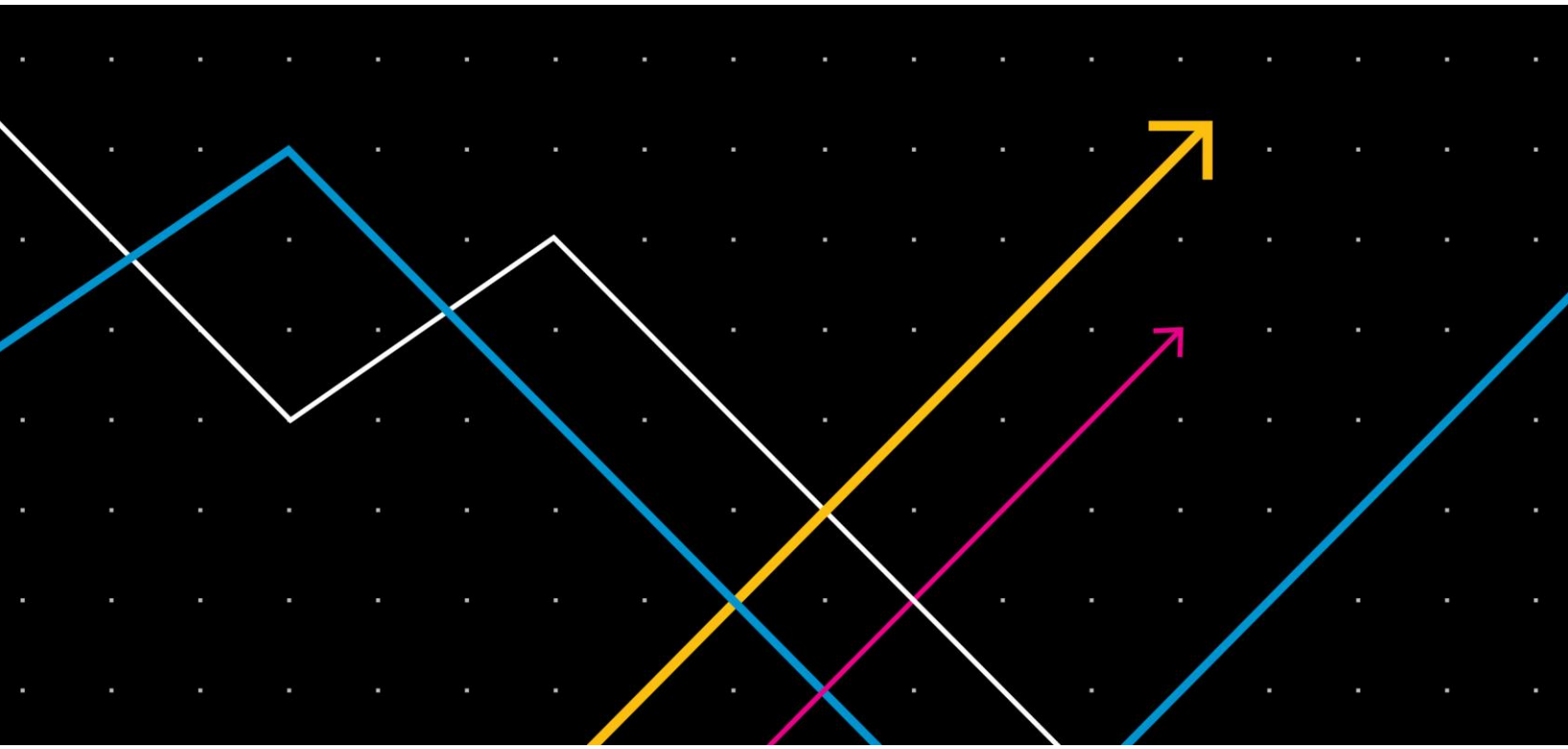

RESEARCH REPORT

The Challenges Facing Arizona Teachers' Retirement Plan

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We are also grateful to the Terry Group for providing us with an actuarial model for the Arizona State Retirement System.

The Challenges Facing Arizona Teachers' Retirement Plan

Arizona public school teachers participate in the Arizona State Retirement System (ASRS), which covers most of Arizona's state and local government employees except those engaged in public safety. The system provides employees with retirement, health, and disability benefits, funded by contributions from employees and their employers. Initial retirement benefits are set by a formula that depends on employees' final average salary and years of service and then adjusts with the cost of living. In 2018, the system paid almost $3 billion in benefits to about 142,000 retirees (ASRS 2017a). The system covers another 210,000 employees and 233,000 inactive plan members who no longer work in the public sector in Arizona but are entitled to future benefits based on their past service.

Arizona's retirement system faces significant challenges. The fund that finances retirement benefits for state employees is insufficient. Under current benefit rules and contribution levels, the plan actuaries calculate that the system now holds enough funds to cover only 71 percent of future benefit obligations (ASRS 2017b). The plan's true financial situation is likely even worse, because these calculations are based on overly optimistic assumptions about how much the plan assets will earn over time. Unless lawmakers reform the state pension system, this deficit will force them to raise plan contributions, necessitating higher taxes or the diversion of scarce resources from other pressing state priorities.

Another shortcoming of teacher pensions, in addition to cost concerns, is that they are ill suited to a changing workplace. Nearly all plan designs reward long-serving teachers but provide few benefits to those who spend less than a full career in a plan. Because all types of workers, including teachers, are increasingly moving from job to job over their career, most teachers do not benefit much from their plan, earning only a meager pension worth no more than their own contributions or failing to qualify for a pension at all (Aldeman and Johnson 2015). Reforms could distribute pension benefits more equally across the workforce. Moreover, pension plans generally penalize those teachers who remain in the classroom past their retirement age, often set as early as 55, because they forfeit a pension check each month that they remain employed after qualifying for retirement. These early retirement incentives are particularly problematic as the population ages. As teacher pension reform becomes increasingly urgent in Arizona, policymakers, teachers, school administrators, and other stakeholders need timely, rigorous, and objective analysis of existing plans and the potential impact of various reform options.

This report examines the challenges facing Arizona teachers' retirement plan. Using an actuarial model for the state developed by the Terry Group, we estimate how much taxpayer contributions to ASRS will likely have to increase over coming years to close the system's financing gap under current benefits rules and various investment return scenarios. We also simulate the distribution of future retirement benefits to newly hired teachers. Our results show that if the current benefit structure does not change, annual employer contributions to ASRS may have to more than double in coming years to make the system solvent.

How Do Teacher Pensions Work?

The two most common retirement plan designs covering American workers are defined-benefit (DB) and defined-contribution (DC) plans. Most public school teachers and state government employees are enrolled in final average salary DB plans, which provide workers with a guaranteed benefit upon retirement paid as a lifelong annuity. Specific provisions vary widely across jurisdictions, but most retirement systems, including ASRS, use the following basic formula to calculate the retirement benefit:

$$\text{Benefit} = \text{Multiplier} \times \text{Years of Service} \times \text{Final Average Salary}$$

The multiplier is a percentage set by a state or an employer, years of service is the number of creditable service years that an employee has earned upon separation, and final average salary (FAS) is the average salary earned by an employee over the last few years of his or her career, often defined as the final three or five years. (Some plans specify the FAS as the average of the highest 3 or 5 years of earnings over a career or over the final 10 years of a career.) Consider a new teacher who reaches the normal retirement age with 20 years of service and a final average salary of $75,000. If her plan multiplier is 2 percent, her unreduced annual benefit at retirement would be $30,000 ($2,500 a month). Employees may begin collecting a pension once they satisfy the plan's retirement eligibility criteria, typically defined by some combination of age and years of service. Most plans allow members who separate before meeting the plan's normal retirement eligibility criteria to receive permanently reduced monthly benefits as long as they satisfy the age and years of service requirements for early retirement benefits. Lifetime pension benefits often fall when members continue working after they qualify for full retirement benefits, because the additional monthly benefits they earn from continued employment are insufficient to make up for the fewer payments they receive by delaying retirement.

Most state pension plans, including ASRS, must be actuarially funded, requiring plans to set aside some money today to cover future benefits as they accrue. Plans are funded by contributions from

employers and generally employees that earn investment returns. The amount that must be set aside each year depends on uncertain assumptions about how long members will remain in the plan, how fast their salaries will grow, how long they will live after retiring, and how much plan contributions will earn in investment returns. Many state pension plans assume an annual rate of return on plan assets between 7 and 8 percent. If these assumptions turn out to be overly optimistic, because actual investment returns fall short of expectations, for example, or because retired members live longer (and collect retirement benefits longer) than expected, the plan will become underfunded. A plan can also become underfunded if it fails to make its required contributions as determined by its trustees.

In contrast to DB plans, DC plans do not guarantee members a certain benefit. DC plans receive contributions from employers and employees and invest these contributions in accounts usually controlled by individual plan members. Upon separation, employees receive the value of their retirement account as a lump-sum payment or series of payments, depending on the market performance of the funds in which the account was invested. Some DC plans allow members to convert their account balances into a lifelong annuity.

Several states now offer their employees retirement plans that combine features of a DB plan with elements of a DC plan (Center for State and Local Government Excellence 2011). Hybrid plans supplement a relatively small DB component with a DC component, and employees and employers generally split their contributions between the two components. Another increasingly popular option is a guaranteed return plan. These plans are individual accounts, similar to DC plans, to which both employees and employers generally contribute. Similar to DC plans, they provide members with notional individual accounts, and they express the retirement benefit as the balance in the account. That balance increases over time with employee and employer contributions and investment returns. The plans guarantee members a minimum investment return, but they also typically limit interest credits when investment returns are unusually high. Guaranteed return plans allow retirees to convert their account balances into a lifelong annuity, as in DB plan designs.[1]

Overview of the Arizona State Retirement System

The Arizona state legislature created ASRS in 1953 as a DC plan. Its purpose was to provide retirement benefits to a wide range of state employees. Arizona teachers originally belonged to the Teachers' Retirement System but voted to join ASRS in 1954. In 1970, the state legislature created a DB plan that eventually became the dominant retirement component for most ASRS members.

The DB plan follows a cost-sharing approach in which employees and employers make the same contribution, defined as a fraction of employee salary. In 2018, the contribution rate was 11.34 percent; it rose to 11.64 percent in fiscal year 2019 (GRS 2017). In addition to regular pension benefits, members are also eligible to receive health insurance through ASRS. The employer currently contributes 0.44 percent of employee salary to help finance these health insurance benefits. Members do not contribute to the costs of health insurance.

Following the 2007–09 Great Recession, Arizona made several changes designed to reduce retirement costs, which had ballooned in the preceding decade. On April 29, 2011, Governor Jan Brewer signed into law senate bill 1609, which transformed the rules governing ASRS benefits for teachers hired on or after July 1, 2011. Previously, teachers could retire and collect full benefits at age 62 if they had 10 or more completed service years or at age 65 if they had fewer service years, or if they satisfied the "rule of 80," which requires that their age and service years total at least 80. Under those rules, a teacher with 25 years of service could retire with full benefits at age 55. Under the new rules, however, new hires could not collect full retirement benefits unless they satisfied one of the following four criteria:

- Reached age 65
- Reached age 62 with 10 years of service
- Reached age 60 with 25 years of service
- Reached age 55 with 30 years of service

The bill also authorized the formation of a retirement study committee designed to explore the possibility of transitioning workers into a new DC plan.

