CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

WHAT SHARE OF NONCOVERED PUBLIC EMPLOYEES WILL EARN BENEFITS THAT FALL SHORT OF SOCIAL SECURITY?

Jean-Pierre Aubry, Siyan Liu, Alicia H. Munnell, Laura D. Quinby, and Glenn Springstead

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Center for Retirement Research at Boston College
Hovey House
140 Commonwealth Avenue
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-0191
https://crr.bc.edu

Jean-Pierre Aubry is associate director of state and local research at the Center for Retirement Research at Boston College (CRR). Siyan Liu is a research economist at the CRR. Alicia H. Munnell is director of the CRR and the Peter F. Drucker Professor of Management Sciences at Boston College's Carroll School of Management. Laura D. Quinby is a senior research economist at the CRR. Glenn Springstead is a social science research analyst at the U.S. Social Security Administration. The research reported herein was pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium. The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, any agency of the federal government, or Boston College. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof. The authors thank Nilufer Gok and Nicolas Nastri for excellent research assistance.

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Center for Retirement Research at Boston College
Hovey House
140 Commonwealth Ave
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-0191
https://crr.bc.edu/

Affiliated Institutions:
The Brookings Institution
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Abstract

Social Security is designed to serve as the base of retirement support, to be supplemented by employer-sponsored plans. However, approximately one-quarter of state and local government employees – currently, around 5 million workers annually – are not covered by Social Security on their current job. Federal law allows these noncovered workers to remain outside of Social Security if their state or local plan provides comparable benefits. Since many public pensions have grown less generous in recent years, determining whether state and local plans currently provide comparable benefits is important.

The paper found that:

- All retirement plans for noncovered workers follow the letter of the law, but a significant number may still leave noncovered workers falling short of Social Security-equivalent resources in retirement.
- Medium-tenure workers who spend the early part of their career in noncovered government employment are at most risk.
- These workers represent only a fraction of the noncovered workforce so that, ultimately, about 16 percent of noncovered workers – representing between 750 thousand to 1 million employees annually – could be at risk.

The policy implications are:

- While only a fraction of noncovered workers are at risk of falling short, the problem is still serious. Social Security is intended to provide a minimum level of retirement income for all Americans. Thus, learning that between 750 thousand to 1 million noncovered workers annually could ultimately be at risk of not receiving that minimum is concerning.

Introduction

Social Security is designed to serve as the base of retirement support, to be supplemented by employer-sponsored plans. However, approximately one-quarter of state and local government employees – currently, around 5 million workers annually – are not covered by Social Security on their current job.[1] Federal law allows these noncovered workers to remain outside of Social Security if their state or local plan provides comparable benefits. Since many public pensions have grown less generous in recent years and a few plans could exhaust their assets, determining whether state and local plans currently provide comparable benefits is important.

To meet the comparability standard, the law requires that defined benefit (DB) plans – the dominant type of state and local plan – provide members with a benefit for life of equal value to the Primary Insurance Amount (PIA) that members would have received had they participated in Social Security. The benefit must start on or before Social Security's full retirement age (FRA). To help public plans determine whether they are in compliance, the government has established Safe Harbor provisions.

Even if the plans meet these legal requirements, noncovered state and local employees still may not receive Social Security-equivalent resources because they face long vesting periods and may not get full cost-of-living adjustments – albeit, they can claim full benefits earlier than under Social Security. Thus, a broader question is whether noncovered workers receive comparable benefits when measured in terms of lifetime wealth.

An earlier study (Quinby, Aubry, and Munnell 2020) concluded that while all state and local plans currently satisfy the letter of the law, 43 percent do not provide Social Security-equivalent resources for some hypothetical new hires. Specifically, in this stylized analysis, these plans fall short for workers who spend 6 to 20 years in noncovered employment before finishing their careers in a covered job.

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[1] While most studies agree that roughly a quarter of state and local workers are noncovered, the exact number of noncovered workers varies depending on the data source and definition of employment. Using the *Continuous Work History Sample*, Purcell (2021) estimates about 17.9 million workers with *most* of their annual earnings coming from state and local government employment and 4.7 million of these workers (26 percent) having noncovered state and local earnings. But, the *Continuous Work History Sample* also indicates 23.1 million workers with at least *some* annual earnings from state and local government employment and 6.6 million of these workers (28 percent) having some noncovered state and local earnings. Finally, the Census Bureau reports 19.6 million total state and local workers as of 2018 (14.7 million full-time and 4.9 million part-time), which would yield yet another estimate for the total number of noncovered workers.

This paper builds on the earlier study in three ways. First, using multiple datasets, it explores the tenure pattern of general employees, teachers, and public safety workers (mostly police and fire) to identify those potentially at risk. Second, it then uses the detailed tenure data to calibrate a model to evaluate the comparability of benefits in DB plans for workers with short, medium, and long tenure. Third, it expands the analysis beyond DB plans to assess the comparability of benefits in defined contribution (DC) and "hybrid" DB-DC plans for noncovered workers. Together, these three analyses provide the most comprehensive evaluation of the benefit status of noncovered workers to date.

The discussion proceeds as follows. The first section provides background on noncovered state and local workers. The second section summarizes the results to date from a 2020 study that represented an initial effort to address the extent to which noncovered workers do not receive benefits comparable to Social Security. The third section provides information on the tenure patterns of state and local workers. The fourth section describes the methodology for a more comprehensive analysis using a synthetic population of noncovered workers and then presents the results. The fifth section concludes that, ultimately, 16 percent of the noncovered workforce – representing between 750 thousand and 1 million employees annually – could be at risk of receiving less in retirement resources than what Social Security provides.

Background

The Social Security Act of 1935 excluded state and local employees from coverage because of constitutional ambiguity over the federal government's authority to impose payroll taxes on public employers and because these employees were already covered by DB pensions (Nuschler, 2021). Beginning in the 1950s, a series of amendments allowed government employers to enroll certain employees in Social Security, so that by 1991 most of them, upwards of 75 percent, were covered by the program. Today, public employees are permitted to remain outside of Social Security if their employer plan meets the IRS Employment Tax Regulations for sufficiently generous benefits. To meet the generosity standard, a plan must provide members with a benefit for life of equal value to the PIA that members would have received had they participated in Social Security. The benefit must start on or before Social Security's FRA, which was traditionally 65 but is now 67 for nearly all workers.

To help public plans determine whether they are complying with the law, the government has established Safe Harbor provisions. In general, benefits in DB plans are equal to a benefit factor multiplied by average final earnings and years of service. The Safe Harbor provisions assume the traditional retirement age of 65 and set a benefit factor that varies with the number of years included in the final earnings calculations. For example, if the plan bases benefits on the three years of highest earnings, it must have a benefit factor of 1.50 percent; if the averaging period is 5 years, the benefit factor must be 1.60 percent (see Table 1). The regulations also outline a Safe Harbor design for DC plans, requiring total contributions to equal at least 7.5 percent of salary annually (and that assets are managed according to fiduciary standards).

Despite the importance of the legal link between state and local pension generosity and Social Security coverage, the issue remains largely undiscussed. It is not clear that the benefits earned by newly hired state and local employees satisfy the Safe Harbor requirements due to recent reductions enacted by government plan sponsors. Moreover, due to years of inadequate contributions and two stock market downturns, many public sector DB plans have insufficient assets to cover their liabilities (Brown and Wilcox 2009; Novy-Marx and Rauh 2014; and Aubry, Crawford, and Munnell 2017).[2] In a scenario in which sponsors exhaust the assets in their pension trust funds and revert to pay-as-you-go, legal scholars question whether state legislatures could be forced to pay promised benefits in full (Monahan 2010 and 2017; Cloud 2011; and Reinke 2011). The federal generosity standards make no provision for an exhaustion scenario.

A First Look at Whether Benefits Meet Federal Standards

The investigation of noncovered benefits by Quinby, Aubry, and Munnell (2020) had three aims. The first was to assess whether retirement benefits for noncovered workers meet the Safe Harbor requirements for DB plans. The second was to investigate whether the Safe Harbor parameters produce retirement benefits at age 67 equivalent to the Social Security PIA. The third was to expand the analysis of noncovered benefits by investigating whether workers receive Social Security-equivalent resources *throughout* retirement. Below we summarize the results.

