assigned their modal occupation. This choice prevents coding such respondents as holding their final job, which may be a bridge job (for the high prevalence of bridge jobs in recent cohorts see, for example, Cahill, Giandrea, and Quinn 2015; and Wettstein 2020). Respondents' retirement age is defined as their age in the first wave in which they reported being retired, and do not have any subsequent waves in which they report they are working again. Furthermore, within each occupation the stated retirement age was Winsorized at the 5th and 95th percentiles.

[8] For example, in the 2010-2018 crosswalk for Census occupation classifications, computer occupations are inextricably joined with project management specialists, which in turn leads to difficulty distinguishing computer scientists from event planners, leading some categories to include fairly disparate occupations; the analysis attempts to keep such unnatural combinations to a minimum.

reasonable statistical precision (e.g., enough observations to reliably estimate the average retirement age in the HRS sample). Finally, a few occupations were combined despite having sufficient sample sizes on their own due to their similarity (for example, "other" management occupations (SOC code 43-9) were joined to "all other" management occupations (SOC code 43). For more detail on the process of classifying occupations into the final list of 26 occupations, see Appendix 1.

The Suitability Index

Finally, the three measures are combined into a suitability index. This step both produces a convenient summary measure of which occupations are most congenial to older workers and helps preserve statistical power in this setting, in which the analysis is based on only a relatively small number of observations.

The index is calculated as the first principal component of susceptibility, SSDI applications, and average retirement ages. To give this measure meaningful units, it is standardized such that 0 represents an occupation of precisely average suitability for older workers, and a 1-unit change in the index corresponds to a 1-standard deviation change in suitability. Furthermore, the index is declining in suitability; that is, a higher value of the index indicates an occupation that is less suitable for older workers.

Descriptive Statistics

Table 1 presents descriptive statistics for the main variables of the analysis. Table 2 shows the linear correlations between the various measures of suitability. These correlations all have the expected signs: for example, occupations with higher susceptibility index values tend to have higher SSDI application rates and lower average retirement ages. Nevertheless, the correlations are generally far from 1, indicating that the different measures do capture different dimensions of occupation characteristics.

Analyzing the Suitability of Future Jobs for Older Workers

With these data in hand, the analysis is straightforward. Multivariate OLS regressions test the association of all three measures of older-worker suitability and the number of jobs projected for each occupation in 2030. Specifically, the following equation is estimated:

$$Employment\ Projection_i = \alpha + \beta_1 Susceptibility_i + \beta_2 SSDI\ Application\ Rate_i + \beta_1 Average\ Retirement\ Age_i + \varepsilon_i$$

In this equation, i indexes occupations.[9] The β coefficients provide the estimates of the associations between employment projections in 2030 (either levels or change relative to 2020 employment) on the left-hand side, and susceptibility of occupations to age-related decline, disability application rates, and the average retirement age, on the right-hand side. Therefore, if the occupations that are most suitable for older workers are projected to grow relatively slowly, β_1 and β_2 would be expected to be positive, while β_3 would be negative.

Because the sample is small, additional univariate regressions test the association of each measure and the outcome variables individually, as well as replacing all three measures with the suitability index. These univariate regressions help confirm that any null result is not due to a lack of degrees of freedom in estimating multiple coefficients.

For ease of interpretation, all the independent variables are standardized before inclusion in the regressions. Thus, coefficients can be interpreted as the association between a one-standard-deviation change in the independent variable and the outcome.

Results

A simple approach to assessing the job prospects for older workers is to examine whether the occupations in which they are currently employed are projected to grow faster or slower in the coming years. For this exercise, the full set of occupational SOC codes are used, because the analysis relies solely on the CPS, which provides a large sample of workers even in relatively specific occupations.[10]

The results of this preliminary analysis are in Table 3. For both the level of 2030 jobs and the change in jobs between 2020 and 2030, the occupations that currently have larger shares of older workers are projected to have fewer jobs in 2030. This alarming observation suggests a mismatch between the jobs older workers currently do and the jobs BLS believes will exist in ten years does. Such a mismatch could stymie efforts to further lengthen working lives.