In addition, the 2011 legislation changed the amount of money that teachers leaving ASRS could withdraw from their retirement accounts. Teachers hired before 2011 had the opportunity to take up the so-called "enhanced option," which allowed them to withdraw their personal contributions plus employer contributions, with interest. Teachers with at least 10 years of service could withdraw 100 percent of employer contributions. However, the enhanced option is no longer available to teachers hired after 2011. They can only withdraw their personal contributions with specified interest.

The 2011 reforms did not change all benefit rules for Arizona teachers. Early retirement benefits remain available to teachers at age 50 with 5 years of service. Benefit reductions for early retirees vary with age and years of service. For example, a teacher with 25 years of service who retires early at age 55, instead of waiting until his or her normal retirement age of 60, would collect only 69 percent of his

or her full benefits each month. Other plan provisions that remained the same include the 5 years required for fully vesting in the employer contributions and the multiplier rates used in the benefit formula, which vary with years of service:

- 2.1 percent if employed for fewer than 20 years
- 2.15 percent if employed between 20 to 24 years
- 2.2 percent if employed between 25 to 29 years
- 2.3 percent if employed for 30 or more years

In other important changes carried out in 2010 and 2013, the state raised the FAS computation period from three years to five years (Brainard and Brown 2016, 11). For workers hired on or after September 13, 2013, the state eliminated the permanent benefit increase, which raised benefits paid to retirees when the investment rate of return realized by ASRS exceeded the rate assumed by the plan actuaries. However, state actuaries reported in 2017 that there was no financial reserve to fund future benefit increases (ASRS 2017).

Recent changes to several Arizona pension plans have sparked legal challenges from public unions and other groups. The Arizona constitution contains a clause that forbids public pension plans from being "diminished or impaired" (NASRA 2015). The Arizona Supreme Court has interpreted this clause, and others, to mean that certain changes, such as reducing cost-of-living adjustments or raising employee contribution increases, are unconstitutional. These rulings complicate efforts to make the system solvent. ASRS itself has been spared from these constitutional challenges, but it has faced legal problems. In March 2017, the Arizona Supreme Court ruled that ASRS employer contributions to deferred compensation plans, like DC plans, count as employee compensation under current regulations.[2] This ruling raises the pension benefits that employees will receive because the final average salary used to compute those benefits will now include those contributions.

Financial and Funding Status

The funded ratio measures the actuarial value of plan assets divided by the actuarial value of accrued liabilities. It provides a simple snapshot of how well current plan assets can cover future benefit obligations and remains an important metric for assessing the financial health of pension systems, although it should be used in conjunction with other measures. As the internet bubble burst and the stock market crashed at the beginning of the century, ASRS suffered large investment losses in 2001,

2002, and 2003, which contributed to a rapidly declining funded ratio in the first half of the past decade (ASRS 2005).

In 2004, the funded status of the defined benefit plan in ASRS stood at 91 percent. Rising costs from postretirement benefit enhancements and the drastic declines in equity markets from the Great Recession combined to further erode the financial position of the pension system. In addition, ASRS has routinely adjusted its portfolio allocation to try to meet its investment return target of 8 percent, but actual returns have generally fallen short of that benchmark.

In the 2017 actuarial valuation, state actuaries calculated a funded ratio of 70.5 percent (GRS 2017). This was a steep decline from the 77.6 percent calculated in the previous year. The large drop in 2017 reflected a change in the investment return assumption, now lowered to 7.5 percent by the plan actuaries. Before 2017, the actuaries had assumed a discount rate of 8 percent. They lowered this traditional rate to more accurately reflect the historical performance of the state's pension investment funds (GRS 2017).

The trustees also reduced the investment return assumption because of capital market forecasts suggesting that the new rate better captured the direction in which markets were heading. Many economists and actuaries consider rates near 8 percent to be unrealistically high, perhaps motivated by bureaucratic inertia to delay the payment of rising pension costs (Chen and Matkin 2017). This debate matters because those assumptions shape how much employers are required to contribute to a plan to meet their actuarial obligations. If the assumptions are too lax and unrealistic, current payments would be insufficient to cover future benefits.

Future Benefit and Amortization Payments

We ran a series of simulations to examine future costs for ASRS through 2050. This section evaluates the payments that employers must make so that the plan can eventually reach a fully funded status, given certain actuarial and investment assumptions. These payments consist of the annual contributions that ASRS makes to fund normal retirement accounts plus the contributions that fund the health supplement account. We began with a baseline projection that assumed a discount rate of 7.5 percent and a return on assets (ROA) of 7.5 percent for every year going forward. These assumptions match those adopted by the state actuaries. This simulation shows how future costs would evolve under widely used and accepted assumptions in the actuarial modeling of state pension plans.

To see what would happen under different investment and economic circumstances, we relaxed these assumptions by lowering the discount rate and the ROA. In considering these other scenarios, our aim is to better understand the financial and budgetary risks to ASRS if its future performance fails to meet its benchmark expectations. Determining the "right" discount rate is still a controversial topic in the field of pension finances, making it even more important to explore different possibilities as a way of understanding the complex risk environment. For these reasons, we developed projections based on lower discount rates and investment returns. We used the 5.3 percent nominal interest rate adopted as the intermediate assumption by the Social Security Administration's trustees in 2018 (Board of Trustees 2018).

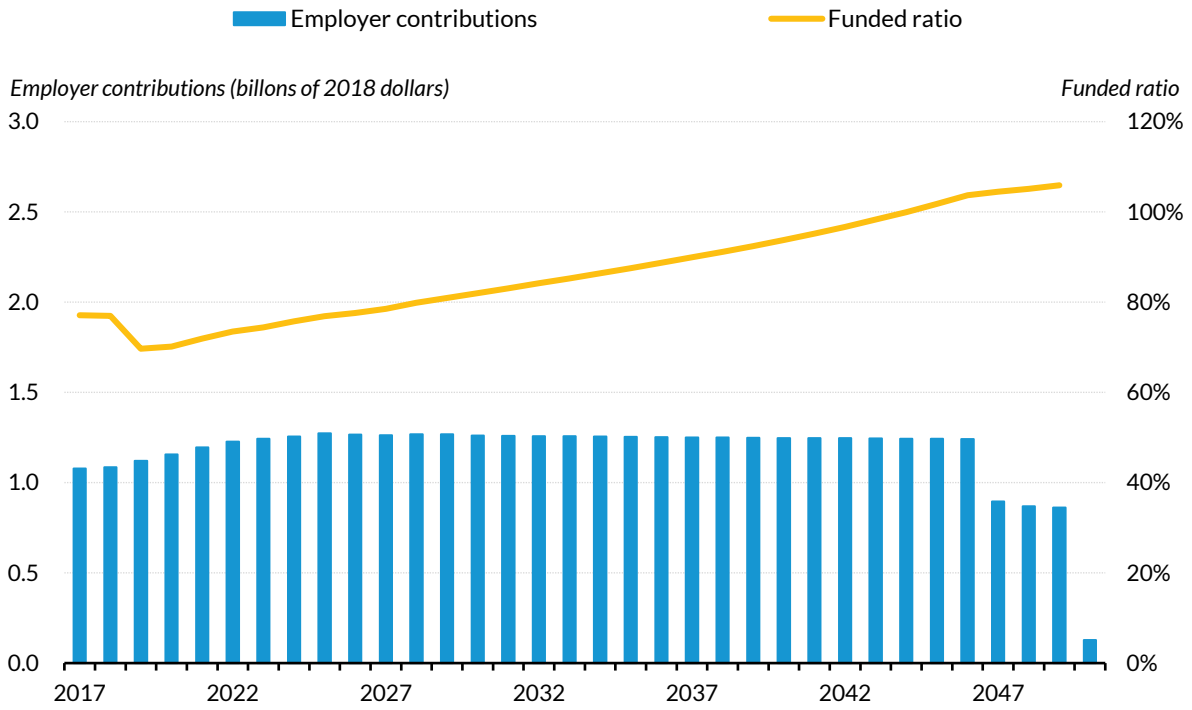
Figures 1 through 3 show the results for the various scenarios we examined. Figure 4 shows the total employer contributions as a percentage of payroll associated with each of these scenarios. The total contribution rates also include amortization payments for financing past unfunded liabilities. Figure 5 plots the employer normal cost rate required to fund accrued benefits. Appendix B contains some additional sensitivity analysis with a constant discount rate and a varying ROA. These results highlight the wide variability in required contributions for different risk scenarios. They also emphasize that ASRS would face substantially higher pension costs if current assumptions fail to properly account for future risks and uncertainties.

Figure 1 shows the results of the baseline scenario, which assumes a constant discount rate of 7.5 percent and a constant ROA of 7.5 percent. The vertical bars indicate total annual employer contributions in inflation-adjusted 2018 dollars. These values include the contributions necessary to fund normal pension costs as well as the health supplement accounts. If the plan actuaries' assumptions are realized, ASRS would become fully funded in about 2044 and would reach that threshold without a substantial increase in employer contributions. Employer contributions would peak at almost $1.3 billion in 2025 (12 percent of payroll), about 16 percent more than the $1.07 billion contribution in 2018.

FIGURE 1

Projected Funding Ratios and Total Annual Employer Contributions in 2018 Dollars

Assuming a constant 7.5 percent discount rate and 7.5 percent ROA



Source: Authors' calculations, based on an actuarial model developed by the Terry Group.

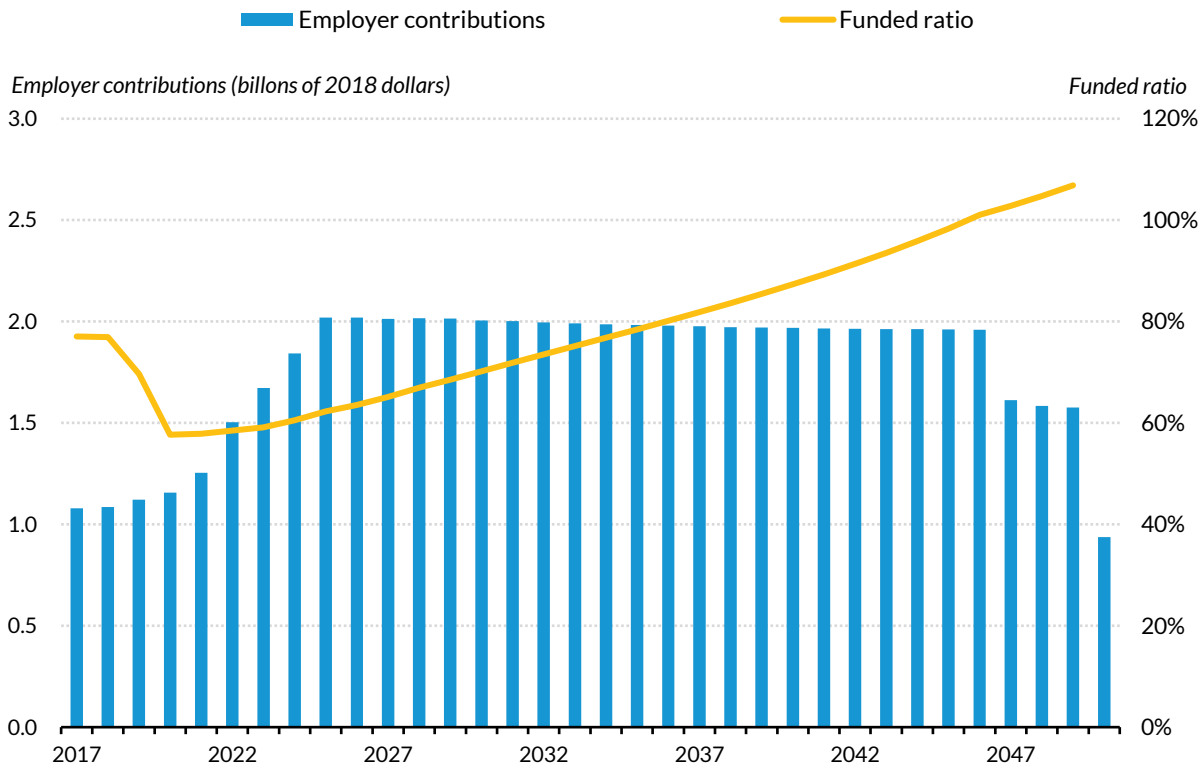
Notes: The funded ratio was computed using actuarial value of assets (AVA). Employer costs include expenses for regular pension assets and expenses for health supplement accounts.