[2] Aubry, Quinby, Wandrei (2021) find that, despite the strong investment returns in 2021, public plans' long-term investment performance remains slightly below their expectations. Specifically, both covered and noncovered plans have underperformed their expectations by about 1 percentage point since 2001. While returns since 2001 have underperformed expectations, returns since 2010 (i.e., following the Global Financial Crisis) have exceeded expectations by over 2 percentage points.

Do Pension Benefits for Noncovered Workers Meet Safe Harbor Requirements?

To assess whether retirement benefits for noncovered new hires meet the Safe Harbor requirements for DB plans, Quinby, Aubry, and Munnell (2020) collected data on Social Security coverage from surveys of plan administrators and detailed benefit data from state and local plans' actuarial valuation reports.[3] Table 2 shows the relevant states and the percentage of workers in these states who are not covered. Social Security coverage in the surveyed states varied significantly by type of employment; while most teachers in these states lack Social Security coverage, only a third of general government employees are not covered (see Figure 1).

The review of actuarial reports produced information on both normal retirement ages (NRAs) and benefit structures for new hires in plans with noncovered workers. Although a couple of plans set their NRA older than the Safe Harbor benchmark of 65, no plan exceeded the current Social Security FRA and many allow for normal retirement at substantially younger ages, with a median age of 62. Similarly, the benefit structure was typically more generous than required by law (see Table 3). For example, among plans with a three-year final average salary period, the median benefit factor is 3.0 percent, whereas the Safe Harbor formula only requires 1.5 percent.[4] In short, the benefits earned by noncovered state and local new hires appear to satisfy the Safe Harbor requirements.

Do the Safe Harbor Designs Work?

To see whether the Safe Harbor parameters result in retirement benefits at age 67 equivalent to the Social Security PIA, the 2020 study compared two scenarios: 1) benefits from a Safe Harbor plan plus Social Security benefits for a worker who spends some of his career in noncovered employment and the rest in covered employment vs. 2) the Social Security benefits that this same worker would have received had they spent a whole career in covered employment. In the calculations, the benefit parameters for the Safe Harbor plan are the following: a 1.5-percent benefit factor, a 3-year final average salary, an NRA of 65, and no

[3] The surveys focused on large state-administered retirement systems identified by the U.S. Government Accountability Office (2010) as representing the bulk of noncovered state and local payrolls.
[4] On the DC side, the median total contribution rate (employer plus employee) is 18 percent of salary and the sample minimum is 10 percent, well above the Safe Harbor contribution requirement of 7.5 percent.

COLA. Because Safe Harbor regulations do not stipulate a vesting requirement, we assume immediate vesting.[5]

Figure 2 compares total annual benefit payment at age 67 from the two scenarios. The results show that the years worked in noncovered employment have little effect on age-67 benefits. That is, the scenario that combines a Safe Harbor-compliant pension with some Social Security (the solid red line) produces roughly the same total annual benefit payment at age 67 as the scenario with continuous Social Security coverage (the dashed gray line), regardless of the worker's assumed tenure in noncovered employment.

Do Noncovered Workers Get the Same Lifetime Benefits?

Although the plans for noncovered public employees satisfy the Safe Harbor requirements and the Safe Harbor achieves the goal of the Employment Tax Regulations, it is still not clear that the noncovered employees enjoy Social Security-equivalent resources *throughout* retirement.

Public pensions and Social Security differ in important ways that affect lifetime retirement resources. On the negative side, state and local plans often set very long vesting periods and are increasingly unlikely to grant full COLAs after retirement.[6] On the positive side, they allow members to collect full benefits at much younger ages than Social Security.

Incorporating these factors into the generosity test requires a conceptual transition from age-67 benefits to lifetime retirement wealth. Specifically, the new standard uses the following ratio:

$$\frac{Noncovered\ Pension\ Wealth + Covered\ Social\ Security\ Wealth}{Counterfactual\ Social\ Security\ Wealth}$$

Noncovered pension wealth is the present value of future state and local pension benefits from noncovered employment; covered Social Security wealth is the present value of Social Security benefits earned from covered employment (in either the public or private sector); and

[5] We assume the hypothetical worker enters government employment at age 35 (in 2028) with a $50,000 starting salary and that his or her wages rise by 3.8 percent annually. For more details on the methodology for this analysis, see Quinby, Munnell, and Aubry (2020).

[6] Vesting periods in noncovered state and local pensions are long relative to private sector DC plans (the most common plan type in the private sector).

counterfactual Social Security wealth equals the present value of the Social Security benefits that the worker *would have received* had they spent a full career in covered employment. If this "counterfactual wealth ratio" is less than one, the worker is worse off than if they had never entered noncovered employment.[7]

The results are presented in Figure 3, which shows that 43 percent of the evaluated plans without Social Security coverage have a counterfactual wealth ratio less than one, indicating insufficient generosity. Note that these calculations ignore the spousal and survivor benefits provided by Social Security, which would further reduce the counterfactual wealth ratio.

That said, the analysis also found that the percentage of plans falling short is sensitive to the employment patterns of the noncovered employees.[8] Using stylized representations of state and local workers, the analysis found that public plans are most likely to fall short for members who stay in their noncovered position for more than a few years but less than a full career. Specifically, 53 percent of plans fell short for a hypothetical worker who enters government employment at age 25, but only spends 12 years in government before leaving for the private sector.[9]

Work Patterns of Noncovered Workers

While the 2020 study provided a useful first look at whether benefits for noncovered workers meet federal standards, it also highlighted the importance of understanding the actual work patterns of state and local employees to ascertain the risk of noncovered workers falling short. This analysis draws on three publicly available longitudinal surveys and one large administrative database to investigate the employment patterns of state and local workers.

Data Sources

The first public-use survey used is the *National Longitudinal Survey of Youth 1979* (NLSY79). NLSY79 follows a nationally representative sample of individuals born between

[7] For details on the methodology for this analysis, see Quinby, Munnell, and Aubry (2020).
[8] Interestingly, the distribution of counterfactual wealth ratios does not appear to be sensitive to realistic variation in earnings levels.
[9] The analysis also found that new hires who spend only 5 years in government employment still accrue benefits at least as valuable as a career covered by Social Security if they spend at least 35 years in covered private sector employment. Prior analyses of the actuarial assumptions used by state and local pensions suggest that about 45 percent of new hires spend less than 5 years in state and local employment (Munnell et al. 2012a, 2012b; Quinby and Wettstein 2019).

1957 and 1964. The panel structure of the survey allows us to observe respondents continuously until their mid-to-late 50s, but the results are noisy due to small sample sizes and self-reporting error, and the survey does not contain information on Social Security coverage until 2002. This paper also relies on the *Panel Study of Income Dynamics* (PSID), which tracks a representative sample of families and their descendants from 1968 through the present. While the PSID follows many workers for much of their worklives, it also suffers from small sample sizes and reporting error, and lacks information on Social Security coverage.[10] The third public-use survey, the *Health and Retirement Study* (HRS), follows individuals who were born between 1931 and 1965 and their spouses in middle and older age. The number of years that respondents ever worked in state or local government, as well as their Social Security coverage, can be determined from questions about past work history. However, these recall questions are particularly vulnerable to reporting error.[11] Moreover, the HRS only asks state and local workers about their occupation starting in 2006.

In addition, this paper draws from the *Continuous Work History Sample* (CWHS), which overcomes many of the limitations of public-use surveys. A random 1-percent sample of all wage and salary workers maintained by the Social Security Administration, the CWHS follows a very large number of workers over their entire career and has authoritative data on Social Security coverage. Nevertheless, it still has two weaknesses for this analysis. First, it only records sector of employment starting in 1981, so older individuals have missing sector data in the early parts of their careers. And, second, it does not contain detailed information on occupation within state or local government.