[9] The regressions are unweighted, giving each occupation equal weight. Standard errors are robust to heteroskedasticity.

[10] Also, the only cross-classification link required is the Census-to-SOC, which leads to less coarsening of occupations due to imperfect linkages between classification systems.

However, the occupations older workers currently hold may not be the ones best suited for their abilities. As jobs in the occupations currently employing many older workers grow relatively scarce, older workers may find new roles in occupations that are suited to their abilities. Furthermore, it is important to remember that the older workers of 2030 are, in large part, the prime-age workers of today; the occupations of workers in their 40s and early 50s today may have a more robust outlook and these workers, also, may adjust their occupations as demand for different tasks shift in the coming years. The rest of the analysis thus focuses on the match between occupations suitable for older workers and those that BLS projects will be in high demand in the next decade.

To validate the suitability index, a helpful first step is to verify that the occupations it deems suitable for older workers do, in fact, employ high shares of older workers currently. Table 4 confirms this relationship. Each column correlates the share of older workers in the various occupations currently with the different components of the suitability index: susceptibility, SSDI application rates, average retirement ages, and, finally, the suitability index itself. All the signs of these correlations are in the expected directions, and they are all statistically significant at least at the 10-percent level, with the exception of the association of SSDI application rates and current older worker share. In the case of the suitability index, its association with the older worker share is significant at the 5-percent level.

Before describing the results of the analysis, some observations regarding the raw data are informative. These data are in Table 5, which lists all 26 occupations and their associated values for 2030 job projections and the various measures of suitability of the occupation for older workers. The table is sorted by the projected change in employment between 2020 and 2030.[11]

Table 5 alone suggests a mixed picture of whether the jobs of the future will be well suited to older workers. The occupation projected to have the greatest growth is health care support (including jobs like home health aides, nursing assistants, and medical assistants). This occupation is well below average in terms of suitability for older workers (1.2 standard deviations worse than average, based on the standardized suitability index). However, the

[11] Table 5 also shows that the suitability index accords with common sense: the worst occupations for older workers are maintenance, mining, and construction (in that order). The best are legal occupations, entertainment, and management.

occupation projected to have the second-fastest growth is "other white collar" (such as miscellaneous managers, market research analysts, and computer programmers). This group of occupations is 1.3 standard deviations *better* than average for older workers. No particular pattern immediately emerges when looking further down the list: food preparation and food servers are third and fourth places for job growth, respectively, and both are only mildly worse than average for older workers (less than one standard deviation each); fifth place is personal care which is almost exactly average in terms of suitability for older workers (0.1 standard deviation).

Table 6 shows the estimated association between all of the components of the suitability index and 2030 employment (in columns 1 and 2, for the level and change of employment, respectively). Overall, not surprisingly, none of the variables is significantly associated with 2030 employment outcomes, with one exception: the average retirement age, which is negatively associated with 2030 employment levels (but not changes relative to 2020). Given the large number of comparisons, finding one with significance at the 5-percent level may well be a type I error.[12]

Of course, with only 26 observations, degrees of freedom may be a concern when estimating multiple coefficients. To confirm that the generally null results in Table 6 are not due to this statistical limitation, Table 7 estimates univariate regressions for each of the three components of the suitability index and the 2030 employment outcomes. Once again, only the average retirement age of each occupation is significantly associated with these outcomes, and even then, only with 2030 employment levels, not with the change in employment relative to 2020.

A final test of this null result relies on the suitability index itself. This variable should capture the most informative variation of its three underlying components, and thus showing a null result with this index is the ultimate test of the hypothesis that future job growth is associated with suitability for older workers. Table 8 displays the results of the univariate regression of projected employment on the suitability index. Neither version of the outcome, levels or changes, shows a significant association with the index, although the point estimates are positive (consistent with less suitable occupations growing relatively faster).