To examine outcomes under a more conservative investment return scenario, we reduced the discount rate and the ROA to 5.3 percent throughout the projection period. A 5.3 percent discount rate is closer to the rate used by many private-sector retirement plans. Figure 2 reports the results. Under this scenario, employer costs escalate sharply over the next decade to fully fund the pension system. ASRS would reach a funded ratio of 100 percent in 2046, but only if total employer contributions increased to roughly $2 billion every year (18 to 19 percent of payroll), a number about twice as high as the employer contributions in 2018. These massive funding escalations would require either additional borrowing or new taxes levied by the state. Employee contributions remain at 50 percent of employer contributions throughout the simulation.

FIGURE 2

Projected Funding Ratio and Total Annual Employer Contributions in 2018 Dollars

Assuming a constant 5.3 percent discount rate and 5.3 percent ROA



Source: Author's calculations, based on an actuarial model.

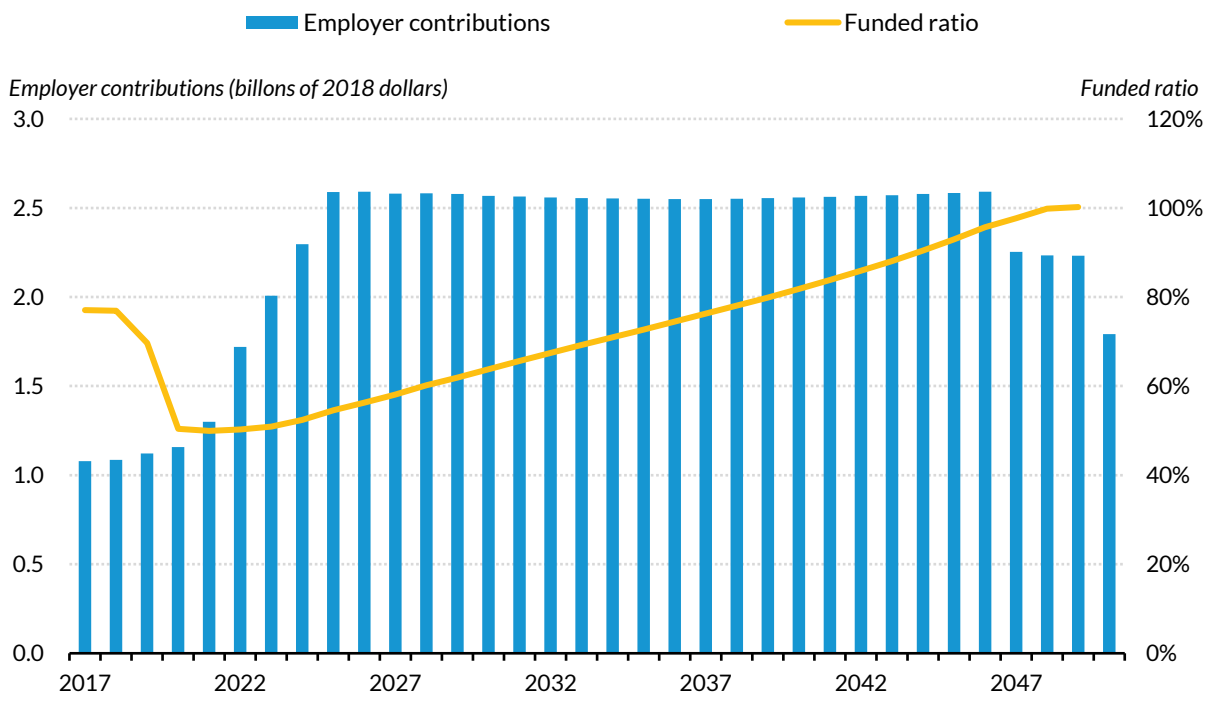
Notes: Funded ratio was computed using actuarial value of assets (AVA). Employer costs include expenses for regular pension assets and expenses for health supplement accounts.

For the scenario with the biggest differences from current assumptions, we considered what would happen to employer contributions with a discount rate of 4 percent but with the ROA at 3.5 percent. The discount rate and the ROA are traditionally assumed to be the same number, but we ran a scenario where they differed as a way of measuring the impact on contribution levels using an unconventional approach.[3] In this scenario, employer contributions balloon to more than $2.5 billion by 2025 (25 percent of payroll) and stay at around that level for the next 20 years. Employer contributions are more than twice as high as the contributions in the baseline scenario.

FIGURE 3

Projected Funding Ratio and Total Annual Employer Contributions in 2018 Dollars

Assuming a constant 4 percent discount rate and 3.5 percent ROA



Source: Authors' calculation, based on an actuarial model.

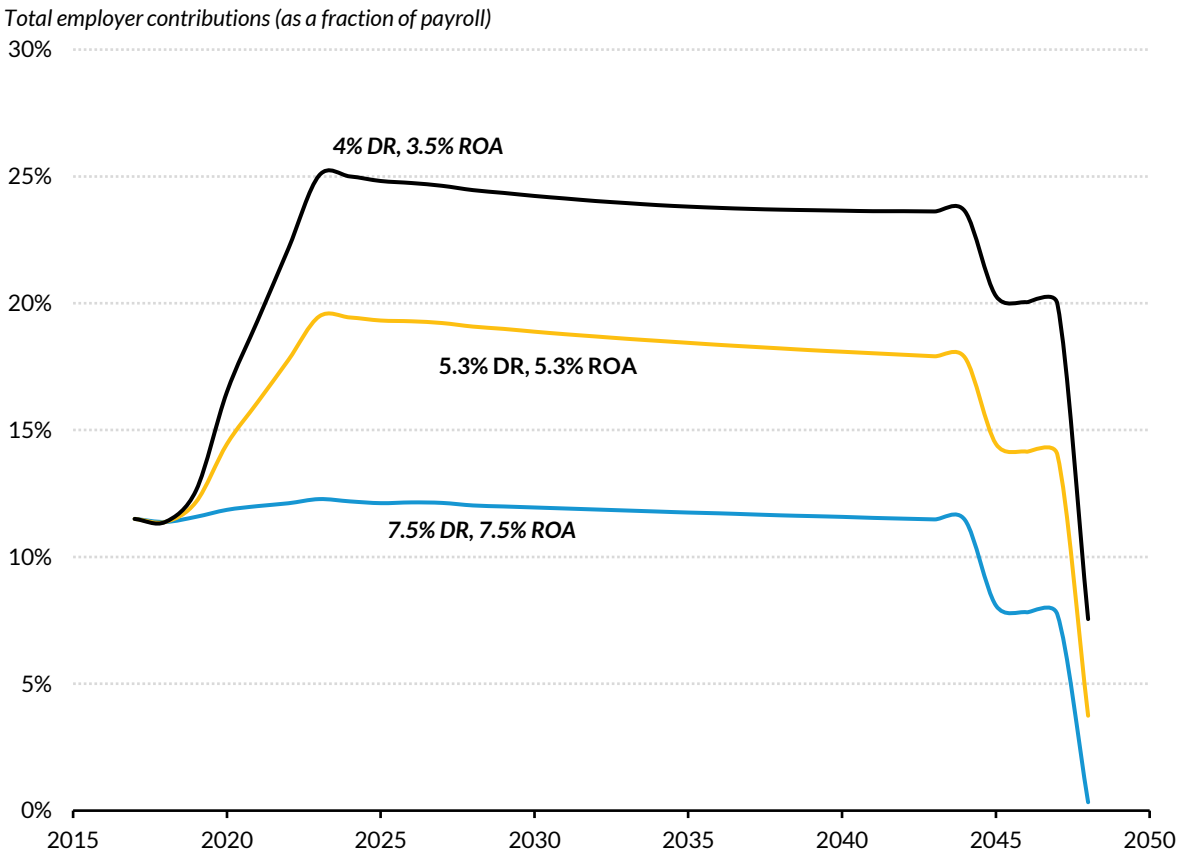
Notes: Funded ratio was computed using actuarial value of assets (AVA). Employer costs include expenses for regular pension assets and expenses for health supplement accounts.

Figure 4 plots the time evolution of the total employer contributions as a share of aggregate payroll for each scenario considered in this section. This total contribution rate includes the funds necessary to amortize previously unfunded liabilities and can thus be thought of as a kind of annual required contribution. We can clearly see a huge variation between the three different scenarios. As a percentage of payroll, the baseline scenario yields a peak employer contribution rate of about 12 percent. By contrast, the low-return scenario clearly highlights the potential dangers for ASRS: a contribution rate peaking at roughly 25 percent and staying above 20 percent until 2045. In each scenario, the contribution rate drastically collapses toward the end as the employer finishes making the necessary amortization payments.

FIGURE 4

Projected Annual Employer Contributions, Including Amortization, as a Percentage of Covered Payroll

Under alternative discount rate and ROA assumptions



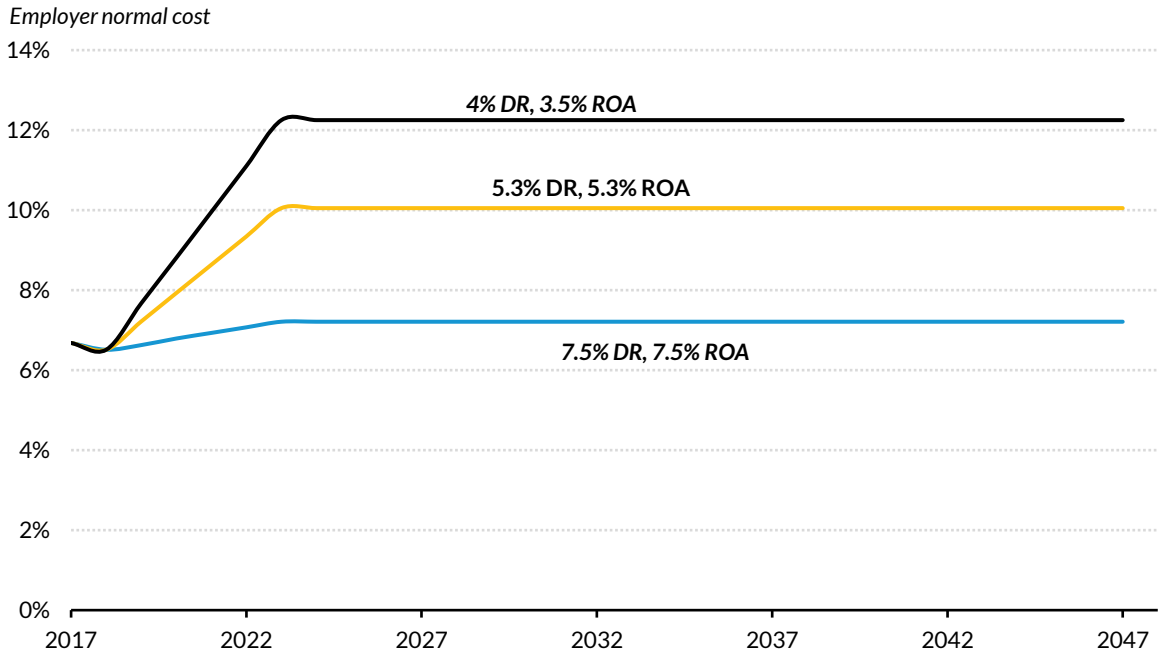
Source: Authors' calculations, based on an actuarial model.
Notes: DR = discount rate; ROA = return on assets

Figure 5 shows the employer normal cost rate. Computing this quantity allows us to focus on what percentage of an employee's salary the state needs to set aside to fund the accrued pension benefits. We can see large variations among the different scenarios. Discount rate assumptions of 4 and 5.3 percent yield substantially higher normal cost rates than the currently assumed rate of 7.5 percent. Lower discount rates offer less risk and volatility in funding pension benefits, but they also require greater employer contributions to cover the larger benefits in present value terms. Because ASRS splits the normal cost equally between employers and employees, higher employer contributions will be matched by higher employee contributions. In effect, these lower discount rates would cut into employee compensation.