Since each data source has advantages and disadvantages, the approach is to synthesize results across all of them. Specifically, the analysis tracks the lifetime work experience of individuals ages 55 to 70 in 2016 (born between 1946 and 1961) to determine the number of years that each worker spends in the state or local sectors, and at what age that period of employment occurs. In most instances, the different datasets yield similar conclusions. For example, Figure 4 shows that 21 to 36 percent of older workers in 2016 had spent at least some of their career in a state or local government job.

[10] The analysis of the NLSY and PSID is limited to respondents because data for spouses is much less reliable. Some older respondents in the PSID are missing early data because their careers started before 1968.
[11] In particular, workers with very short stints in state or local government may not bother to report them.

How Long Do Noncovered Workers Stay in Government Employment?

Table 4 reports the percentage of public sector workers falling into each tenure group – short (5 or fewer years); medium (6 to 20 years); or long (more than 20 years). Interestingly, the four data sources tell a similar story: around one-third of workers leave their government jobs with 6 to 20 years of tenure. Roughly 45 percent of workers only stay for 5 or fewer years, and roughly 25 percent are career employees.[12]

While Table 4 shows aggregate tenure patterns for the entire state and local workforce, the concern here is noncovered workers specifically. Hence, Table 5 contrasts the tenure distribution for covered and noncovered workers in the CWHS.[13] Noncovered workers tend to have longer tenures than their covered colleagues, but the basic conclusion is the same: around one-third of all noncovered workers leave their government jobs with 6 to 20 years of tenure.

When Does Government Employment Occur?

The final pay structure of the typical state and local government DB plan means that the timing of government employment matters as well as the duration.[14] Medium-tenure workers who join the government early in their careers watch the value of their benefits erode for decades, whereas those who spend the last years of their career in government employment enjoy benefits based on final average salary. Hence, it is important to determine the typical age at which medium-tenure state and local workers start their government jobs.

Table 6 presents the median entry age, by tenure, tabulated from the NLSY79, PSID, and HRS for all state and local workers.[15] The results indicate that many workers enter government in their mid-20s or early-30s, implying that medium-tenure workers often leave government in their 40s, and receive a pension that has declined in real terms.

However, these median entry ages also imply that half of medium-tenure workers join the government in midlife, and can retire from their government jobs with a larger pension.[16] Hence,

[12] These results align with Munnell et al. (2012) who conduct a similar exercise for younger cohorts of workers using the data published in public plan *Actuarial Valuations.*

[13] Recall that the CWHS is the most reliable source of data on Social Security coverage.

[14] The final pay structure (i.e., basing retirement benefits on salary received in the most recent years of employment) is common to virtually all DB plans in the United States, whether they be state and local government plans, corporate plans, or plans for federal government employees.

[15] This analysis includes both covered and noncovered workers because the CWHS is missing early employment data for the older cohorts in our analysis.

[16] Moreover, the CWHS data show that approximately 45 percent of medium-tenure workers have more than one employment stint in state and local government.

Table 7 presents the share of all state and local workers who are still working for government after age 55, by total tenure.[17] Intuitively, the table shows that around half of medium-tenure workers are still in the state and local sectors at older ages.

Table 8 reports tenure patterns for three groups of employees: K-12 teachers, public safety, and general employees (all others).[18] Although teachers and public safety workers do tend to stay longer in government, around one-third of each occupation is comprised of medium-tenure workers.

Overall, the tenure analysis shows meaningful variation in the entry age and tenure of state and local employment – with a significant minority of public sector employees being medium-tenure early-career workers.

What Share of Noncovered Workers Receive Social Security-Equivalent Benefits in Retirement?

Accurately estimating the share of noncovered workers that enjoy Social Security-equivalent resources requires a database of noncovered workers that adequately represents their real-world distribution across various benefit structures, tenures, and wage profiles. Because this type of ready-made database does not exist, a synthetic population of noncovered workers was constructed based on various sources of real-world data. This process involved four steps. The first step was to build a database of occupation-specific benefit structures for noncovered workers and estimate the share of noncovered workers in each benefit structure. The second step was to construct occupation-specific tenure archetypes and determine the share of government workers – by occupation – that fall into each archetype. The third step was somewhat mechanical – placing the constructed tenure archetypes within the appropriate benefit structures and apportioning the total noncovered workers in each benefit structure to the archetypes. The fourth step was to generate wage profiles for each tenure archetype within a benefit structure. Once the synthetic population was constructed, the final step was to analyze whether noncovered

[17] The NLSY79 is excluded from this analysis because it only observes workers ages 52 to 59 in 2016. The analysis includes both covered and noncovered workers for consistency with Table 6.

[18] This phase of the analysis relies on the NLSY and PSID, because the HRS and CWHS do not contain sufficiently detailed information. Hence, it includes both covered and noncovered workers. Since some workers switch public sector occupations – and Social Security coverage is based on an employee's occupation and/or job tenure – the analysis classifies workers by the occupational category in which they spend the most working years.

workers enjoy Social Security-equivalent benefits throughout retirement. Each step – and the results of the analysis – is described in detail below.

Step 1: Construct Database of Benefits Structures for Noncovered Workers

For the database of occupation-specific benefit structures, the sample of plans from the 2020 study was expanded to include several more noncovered DB plans from the *Public Plans Database* (PPD) and the largest noncovered plans that are not traditional DBs.[19] In total, the expanded sample includes 55 traditional DB plans, seven stand-alone DC plans (two for higher education only), three "hybrid" DB-DC plans, and one cash balance (CB) plan (see Table 9).[20] In 2020, these plans covered over 5 million state and local government employees and roughly $232 billion in annual earnings, representing about 80 percent of the noncovered state and local government workforce.[21]

Similar to the 2020 study, the database focuses on benefit structures for recently hired workers because they have the least generous pension benefits and therefore are at the greatest risk of falling short of Social Security-equivalent resources in retirement.[22] While just under half of the noncovered workforce currently falls under these less generous benefit structures, the vast majority will be covered under current benefits within 15 years.[23]

Unsurprisingly, the range of benefit structures among the 55 DB plans is similar to the 2020 study (see Table 10).[24] The NRA in the defined benefit plans never exceeds the Social Security FRA of 67 (for workers born after 1959), with the average NRA for noncovered workers being substantially younger for public safety employees. Teachers and general employees have average NRAs much closer to the FRA. The average vesting periods for noncovered general and public safety employees are 7 and 8 years, respectively. However, the

[19] Details on the occupation-specific benefit structures in non-covered government plans come from the Actuarial Valuation (AVs), websites, and benefit handbooks of the retirement plans. The number of non-covered workers in each benefit structure is based on data from Actuarial Valuations (AVs) and the Census of Governments.
[20] Although the current sample excludes 5 small DB plans from the prior sample because they are not in the PPD, the net change to the sample is an increase in plans and noncovered workers.
[21] The Government Accountability Office (2007) estimated total noncovered state and local government earnings of about $213 billion in 2007 and noncovered earnings for the sample of plans in this analysis was estimated to be about $175 billion at that time.
[22] Aubry and Crawford (2017).
[23] In the wake of the Global Financial Crisis (GFC), the majority of state and local pension plans cut benefits for new hires. Based on data in pension plan actuarial valuations, roughly 45 percent of the current state and local workforce was hired after 2010 and virtually all the future workforce in 2037 will have been hired after 2010.
[24] The range of benefits structures for the 55 DB plans is also generally consistent with Springstead (2021).

maximum vesting period exceeds 10 years. Such a long period means that many medium-tenure workers may leave their state and local job well before becoming vested. On average, benefit multipliers are typically more generous than those required by law. In terms of the COLA, 90 percent of noncovered general and public safety beneficiaries receive regular COLAs while only 35 percent of noncovered teachers do.

The DC plans in the database (which were not included in the 2020 study) only provide retirement benefits to the noncovered general employees and teachers, since public safety employees are much less likely to be offered a DC plan in general, whether they are covered or noncovered. The average contribution rate (i.e., employer plus employee) is 18 percent of salary for noncovered general employees and 15 percent for teachers. The minimum contribution rate is 13 percent, well above the federal requirement of 7.5 percent. For the one CB plan, the total contribution rate was 18 percent rate. The DB portion of hybrid plans have similar occupational patterns in NRA and vesting periods as the traditional DB plans, with public safety employees having much lower NRAs and general employees having NRAs very close to the FRA. Unsurprisingly, the DC portion of hybrid plans offers lower contribution rates than the stand-alone DC plans because noncovered workers in these hybrid plans also receive the DB benefits.