[12] In unreported results, similar null findings hold when the outcome is defined as the percentage change in employment in 2030 relative to 2020.

In total, the analysis reveals a weak negative association between the suitability of occupations for older workers and the projected number of jobs in occupations in 2030. This association is generally not statistically significant. Relative to the concerning picture arising from the association between projected jobs and the occupations where older workers currently work, these findings are relatively reassuring.

Conclusion

The first two papers in this sequence of analyses looked at the labor market for older workers right now – how do employers say they value older workers compared to younger ones and what kinds of job listings are they posting that specifically target older workers?[13] Looking forward, a key question is how amenable will the labor market be to older workers in the future? This analysis addresses that question by linking projections of future demand for workers with the kinds of occupations that are a good fit for older workers. By analyzing the future demand alongside the *potential* future supply of older workers' labor, the analysis can go beyond merely looking at the jobs older workers do today to explore what they *could do* in 2030.

Overall, the findings are that broadly little association exists between the occupations that are suitable for older workers' abilities and those that are projected to demand the most labor in ten years. While a weak negative association was found between one measure of occupational suitability for older workers (the average retirement age in the occupation), other measures did not display a significant correlation with projected labor demand. This result is in spite of the fact that the occupations *currently* employing many older workers are projected to grow particularly slowly in the coming years. Thus, the results are relatively reassuring, suggesting that the jobs of the future will indeed be able to support an aging workforce.

[13] Munnell and Wettstein (2020) and Munnell, Wettstein, and Walters (2020).

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Table 1. *Summary Statistics*

	Mean	SD	Min	25%	Median	75%	Max
Employment level 2030 (thousands)	6,362.07	3,760.47	1,088.40	3,703.60	5,669.30	7,527.60	19,015.60
Employment change (2020-2030) (thousands)	456.87	486.14	-539.10	128.20	394.45	685.90	1,580.20
Susceptibility index	45.09	2.09	41.90	43.20	44.40	46.98	48.69
Share applying for SSDI	0.009%	0.004%	0.003%	0.007%	0.009%	0.012%	0.020%
Retirement age	67.06	1.43	64.28	66.40	66.83	67.91	70.14

Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 2. *Correlation Matrix*

	Susceptibility index	Share applying for SSDI	Retirement age	Suitability index
Susceptibility index	1			
Share applying for SSDI	0.634	1		
Retirement age	-0.278	-0.074	1	
Suitability index	0.907	0.842	-0.436	1

Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 3. *Share of Workers Age 55+ (SOC Codes)*

	(1)	(2)
Variables	Employment level 2030	Employment change 2020-2030
Share of workers age 55+ normalized	-38.89**	-6.67***
	(17.22)	(2.34)
Constant	212.78***	15.26***
	(16.99)	(2.25)
Observations	776	776
R-squared	0.01	0.01

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05.
Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 4. *Relationship Between the Suitability Index and the Share of Older Workers*

Variables	(1)	(2)	(3)	(4)
	Share age 55+	Share age 55+	Share age 55+	Share age 55+
Susceptibility index	-0.02**			
	(0.01)			
Share applying for SSDI		-0.01		
		(0.01)		
Retirement age			0.02*	
			(0.01)	
Suitability index				-0.02**
				(0.01)
Constant	0.23***	0.23***	0.23***	0.23***
	(0.01)	(0.01)	(0.01)	(0.01)
Observations	26	26	26	26
R-squared	0.20	0.05	0.08	0.18