FIGURE 5

Projected Annual Employer Normal Cost Rates, without Amortization, as a Percentage of Covered Payroll

By discount rate and ROA



Source: Authors' calculations, based on an actuarial model.

Pension Benefits and New Hires

A major goal of any pension system is to help provide financial security for older workers who have retired. To measure the amount of benefits that ASRS provides and how these benefits are distributed, we performed an actuarial analysis that tracks lifetime pension wealth over the career of a typical worker. Our analysis assumes a constant employee contribution rate of 11.64 percent. We then vary the discount rates to see the resulting impact on the present value of benefits.

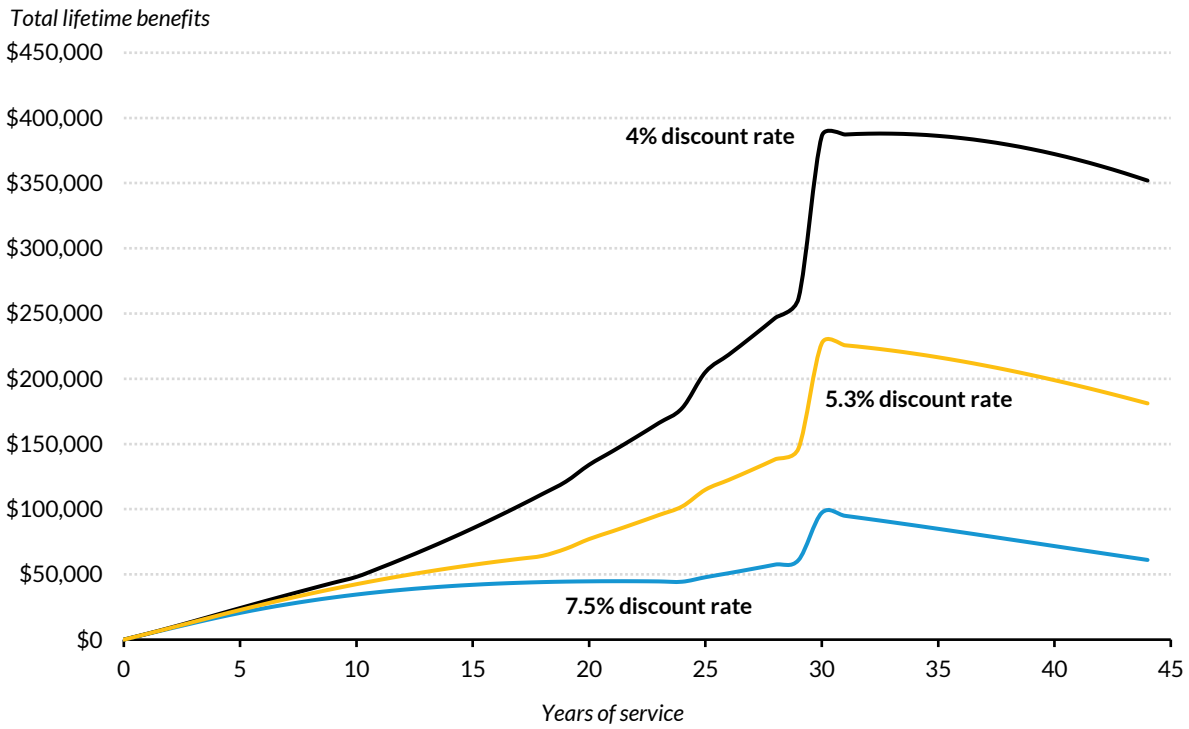
Our results show that the provisions of ASRS reserve the greatest benefits for workers with the longest employment. An employee who retires at age 55 with 30 years of service receives retirement benefits that replace 64 percent of his or her final average salary. However, new hires who leave early do not accumulate any substantial pension savings because ASRS retirement benefits are subject to certain conditions that kick in at certain points in an employee's career. For example, there are normal retirement conditions for members in ASRS at 25 service years and 30 service years. Pension wealth

experiences a spike at these two points as people retire and start collecting their benefits. The spikes are very pronounced at the 30-year mark.

These traditional provisions usually mean that workers who leave ASRS before retirement for other careers receive few, if any, pension benefits. They typically receive their own contributions plus any interest on those contributions, but they collect hardly any benefits associated with the pension rules themselves. In figures 5 through 15, we highlight how the provisions of ASRS impact the retirement of different kinds of workers, and we identify some areas where the current system needs improvement.

FIGURE 6

Present Value of Total Lifetime Pension Benefits by Service Years and Discount Rate



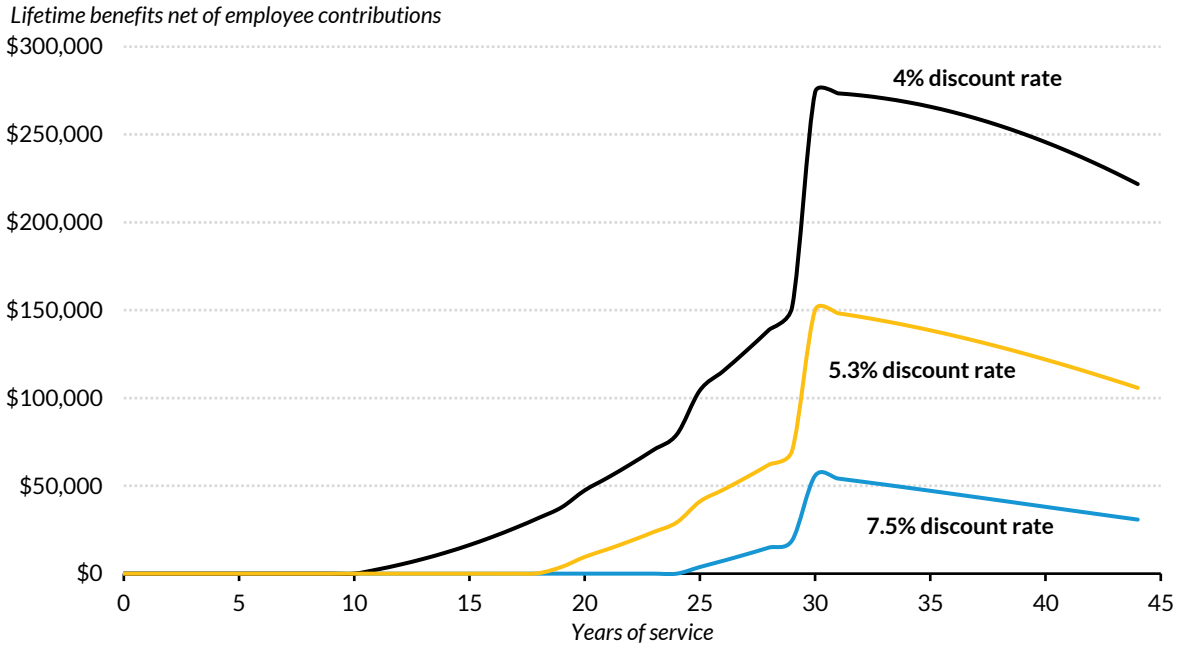
Source: Authors' calculations, based on plan documents.
Notes: Calculations assume a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

Lifetime pension wealth is the total value of retirement benefits that an ASRS member who leaves after completing a certain number of service years can expect to receive over his or her lifetime, discounted to the time of separation. Figure 6 shows the present value of total lifetime pension wealth as a function of service years for three different discount rates: 7.5 percent, 5.3 percent, and 4.0 percent. Large variations exist between these scenarios. A discount rate of 7.5 percent clearly produces

the smallest values for pension wealth because the same future benefit levels are being discounted at a higher rate than the other two scenarios. Pension benefits peak at around 30 years for all scenarios, reflecting the activation of retirement conditions at that time.

FIGURE 7

Present Value of Lifetime Retirement Wealth Net of Employee Contributions by Service Years and Discount Rate



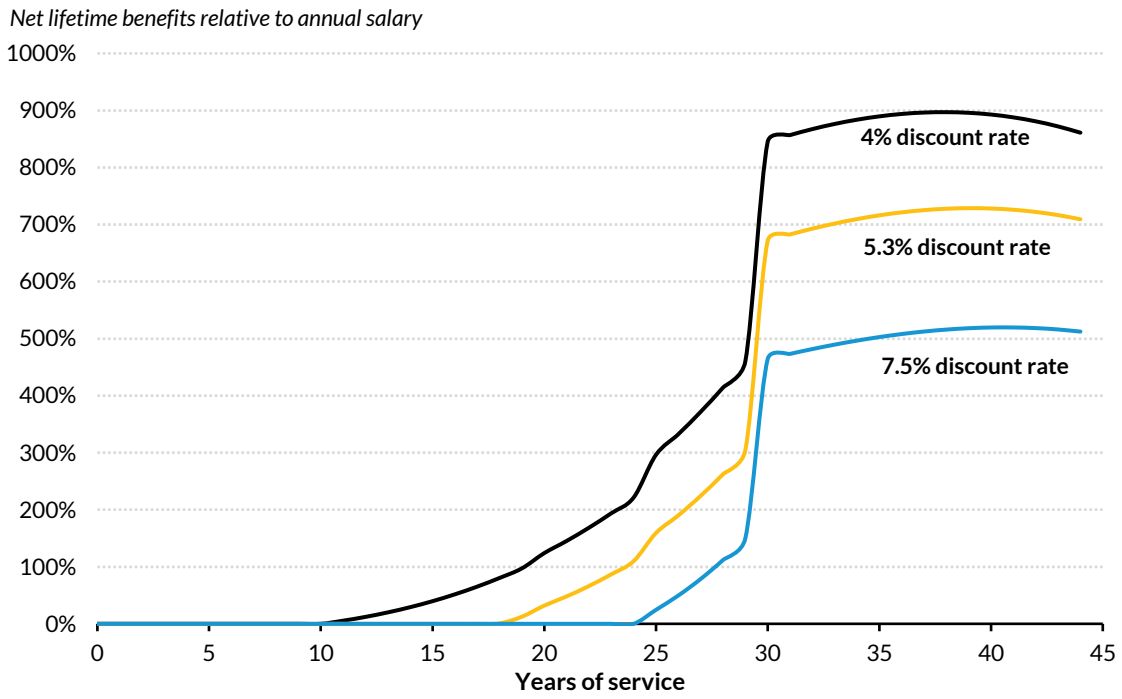
Source: Authors' calculations, based on plan documents.
Notes: Calculations assume a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

Net pension wealth, which measures lifetime pension wealth minus employee contributions with interest, is another useful measure for understanding pension benefits. It underscores how long employees must work before the value of their future retirement benefits exceed their individual contributions. Figure 7 shows the present value of net pension wealth for the three standard scenarios we considered in our analysis. Because reducing the discount rate raises the present value of future benefits, workers see a net benefit to their pension wealth far earlier in their careers under the 4 percent and 5.3 percent scenarios than under the 7.5 percent scenario. The figure highlights how the current plan design and the high discount rate heavily backload benefits for long-term employees at the expense of short-term employees.