Step 2: Construct State and Local Employment Archetypes

For the employment archetypes, four types of state and local tenure were established – short, medium (early career), medium (late career), and long – based on the results of the tenure analysis. Next a prototypical work pattern for each type of tenure was constructed, specific to the government occupation of the worker (see Tables 11a and 11b). For example, a medium-tenure teacher who teaches early in their career is presumed to enter the labor force at 23 (after college), immediately start teaching, leave teaching for the private sector after 13 years, and then retire at age 58 – after 35 years in the labor force.

In general, teachers and public safety workers are presumed to enter government in their early to mid-twenties – a bit sooner than general employees who are presumed to begin in their late twenties.[25] The stint in state and local government employment varies depending on tenure

[25] Interestingly, the public-use data suggested that most early-career government workers enter government at age 29. However, because these datasets are heavily weighted toward general employees, the prototypical employment pattern for early career teachers and public safety workers presumes they begin government work a bit earlier.

type – with short-tenure employees spending only three years, medium tenure 13 years, and long-tenure at least 21 years. And, in terms of total time spent in the labor force, workers with short government tenure are presumed to spend 30 years in the labor force while all others spend 35 years. Tenure analysis using the CWHS suggested that those with shorter tenures in government also have fewer total years in the labor force.[26]

Finally, assumptions were made for the share of workers within each state and local occupation that fall into each of the four tenure types (see Table 12). Overall, about one-third of workers in each occupation are presumed to be medium tenure. However, roughly 55 percent of general employees are assumed to be short-tenure while about 40 percent of teachers and public safety workers are assumed to be long-tenure. The assumptions are consistent with the tenure analysis based on public-use data.

Step 3: Place Archetypes within the Appropriate Benefit Structures

The third step was to place each of the four occupation-specific tenure archetypes within the appropriate occupation-specific benefit structures for each plan. Once the archetypes were placed, the total number of noncovered workers in each benefit structure was apportioned to the four archetypes based on the occupation-specific assumptions regarding the distribution of workers in each archetype. Ultimately, this approach produced a synthetic population of noncovered workers reflecting a realistic distribution of their tenure patterns (see Table 13). For example, in our synthetic population, 40 percent of teachers are long-tenured and spend over 40 years teaching before exiting the labor force at age 65 – the average NRA for teacher plans. Similarly, just over 40 percent of public safety workers are long-tenured, but they exit the labor force at 57 because public safety plans tend to have younger NRAs. Finally, over 50 percent of general employees are short-tenure workers who ultimately exit the labor force at age 50, which reflects the lower overall time spent in the labor force for those with short government tenure.

[26] For analytical tractability, we assume that all time out of the labor force occurs at the beginning of the career (e.g., education) and end of the career (e.g., early retirement), rather than sporadically during the career (e.g., childrearing or unemployment).

Step 4: Generate Wage Profiles

The fourth step is to generate realistic wage profiles for the synthetic population. The profiles are based on tenure-specific earnings trajectories estimated from the CWHS (see Figure 5).[27] To produce the wage profiles for each archetype within a benefit structure, the CWHS earnings trajectories are anchored to actual government wages associated with each specific benefit structure. For example, the complete wage profile for a medium tenure (early-career) teacher within Texas TRS is anchored to the average teacher salary reported by Texas TRS for a teacher age 23 – the age at which such a worker is assumed to first enter teaching.[28] From this point, earnings trajectories in the CWHS are used to generate their salary at all other ages (spanning both private and public sector employment).

A summary of the wage profiles generated for the synthetic population is reported in Table 14. Teachers and public safety employees have much higher real wages during their government tenure and throughout their career than general employees. This disparity reflects the fact that average starting salaries for teachers and public safety workers are generally higher than general employees. Similarly, across all the government occupations, late-career medium-tenure workers tend to earn less than other tenure types because the average starting government salary for a late-career worker is often lower than that of an early-career employee.

Step 5: Calculate whether noncovered workers receive Social Security-equivalent resources

Completing steps 1 through 4 produces a synthetic population of noncovered workers that reflects their real-world distribution across various benefit structures, tenures, and wage profiles. The next step is to use this synthetic population to investigate whether some noncovered workers receive benefits throughout retirement that fall short of what they would have received from Social Security had their job been covered.

[27] Using the CWHS, real wage growth estimates are generated for individuals with three types of state and local tenure – short, medium, and long – by tracing median annual earnings (in CPI-adjusted 2020 dollars) over the lifecycle of workers in each tenure category. Because of data limitations in the CWHS, we focused on the younger cohorts (born 1958-1961). We also omitted workers with zero annual earnings from the calculation of the median at each age. To check for bias from workers with different earnings levels entering and exiting the labor force over the lifecycle, we also looked at within-individual earnings growth by age. The real growth rates from that analysis were qualitatively similar to the main analysis, but noisier.

[28] If the government retirement plan does not provide occupation-specific salary information by age, total average salaries for the occupation are used instead. The total average salary by occupation is based on data in the actuarial valuation of the plan or data on the average occupation-specific wage across all governments in the Census of Governments that participate in the plan.

A counterfactual wealth ratio is calculated for each tenure archetype within a specific benefit structure. In the case of DB plan benefit structures, the ratio is:[29]

$$\frac{Noncovered\ pension\ wealth + Covered\ Social\ Security\ wealth}{Counterfactual\ Social\ Security\ wealth,}$$

In the case of DC plan benefit structures, the methodology is similar, except that the numerator of the counterfactual wealth ratio includes the balance of state and local DC (or CB) wealth at the Social Security FRA.[30] The nominal return on DC assets is assumed to be 4.7 percent, reflecting the intermediate assumptions in the *2021 Social Security Trustees Report*.[31] The ratio becomes the following for DC/CB plan participants:

$$\frac{Remaining\ noncovered\ DC/CB\ wealth + Covered\ Social\ Security\ wealth}{Counterfactual\ Social\ Security\ wealth}$$

And, in the case of hybrid plan benefit structures, which have both a DB and DC component, the methodology is as follows:

$$\frac{Remaining\ noncovered\ DC\ wealth + Noncovered\ pension + Covered\ Social\ Security\ wealth}{Counterfactual\ Social\ Security\ wealth}$$

To translate the results into population-level statistics, they are weighted by the number of noncovered workers apportioned to each archetype within a benefit structure. This final step results in 53 percent of noncovered workers with a counterfactual wealth ratio of less than one (see Table 15). However, more than two-thirds of these workers are short-tenure employees with wealth ratios very close to one. As mentioned in the 2020 analysis, short-tenure workers spend

[29] The economic and mortality assumptions needed to estimate future benefits follow the intermediate assumptions of the *2021 Social Security Trustees Report*.

[30] The assumption is that workers who retire prior to their Social Security FRA use their DC assets to support themselves until their FRA. Short and medium tenure workers – who are assumed to be eligible for Social Security – draw down annual amounts equal to the expected Social Security benefit at their FRA. Long-tenure workers – who are not assumed to be eligible for Social Security – draw down annual amounts sufficient to completely self-annuitize their DC wealth over retirement. If the draw down for short, medium, or long-tenure workers results in DC assets being exhausted prior to the FRA, DC wealth in the counterfactual ratio is equal to zero.

[31] The analysis assumes that workers invest a portion of their DC savings in risky assets.

very little time in noncovered employment and should receive similar retirement income to the counterfactual – especially if they spend at least 35 years in covered employment. The fact that so many short-tenure workers fall slightly short in the synthetic population is mostly a product of the specific work pattern of the short-tenure archetype based on the CWHS data noted earlier – specifically, that these workers spend less than 35 years in the labor force – rather than pension plan benefit adequacy.[32]

Putting aside the population of short-tenure workers, the remaining workers that fall short represent just over 16 percent of the synthetic population and are primarily medium-tenure early career teachers and general employees.[33] As such, the main takeaway from the population analysis is that a significant minority of the noncovered workforce is at risk of receiving less retirement income than they would have from Social Security alone if they had spent their whole career in covered employment. Ultimately, once the less generous benefit provisions apply to all the noncovered workforce, this significant minority could represent between 750 thousand and 1 million workers annually.[34]

Conclusion

Analysis based on a synthetic population of noncovered workers confirms earlier results based on a sample of noncovered benefit structures – that medium tenure workers are at greatest risk of receiving lifetime retirement income that falls short of Social Security. However, because medium tenure workers represent a modest share of all noncovered workers, this translates to 16 percent of all noncovered workers at risk of receiving less retirement income than they would have from Social Security alone if they had spent their whole career in covered employment.