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 5. *Full Dataset*

Title	Employment level 2030	Employment change 2020-2030	Susceptibility Index	Share applying for SSDI	Retirement age	Principal component 1
Office & administrative support	19,015.600	-539.100	43.442	0.009	66.715	-0.550
Retail workers	7,527.600	-331.000	44.329	0.013	67.905	0.200
Manufacturing	5,356.400	-49.200	47.243	0.010	64.276	1.379
Other production occupations	3,371.300	9.800	46.980	0.012	66.452	1.214
Farming, fishing & forestry	1,088.400	26.400	47.879	0.011	67.075	1.247
Legal occupations	1,445.100	116.600	41.896	0.006	69.868	-2.329
Sales representatives	6,663.000	128.200	42.910	0.009	68.766	-1.229
Architect & engineer	2,749.100	145.600	44.152	0.008	69.109	-1.048
Protective services	3,703.600	286.300	46.923	0.005	66.781	0.003
Social services	3,151.400	346.800	43.122	0.008	66.699	-0.834
Entertainment	3,011.200	349.300	44.465	0.006	70.140	-1.566
Teachers	4,471.100	364.500	43.204	0.004	64.999	-0.983
Maintenance	5,555.500	386.800	47.570	0.020	67.592	2.479
Lab workers	4,897.500	402.100	44.013	0.009	65.528	-0.067
Business & financial operations specialists	7,244.300	465.600	42.870	0.005	66.427	-1.272
Extraction/mining	8,694.100	552.400	48.619	0.015	65.587	2.365
Postsecondary education support	5,584.500	555.900	42.239	0.007	66.395	-1.121
Managers	7,701.300	618.100	43.098	0.007	68.258	-1.408
Transportation	5,754.100	622.500	47.685	0.011	68.323	0.865
Physicians	6,646.500	685.900	44.238	0.007	66.879	-0.597
Construction & installation	12,376.300	705.400	48.692	0.012	65.407	2.029
Personal care & service	5,290.900	873.300	45.582	0.010	67.399	0.137
Restaurant workers	7,342.000	1,119.700	46.034	0.009	66.979	0.332
Food preparation workers	6,478.500	1,147.800	46.442	0.012	67.588	0.807
Other white collar	11,876.600	1,308.700	43.475	0.003	65.878	-1.256
Health care support	8,418.000	1,580.200	45.225	0.016	66.573	1.204

Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 6. *Base Regression*

Variables	(1) Employment level 2030	(2) Employment change 2020-2030
Susceptibility index	-970.54	34.40
	(1,041.57)	(137.81)
Share applying for SSDI	869.80	2.50
	(646.89)	(168.46)
Retirement age	-1,399.16**	-50.88
	(644.16)	(80.15)
Constant	6,362.07***	456.87***
	(728.14)	(100.58)
Observations	26	26
R-squared	0.14	0.02

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05.
Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 7. *Singleton Regressions*

Variables	(1) Employment level 2030	(2) Employment level 2030	(3) Employment level 2030	(4) Employment level 2030	(5) Employment change 2020-2030	(6) Employment change 2020-2030	(7) Employment change 2020-2030	(8) Employment change 2020-2030
Susceptibility index	-29.79				50.13			
	(816.74)				(70.91)			
Share applying for SSDI		357.79				28.09		
		(594.08)				(106.29)		
Retirement age			-1,193.83**				-60.63	
			(557.74)				(72.26)	
Constant	6,362.07***	6,362.07***	6,362.07***	6,362.07***	456.87***	456.87***	456.87***	456.87***
	(752.67)	(749.28)	(713.76)	(747.01)	(96.79)	(97.14)	(96.55)	(96.67)
Observations	26	26	26	26	26	26	26	26
R-squared	0.00	0.01	0.10	0.02	0.01	0.00	0.02	0.01

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05.
Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Table 8. *Principal Component Regressions*

Variables	(1) Employment level 2030	(2) Employment change 2020-2030
Suitability index	461.30	55.49
	(687.17)	(77.19)
Constant	6,362.07***	456.87***
	(747.01)	(96.67)
Observations	26	26
R-squared	0.02	0.01

Notes: Robust standard errors in parentheses. *** p<0.01.
Source: Author's calculations based on the BLS (2020), the CPS (2015-2019), the HRS (2004-2016), the SIPP (2004-2008), and Belbase, Sanzenbacher, and Gillis (2017).