Figures 8 through 10 plot the ratio of pension wealth over time to both annual salary and cumulative salary as a way of gauging the relative size of the benefits. These plots highlight the retirement benefit gap between short-term workers and their long-term counterparts. Examining the 7.5 percent scenario in figure 8, we see that a worker with 30 years of service has earned net lifetime pension benefits that are almost 500 percent larger than his or her annual salary in that final service year. But the net lifetime benefits of a worker with 25 years of service, just 5 years fewer, are only about 25 percent of the value of the final annual salary.

FIGURE 8

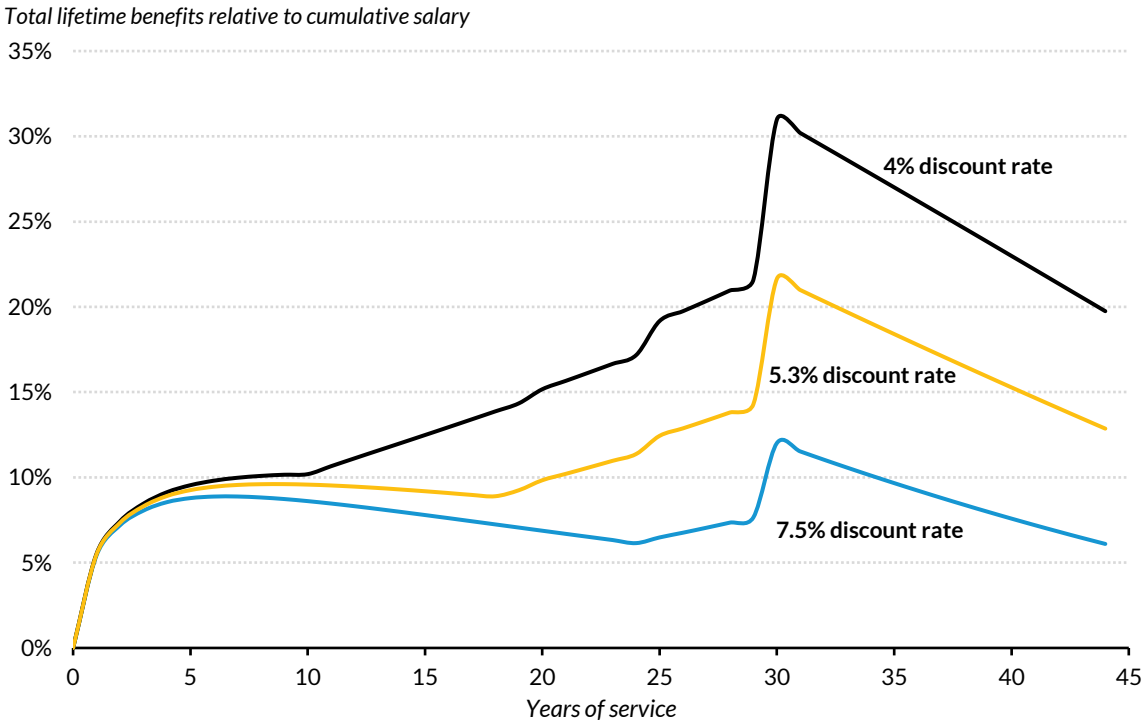
Projected Net Lifetime Pension Wealth as a Percentage of Annual Salary, by Service Years and Discount Rate



Source: Authors' calculations, based on plan documents.
Notes: Calculations assume a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

FIGURE 9

Ratio of Present Value Lifetime Pension Wealth to Present Value Cumulative Salary, by Service Years and Discount Rate



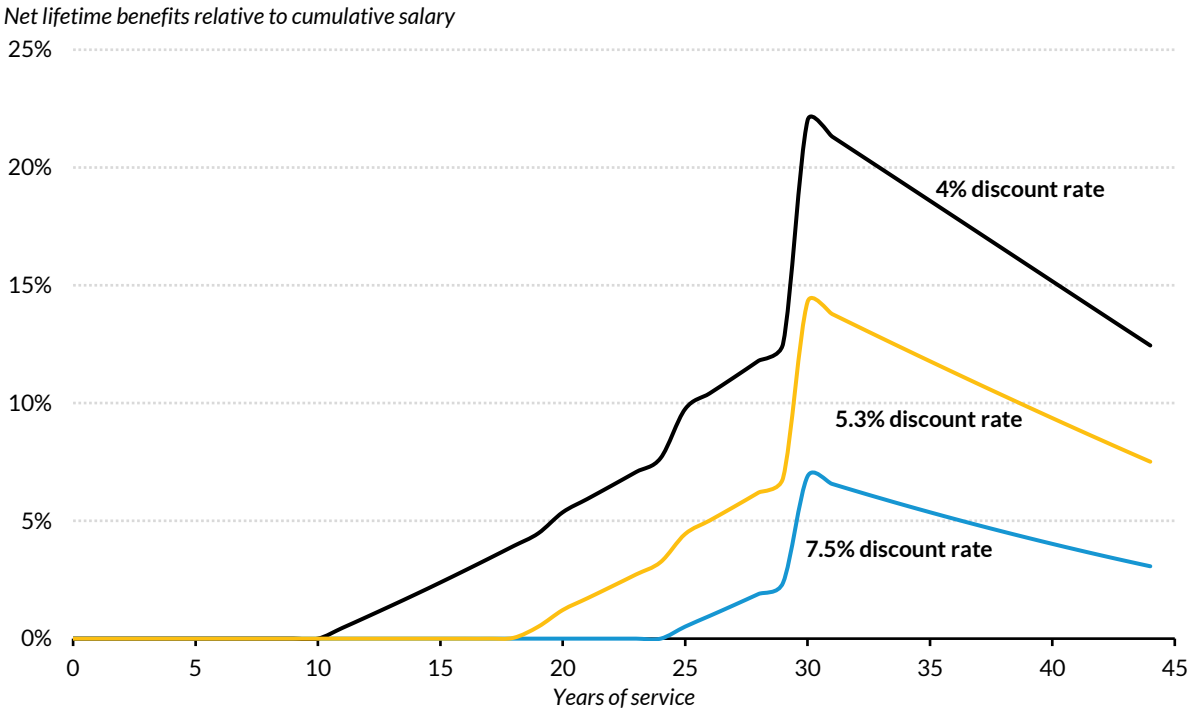
Source: Authors' calculations, based on plan documents.
Notes: Calculations assume a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

The differences between long-term workers and short-term workers are much smaller when we look at figures 9 and 10, which measure the ratio of the present value of pension wealth to the present value of cumulative salary. The ratio in figure 9 involves gross lifetime pension wealth, and the one in figure 10 involves net pension wealth. However, even here there are differences among the ratios depending on how long someone has stayed on the job. The ratios peak at around 30 years for all three scenarios; they then decline later as a result of rapidly rising salaries and pensions being discounted over longer periods.

FIGURE 10

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rates of 4 percent, 5.3 percent, and 7.5 percent



Source: Authors' calculations, based on plan documents.

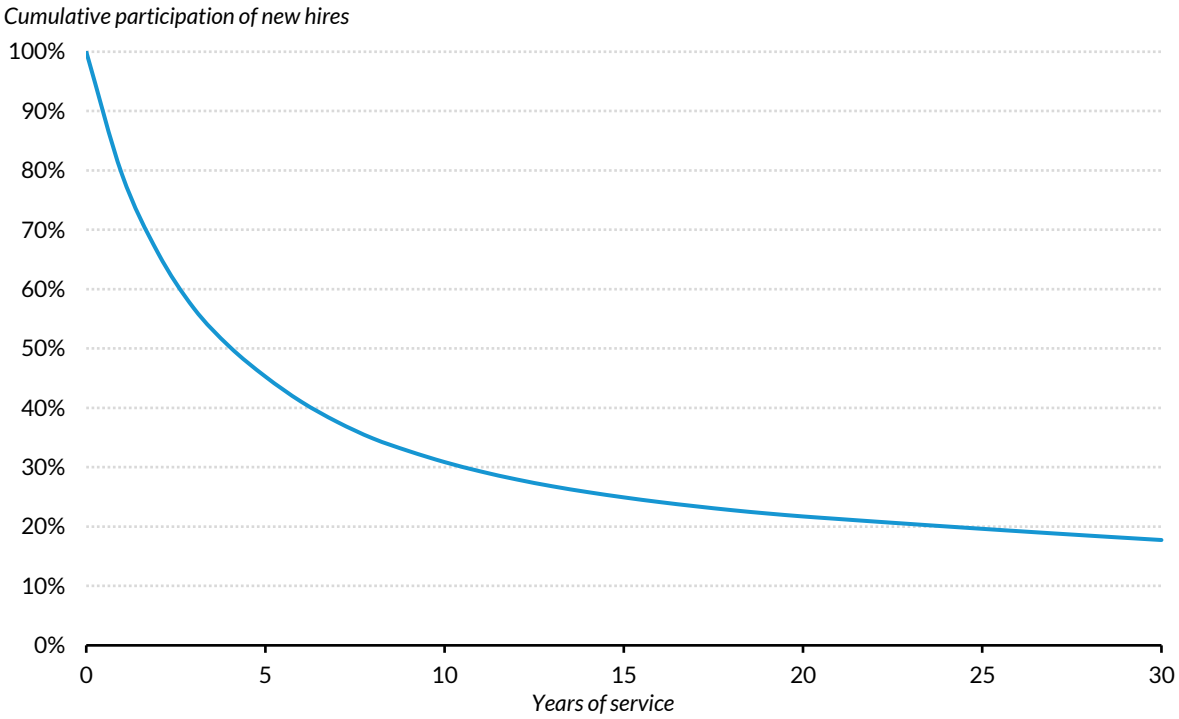
Notes: Calculation assumes a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

For net pension wealth, all three scenarios show a clear difference between the early service years, when net wealth takes off, and the final results after 45 years of service.

For the baseline scenario, net pension wealth to cumulative salary peaks at roughly 7 percent after 30 years of service. For the lowest discount rate, the ratio peaks at 23 percent, over three times higher than the baseline scenario.

FIGURE 11

Percentage of ASRS Hires Who Remain in the Plan by Completed Service Years



Source: Authors' calculations, based on demographic data from ASRS.