Although the share of workers falling short is not large, the problem is still serious. Social Security is intended to provide a *minimum* level of retirement income for all Americans.

[32] Because short-tenure workers in the synthetic population spend only 3 years in government employment, they are unlikely to have become vested in public DB pension before they leave state and local positions. If short-tenure workers are presumed to spend 35 years in covered employment, no teachers fall short while general employees and public safety fall short to a much lesser extent.

[33] Additionally, 60 percent of the plans fell short for medium tenure workers – consistent with the 53 percent of plans falling short for medium tenure workers in the 2020 analysis. The plans that do not fall short in this and the 2020 analysis are predominantly public safety plans.

[34] Before the onset of the pandemic, state and local employment had grown by roughly .5 percent per year since 2000. If employment returns to pre-Covid levels by 2023 and then grows by .5 percent annually for the next 15 years, the noncovered workforce will consist of just over 5 million workers once current benefits apply to most of them.

Covered public sector workers – and many private sector workers – augment their Social Security benefits with employer-sponsored retirement plans. Thus, learning that, ultimately, between 750 thousand and 1 million noncovered workers annually could be at risk of not receiving that minimum is concerning.

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Tables and Figures

Table 1. *Safe Harbor Minimum Benefit Factors for Defined Benefit Pension Plans*

Basis for final average earnings	Benefit factor
Highest –	
3 years	1.50%
4 years	1.55
5 years	1.60
6-10 years	1.75
More than 10 years	2.00

Source: IRS Revenue Procedure 91-40.

Table 2. *Percentage of State and Local Workers Noncovered in Sample States, 2018*

State	Percentage of workers noncovered
California	42%
Colorado	76
Connecticut	64
Georgia	22
Illinois	42
Kentucky	29
Louisiana	87
Massachusetts	100
Missouri	20
Nevada	100
Ohio	100
Texas	35

Sources: Authors' and NASRA surveys of plan administrators; U.S. Census Bureau, *Annual Survey of Public Employment and Payroll* (ASPEP); and other public sources.

Table 3. *Characteristics of Benefit Formulas for Noncovered State and Local New Hires in 2016*

Basis for final average earnings	# of benefit formulas	Benefit factor	
		Sample median	Safe Harbor requirement
Highest –			
1 year	1	3.00%	1.50%
2 years	1	2.00	1.50
3 years	22	3.00	1.50
5 years	33	3.00	1.60
6-10 years	8	2.00	1.75

Sources: Authors' and NASRA surveys of plan administrators and plan actuarial valuation reports.

Table 4. *Distribution of Worker Tenure in State and Local Government Across Four Data Sources*

Tenure	NLSY79	PSID	HRS	CWHS
1-5	54%	48%	33%	41%
6-20	30	31	37	32
21+	16	21	30	27

Note: Sample is limited to workers ages 55-70 in 2016 with some state or local employment during their career.
Sources: Authors' estimates from the NLSY79 (1979-2016); PSID (1983-2017); HRS (1992-2016); and CWHS (1981-2016).

Table 5. *Distribution of Worker Tenure in State and Local Government by Social Security Coverage*

Tenure	Covered	Noncovered
1-5	44%	33%
6-20	31	32
21+	25	35

Note: Sample is limited to workers ages 55-70 in 2016 with some state or local employment during their career. The table does not include workers who have both covered and noncovered tenure; these workers only comprise seven percent of the state and local workforce in the CWHS.
Source: Authors' estimates from the CWHS (1981-2016).

Table 6. *Median Age of Entry into State or Local Government, by Tenure*

Tenure	NLSY79	PSID	HRS
1-5	22	37	29
6-20	25	35	38
21+	23	27	25

Note: Sample is limited to workers ages 55-70 in 2016 who have some state or local employment during their career.
Sources: Authors' estimates from the NLSY79 (1979-2016) and HRS (1992-2016).

Table 7. *Share of Workers Employed by a State or Local Government at Ages 55 to 70*

Tenure	PSID	HRS	CWHS
1-5	12%	20%	17%
6-20	41	47	55
21+	73	69	93

Note: Sample is limited to workers ages 55-70 in 2016 who have some state or local employment during their career.
Sources: Authors' estimates from the PSID (1983-2017); HRS (1992-2016); and CWHS (1981-2016).

Table 8. *Distribution of Tenure in State and Local Government, by Occupation*

	Teachers		Public Safety		General	
Tenure	NLSY79	PSID	NLSY79	PSID	NLSY79	PSID
1-5	28%	20%	32%	26%	58%	55%
6-20	31	40	30	29	30	29
21+	40	40	38	45	12	16

Note: Sample is limited to workers ages 55-70 in 2016 who have some state or local employment during their career.
Sources: Authors' estimates from the NLSY79 (1979-2016) and PSID (1983-2017).

Table 9. *Summary of Noncovered Retirement Plans in Sample*

State	Plan	Social Security coverage	Payroll (billions)	Membership
CA	California PERF	Some	$19.7	702,229
CA	University of California	Some	0.5	10,362
CT	Connecticut Municipal	Some	0.2	6,882
CT	Connecticut SERS[a]	Some	1.4	38,243
GA	Georgia Teachers	Some	4.8	188,797
IL	Illinois SERS	Some	0.2	5,626
LA	Louisiana Parochial Employees	Some	0.6	22,308
TX	Texas Municipal[b]	Some	1.0	30,371
	Total -- Some Coverage		***$28.4***	***1,004,819***
CA	California Teachers	None	32.9	801,260
CA	LA County ERS	None	8.4	181,260
CA	Los Angeles ERS	None	2.2	55,254
CA	Los Angeles Fire and Police	None	1.6	27,155
CA	Los Angeles Water and Power	None	1.1	21,340
CA	Orange County ERS	None	2.0	47,197
CO	Colorado Municipal[c]	None	0.7	23,714
CO	Colorado School	None	5.1	215,154
CO	Colorado State[c]	None	3.0	103,969
CO	Denver Schools	None	0.7	24,815
CT	Connecticut Teachers	None	4.3	90,234
DC	DC Police & Fire	None	0.5	9,366
DC	DC Teachers	None	0.5	10,731
FL	Miami Fire and Police	None	0.2	4,219
GA	Atlanta ERS	None	0.2	7,021
GA	Atlanta Fire	None	0.1	2,056
GA	Atlanta Police	None	0.1	3,439
IA	Iowa Municipal Fire and Police	None	0.3	8,608
IL	Chicago Fire	None	0.5	9,853
IL	Chicago Municipal	None	1.8	76,440
IL	Chicago Police	None	1.2	27,831
IL	Chicago Teachers	None	2.2	67,538
IL	Illinois Teachers	None	10.5	303,373
IL	Illinois Universities[c]	None	3.5	236,039
KY	Kentucky Teachers	None	3.6	137,252
LA	Baton Rouge City Parish RS	None	0.1	6,766
LA	Louisiana Municipal Police	None	0.3	12,372
LA	Louisiana Schools	None	0.3	26,506
LA	Louisiana SERS	None	2.0	93,900
LA	Louisiana Teachers	None	4.1	175,681
MA	Boston RS	None	1.6	36,562
MA	Massachusetts SRS	None	6.4	156,846