Appendix 1. The Occupation Classification System

The analysis used a set of 26 occupation groupings to discuss the relationship between projected job growth over the next decade and the suitability of jobs for older workers. The contents of each grouping are shown in Appendix Table A1, with exact definitions from the 2018 Standard Occupation Classification (SOC) system. These 26 occupation groupings were constructed specifically for this project, for two main objectives: comparing across datasets that used different occupation encoding systems, and ensuring that each occupation would have sufficient sample size in the data.

To this first goal, these 26 codes ensured that each of the six measures can be calculated on a comparable definition of occupations, as the individual measures used data from four different occupation encoding schemes. Employment growth was calculated from the BLS Employment Projections, which used the 2018 SOC codes, while the Susceptibility Index was defined using the 2010 O*NET-SOC codes. The remaining two measures – the average retirement age, SSDI transition risk – were calculated from the HRS and SIPP, both of which used Census occupation lists from 2002 and 2010. Each of those four occupation code lists make different choices about when to group jobs together in the same occupation code. Comparability required that each measure be calculated on a harmonized occupation list that groups two jobs whenever any one of the four lists do.[14]

The first step in constructing this project's occupation groupings was to find the most detailed harmonized occupation list. This harmonized list followed the grouping decisions of each of the four occupation code lists used in the data, as well as two additional lists: the 2019 O*NET-SOC codes and the 2018 Census code list. While neither was used in the data, they were necessary to compare the various occupation code lists as a direct crosswalk comparison only existed between the 2002 and 2010 Census code lists. The 2019 O*NET-SOC codes bridged the 2010 O*NET-SOC codes and the 2018 SOC codes, and the 2018 Census code list bridged the 2010 Census code list and the 2018 SOC codes.

[14] Small deviations from this principle were adopted in the end to avoid some final occupation groupings to be meaninglessly broad. For example, court reporters were classified as media occupations in the 2018 Census codes, however in 2010 they were in legal support. This led to a single occupational group containing both legal professions and entertainment. We decided to classify legal support together with other legal professions, at the cost of potentially including court reports as legal professionals rather than entertainers.

The second goal of the 26 codes was to ensure sufficient sample size in each occupation when calculating the measures of job suitability. Specifically, two measures – the average retirement age and SSDI transition risk – both required sufficient observations in their respective datasets for the point estimates to be meaningful. This step grouped similar occupations codes together with a target of about 2% of the workforce in the smallest groupings. Similarities were based on the 2018 SOC codes, which are represented as a six-digit number. The first two digits of the six-digit code represent 23 major groups, the first three represent 98 minor groups, and the first five represent 459 broad occupations. The harmonized occupations were grouped first at the five-, three-, then two-digit levels to make larger but internally similar occupation groups.

Appendix Table A1. *Crosswalk Between the SOC System and the Final Occupation Codes in the Analysis*

Final SOC name	SOC occupation code	Final occupation code	Final occupation name
Top executives	11-1000	11-XXXX	Managers
Advertising, marketing, promotions, public relations, and sales managers	11-2000	11-XXXX	
Farmers, ranchers, and other agricultural managers	11-9010	11-XXXX	
Construction managers	11-9020	11-XXXX	
Education and childcare administrators	11-9030	11-XXXX	
Architectural and engineering managers	11-9040	11-XXXX	
Food service managers	11-9050	11-XXXX	
Lodging managers	11-9080	11-XXXX	
Medical and health services managers	11-9110	11-XXXX	
Natural sciences managers	11-9120	11-XXXX	
Property, real estate, and community association managers	11-9140	11-XXXX	
Social and community service managers	11-9150	11-XXXX	
Emergency management directors	11-9160	11-XXXX	
Business operations specialists	13-1000	13-XXXX	Business & financial operations specialists
Management analysts	13-1110	13-XXXX	
Fundraisers	13-1130	13-XXXX	
Compensation, benefits, and job analysis specialists	13-1140	13-XXXX	
Training and development specialists	13-1150	13-XXXX	
Financial specialists	13-2000	13-XXXX	
Operations specialties managers	11-3000	15-XXXX	Other
Gambling managers	11-9070	15-XXXX	
Postmasters and mail superintendents	11-9130	15-XXXX	
Funeral home managers	11-9170	15-XXXX	
Miscellaneous managers	11-9190	15-XXXX	
Meeting, convention, and event planners	13-1120	15-XXXX	
Market research analysts and marketing specialists	13-1160	15-XXXX	
Miscellaneous business operations specialists	13-1190	15-XXXX	
Computer and mathematical occupations	15-0000	15-XXXX	
Architecture and engineering occupations	17-0000	17-XXXX	Architect & engineers
Life, physical, and social science occupations	19-0000	19-XXXX	Lab workers
Health technologists and technicians	29-2000	19-XXXX	
Other healthcare practitioners and technical occupations	29-9000	19-XXXX	
Community and social service occupations	21-0000	21-XXXX	Social services