Figure 11 plots the percentage of new hires covered by ASRS who remain in the plan as a function of completed service years, using the withdrawal rates from the plan's 2017 annual financial report (ASRS 2017). More than half of ASRS hires leave state employment within their first six years of service. These early leavers will receive their own plan contributions with interest back, but most of them will not gain anything at all from the regular pension benefits of ASRS, which have a vesting period of five years. The results shown here include other state employees besides teachers, but they are nonetheless indicative of the major problems that Arizona has experienced with teacher retention rates over the past decade.[4]

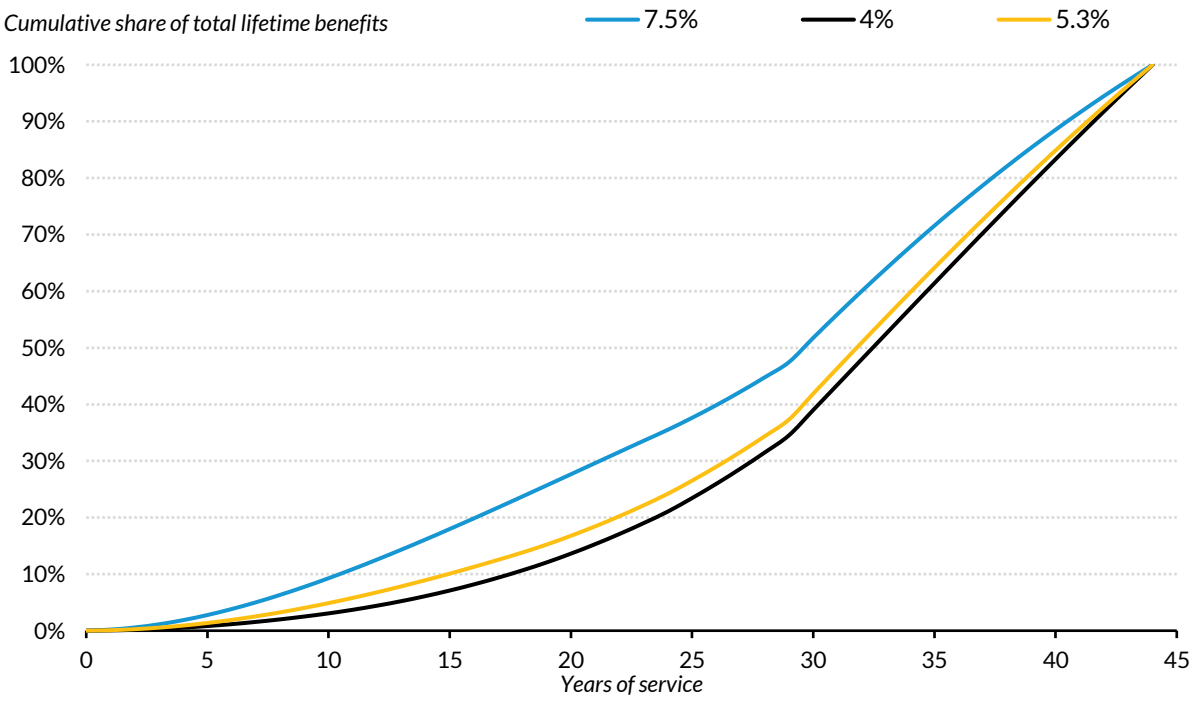
In a 2015 report, the Arizona Department of Education argued that the state was facing a "teacher shortage crisis" after its surveys showed that most school districts had open positions, some of which were being filled by long-term substitutes (Educator Recruitment and Retention Task Force 2015). The report recommended providing teachers with additional classroom resources, higher compensation, and greater mentoring support, among other proposals.

To better understand the evolving distribution of lifetime pension wealth, we plot the cumulative share of pension wealth as a function of service years in figures 12 and 13. These plots measure the accumulation of pension wealth across service years. In the early years of work, the amount of accumulation is clearly negligible. Consider figure 12, which tracks the time evolution of the cumulative share for total lifetime pension wealth. In the 4 percent discount rate scenario, it takes 25 years of service to accumulate roughly 25 percent of all the possible benefits in our simulation. However, it only takes 10 more years, or 35 years in total, to accumulative 60 percent of all possible benefits.

FIGURE 12

Projected Cumulative Share of the Present Value of Lifetime Pension Wealth

Results shown for discount rates of 4 percent, 5.3 percent, and 7.5 percent



Source: Authors' calculations.

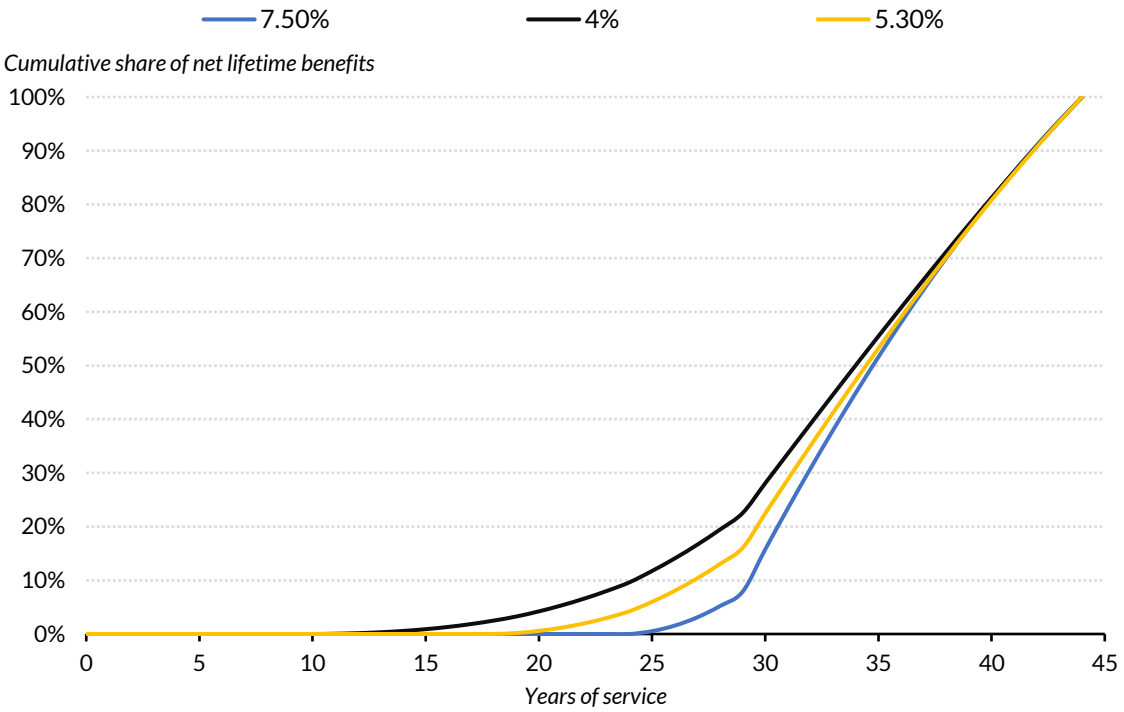
Notes: Calculation assumes a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

The results are quite striking for figure 13, which measures the cumulative share of net pension wealth over time. It takes almost 35 years of service to accumulate half of all possible net benefits and then only 10 years to accumulate the other half. These figures highlight the very uneven ways in which ASRS pension benefits accumulate over time.

FIGURE 13

Projected Cumulative Share of net Pension Wealth

Results shown for discount rates of 4 percent, 5.3 percent, and 7.5 percent



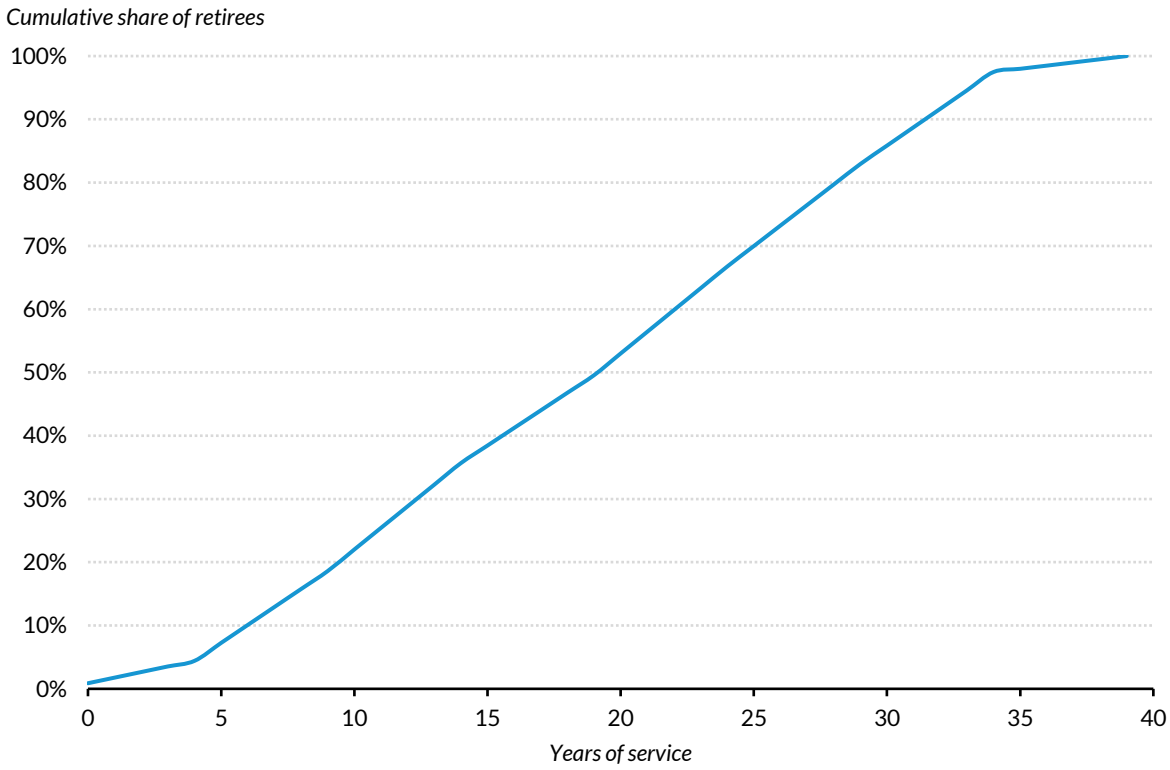
Source: Authors' calculations.

Notes: Calculations assume a starting age of 25, a starting salary of $40,000, and an employee contribution rate starting at 11.64 percent and settling at 12.97 percent by 2021, increasing by increments of roughly 0.4 percent.

Figure 14 shows the cumulative share of retirees from ASRS as a function of service years. 50 percent of all retirees had retired by their 20th year of service. By retiring at this stage, these retirees missed out on substantial additional benefits that they could have earned had they continued working for another 5 or 10 years. Almost 90 percent of all retirees had gone into retirement by 30 years of service. Many different factors can influence someone to retire, but this chart highlights how plenty of Arizona workers and teachers are not obtaining the most rewarding features of their DB plan, knowingly or not.

FIGURE 14

Cumulative Share of Retirees as a Function of Service Years



Source: Authors' calculations, based on data from Table F of 2017 Annual Valuation Report (GRS 2017).