MA	Massachusetts Teachers	None	7.1	161,213
ME	Maine State and Teacher	None	2.0	84,535
MI	Detroit Police and Fire	None	0.1	12,358
MO	Missouri Teachers	None	4.8	154,973
NV	Nevada Police Officer and Firefighter	None	1.1	22,979
NV	Nevada Regular Employees	None	5.7	173,585
OH	Cincinnati ERS	None	0.2	7,370
OH	Ohio PERS[d]	None	14.4	1,150,298
OH	Ohio Police & Fire	None	2.3	63,203
OH	Ohio School Employees	None	3.5	245,851
OH	Ohio Teachers[d]	None	12.3	346,225
OK	Oklahoma Fire	None	0.3	9,825
PA	Pittsburgh Police	None	0.1	2,445
TX	Houston Firefighters	None	0.3	7,451
TX	Houston Police	None	0.5	9,819
TX	Texas Teachers[e]	None	47.4	1,427,734
VA	Fairfax County Police	None	0.1	2,663
	Total -- No Coverage		$204.0	***6,886,278***
	Total -- Full Sample		$232.3	***7,891,097***

[a] This retirement system enrolls new members into a hybrid DB/DC plan, but allows state teachers and other professional staff at higher-ed institutions the option to enroll in a DC plan instead.
[b] This retirement system is a cash balance plan.
[c] This retirement system offers plan members the option to enroll in either a traditional DB plan or a stand-alone DC plan.
[d] This retirement system offers plan members the option to enroll in either a traditional DB plan, a stand-alone DC plan, or a hybrid DB/DC plan.
[e] This retirement system enrolls new members into a traditional DB plan, but gives state teachers and other professional staff at higher-ed institutions the option to enroll in a DC plan instead.
Note: For plans with "some" Social Security coverage, the payrolls and membership data reported in this table were calculated by applying the share plan members estimated to be noncovered (obtained from a private survey of plan administrators done by NASRA or direct communications with plan administrators by the CRR) to the plan's total membership and payroll.
Sources: Authors' calculations based on the PPD, government and retirement system financial reports, plan websites, and direct communications with plan administrators.

Table 10. *Summary of Benefit Structures for Noncovered Workers, 2020*

Benefit Structure	General Employees			Teachers			Public Safety		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Defined Benefit Plans									
NRA	65.8	55	67	63.8	55	67	57.0	49	67
Vesting Period	7.1	5	15	5.4	5	10	8.3	4	15
Benefit Multiplier									
FAS Period = 1 Year	-	-	-	-	-	-	2.7%	2.5%	3.0%
FAS Period = 2 Years	-	-	-	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
FAS Period = 3 Years	2.3%	1.5%	2.5%	2.1%	1.5%	2.5%	2.2%	2.0%	3.0%
FAS Period = 4 Years	-	-	-	-	-	-	-	-	-
FAS Period = 5 Years	2.3%	2.2%	3.0%	2.3%	1.8%	2.5%	2.1%	1.5%	3.0%
FAS Period = 6+ Years	2.3%	1.0%	2.4%	2.2%	2.0%	2.2%	2.0%	1.0%	2.5%
COLA									
% of workers w/o COLA	92.9%	0	1	34.8%	0	1	94.3%	0	1
% of workers w/simple COLA	35.9%	0	1	23.0%	0	1	14.2%	0	1
COLA rate (for % w/ COLA)	2.2%	1.0%	3.0%	1.8%	1.0%	2.4%	2.2%	1.0%	3.0%
Defined Contribution Plans									
Contribution Rate	17.6%	13.0%	20.1%	14.9%	14.0%	24.0%	-	-	-
Vesting Period	4.6	0	5	2.3	2	5	-	-	-
Hybrid Plans									
NRA	65.6	65	67	60.0	60	60	50.0	50	50
Vesting Period	8.6	5	10	5.0	5	5	10.0	10	10
Benefit Multiplier									
FAS Period = 1 Year	-	-	-	-	-	-	-	-	-
FAS Period = 2 Years	-	-	-	-	-	-	-	-	-
FAS Period = 3 Years	-	-	-	-	-	-	-	-	-
FAS Period = 4 Years	-	-	-	-	-	-	-	-	-
FAS Period = 5 Years	1.2%	1.0%	1.3%	1.0%	1.0%	1.0%	2.5%	2.5%	2.5%
FAS Period = 6+ Years	-	-	-	-	-	-	-	-	-
COLA									
% of workers w/o COLA	100%	1	1	0%	0	0	100%	1	1
% of workers w/simple COLA	27.9%	0	1	0%	0	0	0%	0	0
COLA rate (for % w/ COLA)	2.1%	2.0%	2.4%	-	-	-	2.0%	2.0%	2.0%
DC Plan - Contribution Rate	4.2%	2.0%	10.0%	12.0%	12.0%	12.0%	2.0%	2.0%	2.0%
DC Plan - Vesting Period	2.2	0	3	0	0	0	3	3	3
Cash Balance Plans									
Contribution Rate	18.0%	18.0%	18.0%	-	-	-	-	-	-
Guaranteed interest rate	5.0%	5.0%	5.0%	-	-	-	-	-	-

Note: Means are weighted by the share noncovered workers in each benefit structure.
Sources: Authors' calculations from CRR synthetic noncovered worker population.

Table 11a. *Tenure Archetypes for Workers in Traditional DB plans, by Occupation*

	Tenure in State and Local Government			
Occupation	**Short**	**Medium (early career)**	**Medium (late career)**	**Long**
Teacher	- Joins govt. after college at age 23. - 3 years in govt. (NLSY and PSID). - 30 years in the labor force (CWHS). - Retires age 53.	- Joins govt. after college at age 23. - 13 years in govt. (NLSY and PSID). - 35 years in the labor force (CWHS). - Retires age 58.	- Joins private sector after college at age 23. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA.	- Joins govt. after college at age 23. - Retires the later of: 1) the NRA *or* 2) 21 years of govt. tenure.
Public Safety	- Joins private sector age 20.[35] - Joins govt. age 25 (NLSY, PSID, and HRS).[36] - 3 years in govt. (NLSY and PSID). - 30 years in the labor force (CWHS). - Retires age 50.	- Joins private sector age 20. - Joins govt. at age 25 (NLSY, PSID, and HRS). - 13 years in govt. (NLSY and PSID). - 35 years in the labor force (CWHS). - Retires age 55.	- Joins private sector age 20. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA.	- Joins govt. age 20. - Retires the later of: 1) the NRA *or* 2) 21 years of govt. tenure.
General	- Joins private sector age 20. - Joins govt. age 29 (NLSY, PSID, and HRS). - 3 years in govt. (NLSY and PSID). - 30 years in the labor force (CWHS). - Retires age 50.	- Joins private sector age 20. - Joins govt. age 29 (NLSY, PSID, and HRS). - 13 years in govt. (NLSY and PSID). - 35 years in the labor force (CWHS). - Retires at age 55.	- Joins private sector age 20. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA.	- Joins govt. age 20. - Retires the later of: 1) the NRA *or* 2) 21 years of govt. tenure.

Source: Authors' assumptions based on plan design features from *Actuarial Valuation Reports* and tenure patterns tabulated from the NSLY, HRS, PSID, and CWHS.

[35] The labor-force entry age of 20 assumes that some workers only have a high school degree while others have a Bachelor's degree.

[36] On average, the NLSY, PSID, and HRS indicate that early-career workers enter the government at age 29. However, these datasets are heavily weighted toward general employees. This analysis assumes that protective service officers start their government jobs a bit earlier.

Table 11b. *Tenure Archetypes for Workers Not in Traditional DB plans, by Occupation*

	Tenure in State and Local Government			
Occupation	**Short**	**Medium (early career)**	**Medium (late career)**	**Long**
Teacher	- Same as DB assumptions.	- Same as DB assumptions.	- Joins private sector after college at age 23. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA of associated DB plan.	- Joins govt. after college at age 23. - Retires the later of: 1) the NRA of associated DB plan *or* 2) 21 years of govt. tenure.
Public Safety	- Same as DB assumptions.	- Same as DB assumptions.	- Joins private sector age 20. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA of associated DB plan.	- Joins govt. age 20. - Retires the later of: 1) the NRA of associated DB plan *or* 2) 21 years of govt. tenure.
General	- Same as DB assumptions.	- Same as DB assumptions.	- Joins private sector age 20. - Enters govt. 13 years before NRA. - 13 years in govt. (NLSY and PSID). - Retires at NRA of associated DB plan.	- Joins govt. age 20. - Retires the later of: 1) the NRA of associated DB plan *or* 2) 21 years of govt. tenure.