Legal occupations	23-0000	23-XXXX	Legal occupations
Preschool, elementary, middle, secondary, and special education teachers	25-2000	25-2XXX	Teachers
Postsecondary teachers	25-1000	25-XXXX	Postsecondary education support
Other teachers and instructors	25-3000	25-XXXX	
Librarians, curators, and archivists	25-4000	25-XXXX	
Other educational instruction and library occupations	25-9000	25-XXXX	
Arts, design, entertainment, sports, and media occupations	27-0000	27-XXXX	Entertainment
Healthcare diagnosing or treating practitioners	29-1000	29-1XXX	Physicians
Healthcare support occupations	31-0000	31-XXXX	Health care support
Protective service occupations	33-0000	33-XXXX	Protective services
Food and beverage serving workers	35-3000	35-3XXX	Restaurant workers
Supervisors of food preparation and serving workers	35-1000	35-XXXX	Food preparation workers
Cooks and food preparation workers	35-2000	35-XXXX	
Other food preparation and serving related workers	35-9000	35-XXXX	
Building and grounds cleaning and maintenance occupations	37-0000	37-XXXX	Maintenance
Personal care and service occupations	39-0000	39-XXXX	Personal care & services
Supervisors of transportation and material moving workers	53-1000	39-XXXX	
Retail sales workers	41-2000	41-2XXX	Retail workers
Supervisors of sales workers	41-1000	41-XXXX	Sales representatives
Sales representatives, services	41-3000	41-XXXX	
Sales representatives, wholesale and manufacturing	41-4000	41-XXXX	
Other sales and related workers	41-9000	41-XXXX	
Office and administrative support occupations	43-0000	43-XXXX	Office & administrative support
Farming, fishing, and forestry occupations	45-0000	45-XXXX	Farming, fishing & forestry
Supervisors of construction and extraction workers	47-1000	47-XXXX	Extraction/ mining
Helpers, construction trades	47-3000	47-XXXX	
Extraction workers	47-5000	47-XXXX	
Material moving workers	53-7000	47-XXXX	
Construction trades workers	47-2000	49-XXXX	Construction & installation
Other construction and related workers	47-4000	49-XXXX	
Installation, maintenance, and repair occupations	49-0000	49-XXXX	

Food processing workers	51-3000	51-9XXX	Other production occupations
Other production occupations	51-9000	51-9XXX	
Supervisors of production workers	51-1000	51-XXXX	Manufacturing
Assemblers and fabricators	51-2000	51-XXXX	
Metal workers and plastic workers	51-4000	51-XXXX	
Printing workers	51-5100	51-XXXX	
Textile, apparel, and furnishings workers	51-6000	51-XXXX	
Woodworkers	51-7000	51-XXXX	
Plant and system operators	51-8000	51-XXXX	
Air transportation workers	53-2000	53-XXXX	Transportation
Motor vehicle operators	53-3000	53-XXXX	
Rail transportation workers	53-4000	53-XXXX	
Water transportation workers	53-5000	53-XXXX	
Other transportation workers	53-6000	53-XXXX	

Source: Authors' calculations.

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