Policy Implications and Analysis

ASRS continues to face serious funding challenges. Our simulations show that if the investment assumptions of the plan actuaries materialize, ASRS could reach a healthy funding ratio without any substantial alterations to the current level of employer contributions. However, more realistic actuarial and investment scenarios indicate that the annual employer contributions required to fully fund the plan must double or nearly triple over current levels. If one of these scenarios ends up materializing instead, ASRS would require substantial amounts of additional taxpayer funds to reach a strong financial status.

Our actuarial analysis shows that ASRS provides healthy retirement benefits for long-term workers. However, short-term workers fare much worse. Because members hired at age 25 must work well over a decade before their pension benefits exceed the value of their own contributions, those who separate earlier receive no employer-funded retirement benefits for their years of service. Despite

offering generous benefits for long-term service as a way of persuading new hires to stay on the job, Arizona has struggled with low teacher retention rates that have been blamed on everything from low pay to reduced education funding. According to withdrawal rates from 2017, most new employees hired by ASRS end up leaving the job within six years. They thus miss out on a large portion of the benefits earned by long-term workers, given the vesting period of five years.

In the field of pension studies, recent research has focused heavily on the sustainability and fairness of pension systems that serve current teachers. In a 2013 study from the Manhattan Institute, McGee and Winters (2013) argued that current DB plans should be scrapped and replaced because they favor long-term teachers at the expense of short-term teachers who leave the profession before qualifying for various retirement benchmarks. In a 2017 post for Education Next, Aldeman and Robson made similar arguments, emphasizing that "more than half of teachers do not receive any employer pension benefits" because they do not qualify for such benefits.[5]

These and other scholars have called for an overhaul of traditional DB plans by replacing them with DC plans and hybrid plans that would better service a mobile workforce of people who are no longer tied to the same career for their entire lives. But other scholars disagree, in particular for the case of Arizona. They argue that recent reforms in 2011 have set ASRS on a path toward fiscal sustainability and that switching to a 401(k)-style retirement plan would be too risky, leaving workers with potentially inadequate savings as they head off into retirement (Wells and Herzenberg 2014).

In May 2018, amid widespread protests from teachers, Arizona passed a law that would boost teacher salaries 20 percent over the next three years. The law also provided over $500 million for additional education funding. These provisions may help improve retention, but their ultimate effects will remain unknown for quite some time. While the provisions of this law take effect, Arizona could certainly do more to boost retirement benefits for short-term teachers, either by changing the provisions of the current DB plan or by introducing an altogether different kind of plan, such as a hybrid.

Appendix A. Actuarial Methodology

For the actuarial modeling, we used the RP-2014 tables provided by the Society of Actuaries for the mortality assumptions. Our mortality figures specifically come from the total dataset of males and females, which we blended together equally to have a unified mortality vector. We then applied a static projection with the Scale MP-2014 table defined in the calendar year 2018. We used the salary growth schedule adopted by actuaries for the state of Arizona. We also borrowed their annual separation rates for new hires in our analysis. We assumed a starting age of 25 and a starting salary of $40,000.

In every service year of the simulation, we assume that the employee chooses either the present value of the annuity or the value of the retirement account, whichever is higher. The value of the retirement account is the amount of money that the worker can withdraw upon leaving employment. For current ASRS members hired after 2011, that account value equals the employee contributions along with any accrued interest. The present value of the annuity is calculated using the standard benefit formula adjusted by early retirement penalties.

We created figures 12 and 13, which show the evolution of cumulative pension wealth by service years, by taking the pension wealth in any given service year, dividing it by the cumulative pension wealth across all service years, and then successively adding each percentage until reaching 100.

The normal cost rate is a ratio of expected benefits to expected wages expressed in the formula below. Specifically, the elements in the calculation are the separation rates, *s*, the present value of the net retirement wealth, *W*, and the present value of the cumulative wages, *C*. If we let the subscript *i* track the service year, then the normal cost can be calculated by dividing the expected benefits (McGee and Welch 2016)

$$EPB = \sum_{i=0}^{N} s_i W_i$$

with the expected wages

$$EPW = \sum_{i=0}^{N} s_i C_i \, .$$

Formally, the normal cost is the ratio of the expected present value of retirement benefits to the expected present value of cumulative wages. Known as the Entry Age Normal method, this technique is the one recommended by the Governmental Accounting Standards Board when calculating normal cost (GASB 2012).

Appendix B. Additional Results

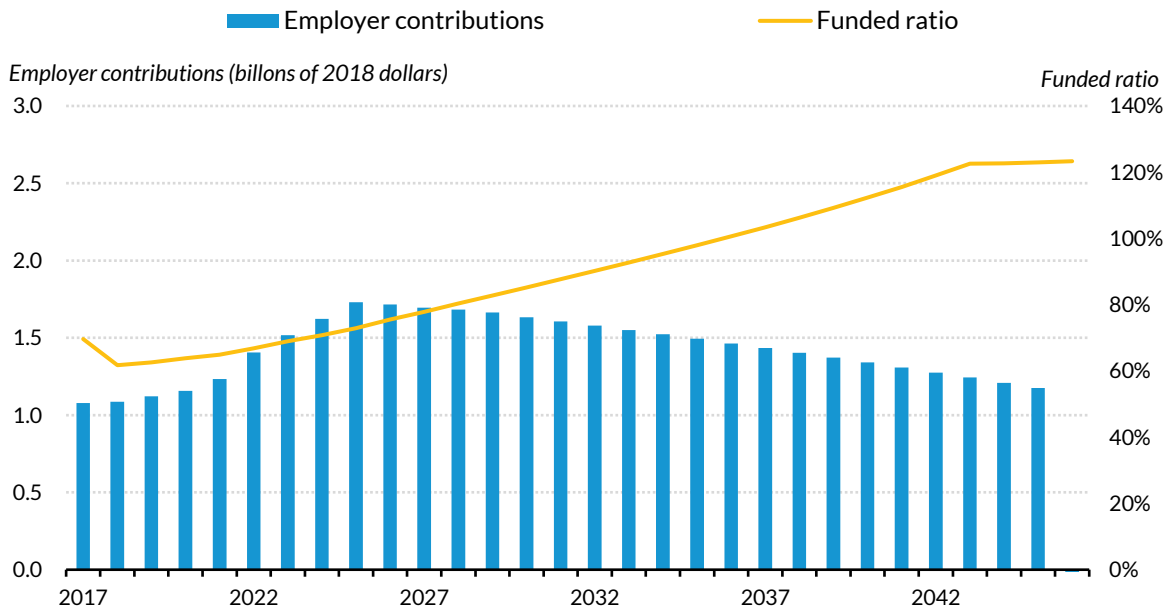
For additional sensitivity analysis, we show various scenarios in which the discount rate stays constant but the ROA varies. Figures B.1 through B.3 show the evolution of the funded ratio and of total employer contributions with a constant discount rate of 6 percent but with ROA assumptions matching the three scenarios in the main report (7.5 percent, 5.3 percent, and 3.5 percent). Running the simulation until 2046, we see that ASRS becomes fully funded for the baseline scenario of 7.5 percent but not for the other two cases, highlighting the inherent risks posed to the plan by future market uncertainties.

For more dynamic scenarios, we considered what would happen if we held the discount rate constant and let the ROA vary every year. Figures 18 and 19 show these results. In figure B.4, the discount rate is 5.3 percent and the ROA averages to 6.17 percent over the entire simulation. The plan reaches a fully funded status by 2037. In figure B.5, the discount rate is set to 6 percent and the ROA averages out to 5.5 percent, but the plan does not reach a funded status of 100 percent.

FIGURE B.1

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rate of 6 percent and ROA of 7.5 percent

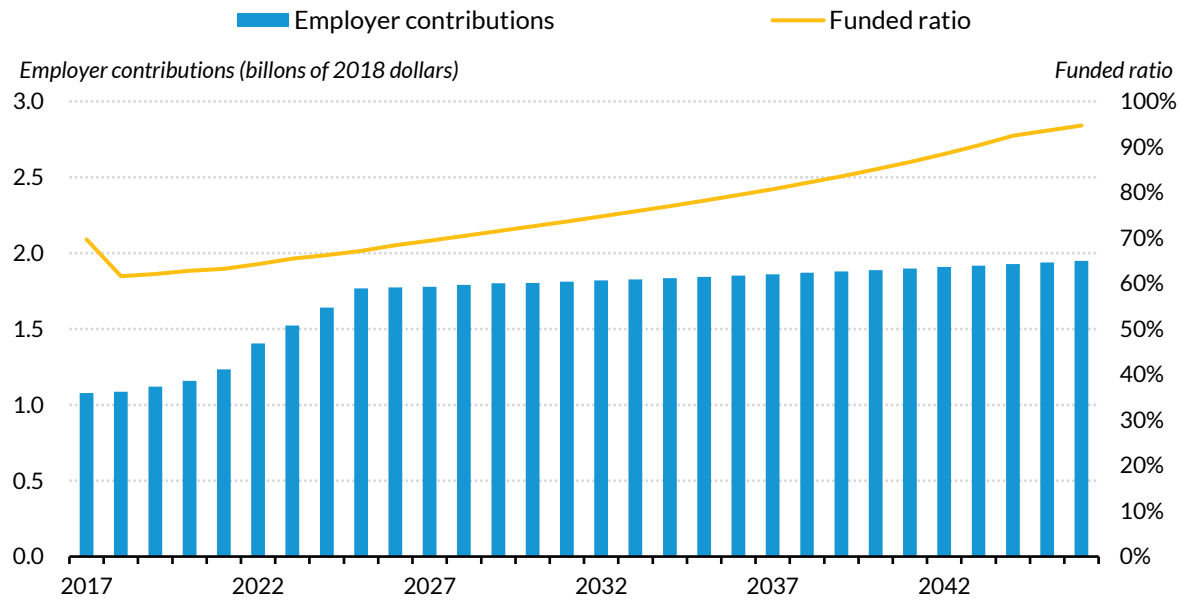


Source: Authors' calculations, based on an actuarial model.

FIGURE B.2

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rate of 6 percent and ROA of 5.3 percent

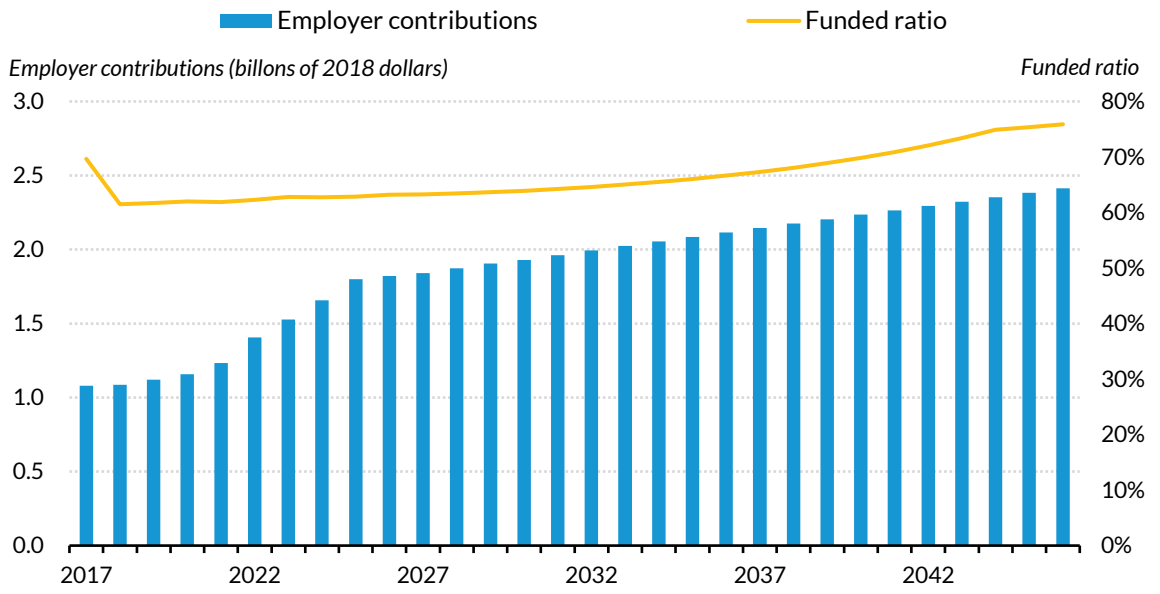


Source: Authors' calculations, based on an actuarial model.