Note: All DC and Hybrid plans have an "associated DB plan." For Hybrid plans, the "associated DB plan" is the DB portion of the hybrid. For stand-alone DC plans, the "associated DB plan" is the traditional DB plan provided by the government retirement system.
Source: Authors' assumptions based on plan design features from *Actuarial Valuation Reports* and tenure patterns tabulated from the NSLY, HRS, PSID, and CWHS.

Table 12. *Share of Workers in Each Tenure Archetype, By Occupation*

	Short	Medium (early career)	Medium (late career)	Long	Total
Teacher	24%	18%	18%	40%	100%
Public Safety	29	15	15	42	100
General	57	15	15	14	100

Source: Authors' assumptions based on tenure patterns tabulated from the NSLY, HRS, and PSID.

Table 13. *Work Patterns for the Synthetic Population of Noncovered Workers*

		Mean				
	Share of noncovered Population	Entry age for labor force	Entry age for S/L work	Total years of S/L work	Total years in labor force	Retirement age from labor force
Teachers						
Short-tenure	13%	23	23	3	30	53
Medium-tenure: early career	10	23	23	13	35	58
Medium-tenure: late career	10	23	51	13	41	64
Long-tenure	22	23	23	41	41	64
Public Safety						
Short-tenure	2	20	25	3	30	50
Medium-tenure: early career	1	20	25	13	35	55
Medium-tenure: late career	1	20	44	13	37	57
Long-tenure	3	20	20	37	37	57
General Employees						
Short-tenure	21	20	29	3	30	50
Medium-tenure: early career	6	20	29	13	35	55
Medium-tenure: late career	6	20	52	13	45	65
Long-tenure	5	20	20	45	45	65

Source: Authors' calculations based on CRR synthetic population of noncovered workers.

Table 14. *Wage Data for the Synthetic Population of Noncovered Workers, in 2020 Dollars*

	Share of noncovered population	Career average real wage growth rate	S/L average wage	Average career wage
Teachers	56.0%	2.4%	$58,728	$65,600
Short-tenure	13.4	3.0	35,762	61,972
Medium-tenure: early career	10.1	1.8	46,210	53,642
Medium-tenure: late career	10.1	1.5	39,874	35,673
Long-tenure	22.4	2.6	86,625	86,625
Public safety	6.0	4.2	66,906	69,663
Short-tenure	1.8	4.6	50,436	63,254
Medium-tenure: early career	0.9	3.3	54,420	56,189
Medium-tenure: late career	0.9	3.2	54,446	46,159
Long-tenure	2.5	4.7	87,283	87,283
General employees	37.9	4.0	44,182	43,786
Short-tenure	21.4	4.6	42,116	43,072
Medium-tenure: early career	5.6	3.3	39,270	38,260
Medium-tenure: late career	5.6	2.6	39,129	33,794
Long-tenure	5.3	3.8	63,016	63,016

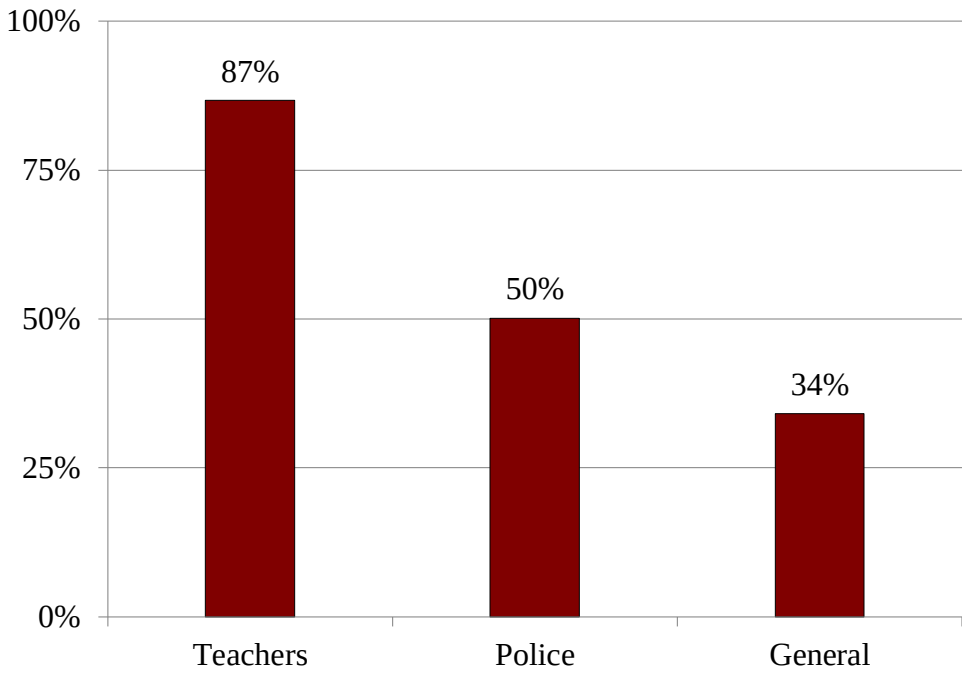
Source: Authors' calculations based on CRR synthetic population of noncovered workers.

Table 15. *Counterfactual Wealth Ratios for the Synthetic Population of Noncovered Workers*

Occupation and worker type	Share of noncovered population	Percent falling short (wealth ratio < 1)	Counterfactual wealth ratio			
			Mean	SD.	Min.	Max.
All noncovered S/L workers	100.0%	52.8%	1.293	0.552	0.663	5.978
Teachers	56.0	41.1	1.377	0.519	0.784	3.142
Short-tenure	13.4	99.8	0.955	0.004	0.949	1.010
Medium-tenure: early career	10.1	93.0	0.872	0.051	0.784	1.130
Medium-tenure: late career	10.1	2.1	1.192	0.149	0.986	1.516
Long-tenure	22.4	0.0	1.939	0.330	1.160	3.142
Public safety	6.0	38.2	1.793	1.067	0.740	5.978
Short-tenure	1.8	100.0	0.943	0.007	0.930	0.964
Medium-tenure: early career	0.9	47.6	1.035	0.168	0.742	1.739
Medium-tenure: late career	0.9	11.6	1.385	0.326	0.740	2.740
Long-tenure	2.5	1.2	2.801	0.955	0.820	5.978
General employees	37.9	72.4	1.089	0.363	0.663	3.927
Short-tenure	21.4	99.7	0.930	0.016	0.894	1.003
Medium-tenure: early career	5.6	97.3	0.851	0.090	0.663	1.277
Medium-tenure: late career	5.6	10.8	1.282	0.201	0.865	1.770
Long-tenure	5.3	1.4	1.777	0.464	0.711	3.927

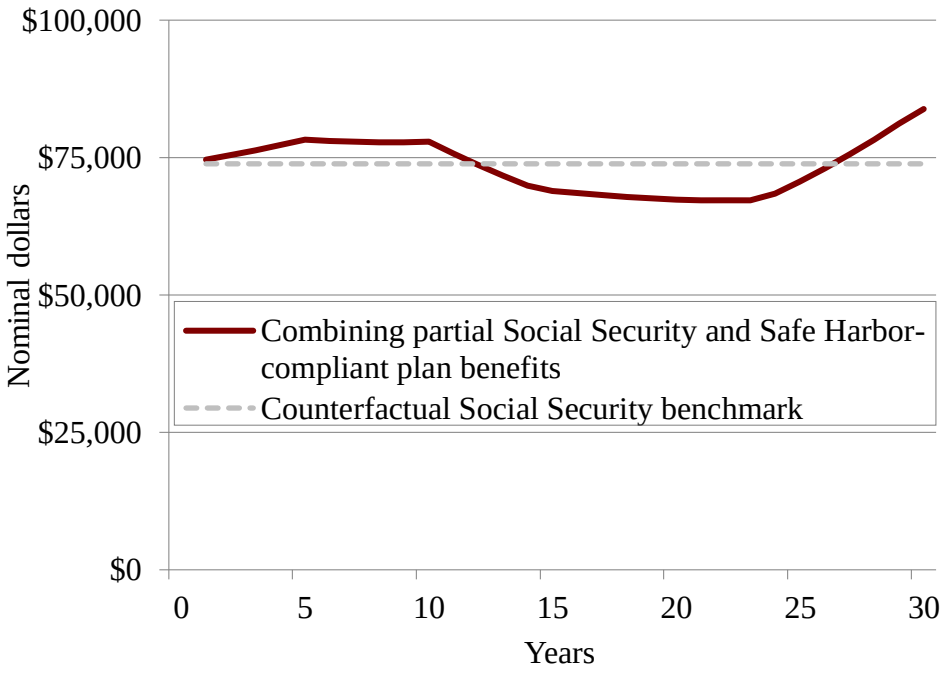
Source: Authors' calculations based on CRR synthetic population of noncovered workers.