FIGURE B.3

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rate of 6 percent and ROA of 3.5 percent

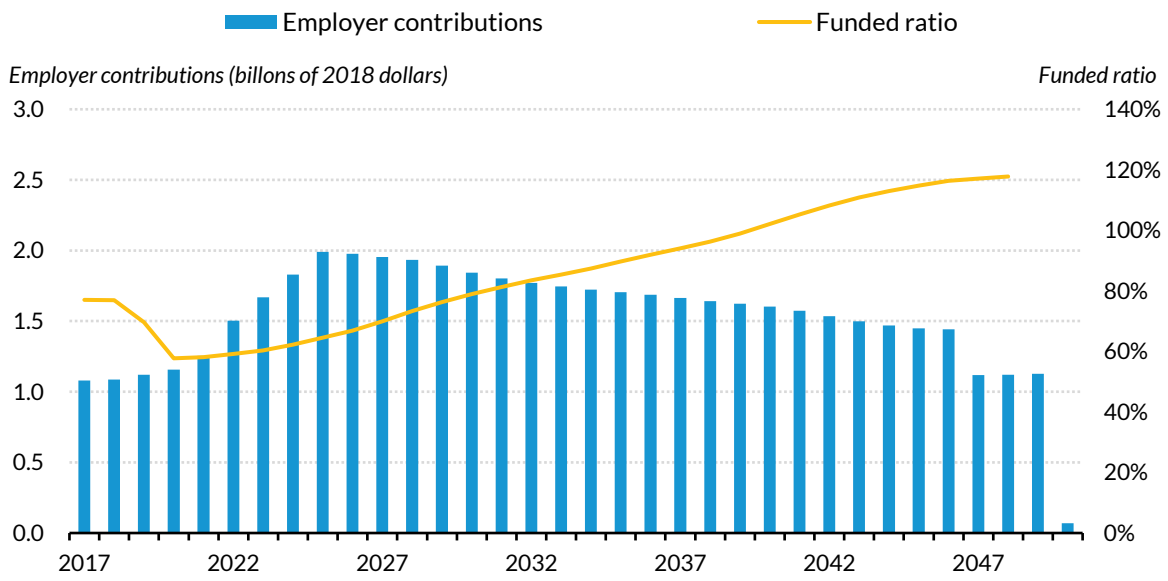


Source: Authors' calculations, based on an actuarial model.

FIGURE B.4

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rate of 5.3 percent and a varying ROA, averaging 6.17 percent over time

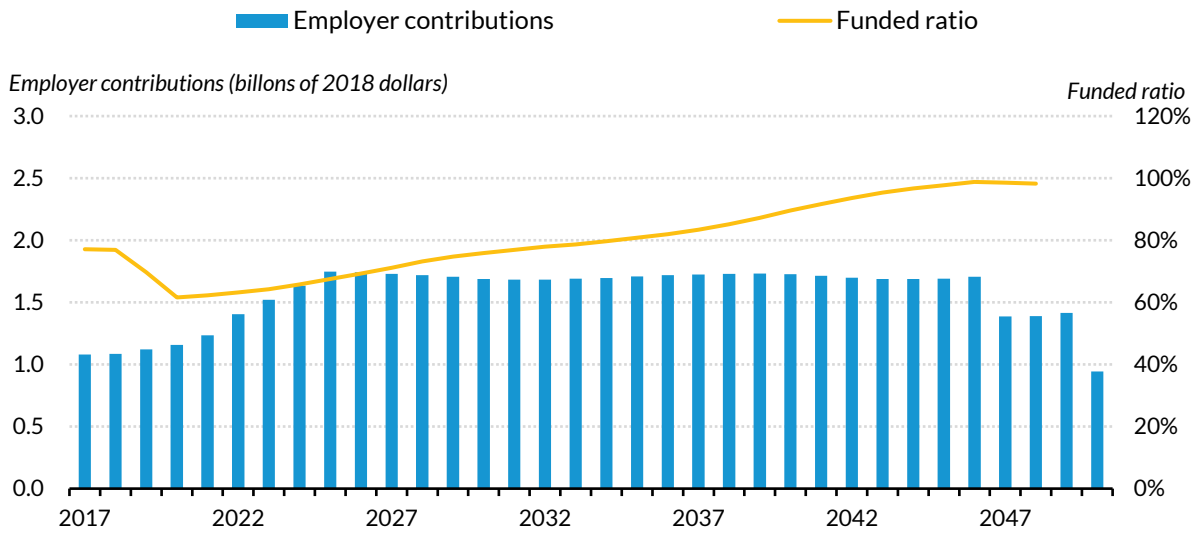


Source: Authors' calculations, based on an actuarial model.

FIGURE B.5

Ratio of Net Lifetime Pension Wealth to Cumulative Salary as a Function of Service Years

Results shown for discount rate of 6 percent and a varying ROA, averaging 5.5 percent over time



Source: Authors' calculations, based on an actuarial model.

Notes

[1] These plans are sometimes called cash balance plans. See "Types of Retirement Plans," US Department of Labor, accessed April 1, 2019, https://www.dol.gov/general/topic/retirement/typesofplans.

[2] "Ruling Changes ASRS Compensation Definition Regarding Employer-Paid Deferred Comp Payments," Arizona State Retirement System Blog, accessed April 1, 2019, https://www.azasrs.gov/blog/ruling-changes-asrs-compensation-definition-regarding-employer-paid-deferred-comp-payments.

[3] The Governmental Accounting Standards Board (GASB) recommended a new method for calculating the discount rate in 2012 that applies to pension systems with a projected "depletion date," the point in time at which benefit payouts would become larger than pension assets (Winningham 2014). Under the GASB proposal, the discount rate should be calculated using a blended mixture of the long-term investment return rate and a municipal bond rate. The investment return is an actuarial assumption that can be modified depending on how pension assets perform over time. But the bond rate is an empirical, published index that should be updated every year by plan actuaries. The most obvious consequence of this move is that the discount rate and the ROA are no longer going to be the same, in general. ASRS does not have a projected depletion date, in which case using the same discount rate and ROA is acceptable. However, it's still useful to imagine and analyze a scenario where the rates do diverge, given future market uncertainties and calls for more conservative discount rates.

[4] Valerie Strauss, "Why Teachers Are Fleeing Arizona in Droves," *Washington Post*, June 19, 2015, https://www.washingtonpost.com/news/answer-sheet/wp/2015/06/19/why-teachers-are-fleeing-arizona-in-droves/?noredirect=on&utm_term=.cb37bbed0a82.

[5] Chad Aldeman and Kelly Robson, "Why Most Teachers Get a Bad Deal on Pensions," *EdNext Blog*, Education Next, May 16, 2017, https://www.educationnext.org/why-most-teachers-get-bad-deal-pensions-state-plans-winners-losers/.

References

Aldeman, Chad, and Richard W. Johnson. 2015. Negative Returns: How State Pensions Shortchange Teachers. Washington, DC: TeacherPensions.org, Urban Institute, and Bellwether Education Partners. https://www.urban.org/research/publication/negative-returns-how-state-pensions-shortchange-teachers.

ASRS (Arizona State Retirement System). 2005. Comprehensive Annual Financial Report for the Year Ended June 30, 2005. Phoenix: Arizona State Retirement System. https://www.azasrs.gov/sites/default/files/pdf/2005_Annual_Comprehensive_Financial_Report.pdf.

———.2017a. Comprehensive Annual Financial Report for the Year Ended June 30, 2017. Phoenix: Arizona State Retirement System, 126. https://www.azasrs.gov/sites/default/files/ASRS_CAFR_FY17.pdf.

———.2017b. Comprehensive Annual Financial Report for the Year Ended June 30, 2017. Phoenix: Arizona State Retirement System, 93. https://www.azasrs.gov/sites/default/files/ASRS_CAFR_FY17.pdf.

Board of Trustees (Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds). 2018. 2018 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds. Washington, DC: Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds. https://www.ssa.gov/oact/TR/2018/index.html.

Brainard, Keith and Alex Brown. 2016. "Spotlight on Significant Reforms to State Retirement Systems." Washington, DC: National Association of State Retirement Administrators. https://www.nasra.org/files/Spotlight/Significant%20Reforms.pdf.

Center for State and Local Government Excellence. 2011. "What are Hybrid Retirement Plans?" Washington, DC: Center for State and Local Government Excellence. https://slge.org/assets/uploads/2011/12/Hybrid-primer.pdf.

Chen, Gang, and David S. T Matkin. 2017. "Actuarial Inputs and the Valuation of Public Pension Liabilities and Contribution Requirements: A Simulation Approach." Washington, DC: Center for Retirement Research at Boston College. http://crr.bc.edu/wp-content/uploads/2017/05/wp_2017-4.pdf.

Educator Recruitment and Retention Task Force. 2015. Education Retention and Recruitment Report. Phoenix: Arizona Department of Education. http://www.azed.gov/wp-content/uploads/2015/02/err-initial-report-final.pdf.

GASB (Governmental Accounting Standards Board). 2012. Statement No. 67 of the Governmental Accounting Standards Board: Financial Reporting for Pension Plans. Norwalk, CT: Governmental Accounting Standards Board. https://www.gasb.org/jsp/GASB/Document_C/DocumentPage?cid=1176160220594.

GRS (Gabriel, Roeder, Smith, & Company). 2017. "Annual Actuarial Valuation." Arizona State Retirement System.

McGee, Josh, and Michelle H. Welch. 2016. Modeling Pension Costs. Washington, DC: Urban Institute. https://www.urban.org/sites/default/files/20160314_technical-paper-pension-costs_finalized.pdf.

McGee, Josh B., and Marcus A. Winters. 2013. Better Pay, Fairer Pensions: Reforming Teacher Compensation. Civic Report No. 79. New York: Center for State and Local Leadership, Manhattan Institute. https://www.manhattan-institute.org/html/better-pay-fairer-pensions-reforming-teacher-compensation-5861.html.

NASRA (National Association of State Retirement Administrators). 2015. "Arizona." Lexington, KY: NASRA.https://www.nasra.org/az

Wells, Dave and Stephen Herzenberg. 2014. Arizona's Pensions: On Track to Financial Sustainability with Retirement Security. Phoenix: Grand Canyon Institute. https://www.nasra.org/Files/State-Specific/Arizona/AZpensions_on_track_jan2014.pdf.

Winningham, William. 2014. “GASB 67/68: Depletion Date Projections.” Seattle: Milliman. http://www.milliman.com/uploadedFiles/insight/Periodicals/peri/pdfs/gasb-depletion-date-projections.pdf.

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