Figure 1. *Percentage of State and Local Workers Noncovered in Sample States, by Occupation, 2018*



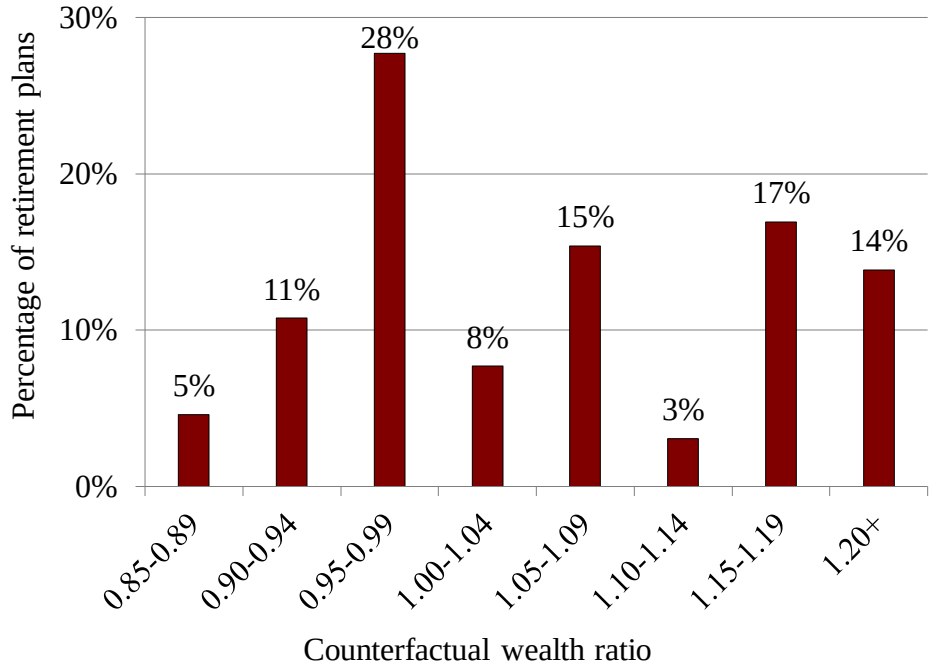
Sources: Authors' and NASRA surveys of plan administrators; ASPEP; and other public sources.

Figure 2. *Estimated Retirement Benefit Under Two Scenarios for a Hypothetical New Worker Age 25 in 2018, by Years in Noncovered Employment*



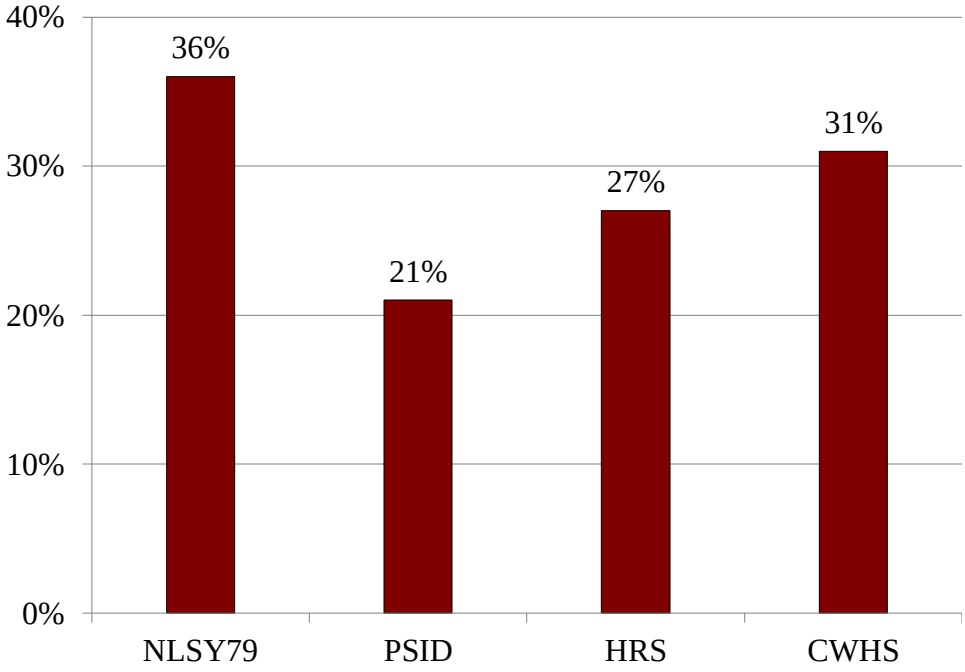
Source: Authors' calculations.

Figure 3. *Distribution of State and Local Plans, by Counterfactual Wealth Ratio, 2018*



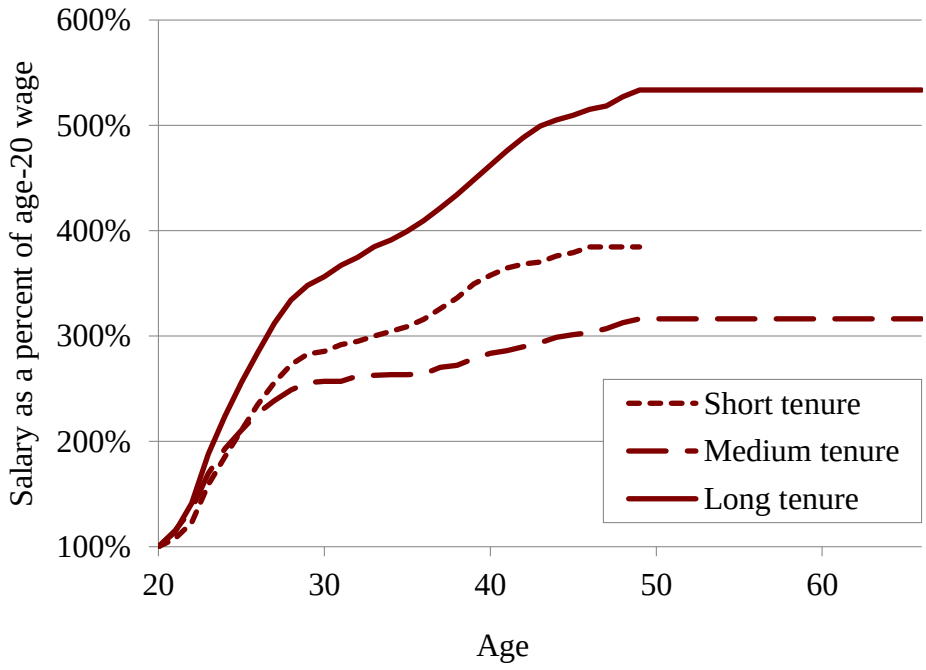
Note: Numbers do not add to 100 percent due to rounding.
Source: Authors' calculations based on plan actuarial valuation reports.

Figure 4. *Likelihood of Ever Having Worked for State or Local Government*



Note: The figure shows the percentage of older workers in 2016 who worked for state or local government at some point in their career.
Sources: Authors' estimates from the NLSY79 (1979-2016); PSID (1983-2017); HRS (1992-2016); and CWHS (1981-2016).

Figure 5. *Illustrative Real-Wage Trajectories, by State and Local Tenure*



Source: Authors' calculations based on the CWHS.

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