

The Contribution Rate Just Keeps Growing:

Why Persistent Pension Debt Has Created
Challenges for ASRS That Arizona Should Fix as
Soon as Possible



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This paper was written by Anthony Randazzo, Carol O'Neill, and Jonathan Moody. Historic analysis relies primarily on documents and data provided by the Arizona State Retirement System. The paper also draws heavily from research published by Bellwether Education Partners, Reason Foundation, and Urban Institute, all of which were provided grants to develop data-driven analysis of ASRS.

Introduction

The first day of the 2001-02 school year in Arizona's Deer Valley Unified School District wasn't just the start of school for children across the north Phoenix area, it was Emma and George's first day of teaching. Both, recent graduates of master's programs, were given starting salaries of \$24,321, healthcare, and the promise of a pension.

Emma had grown up in Tucson and came from a long line of teachers. Her father had worked at her elementary school and, feeling proud of his work, she had always wanted to be a teacher just like him.

George grew up in Glendale and was drawn to teaching out of a sense of civic duty and a love of children and education. While in college he discovered he had a natural talent for public speaking and, to earn extra money, he tutored. Teaching just seemed like a natural fit.

Both Emma and George are still teaching today, though George left the Arizona school system after seven years. While their lives have gone in different directions, neither has had satisfactory experiences on their path to retirement security.

This paper examines challenges facing the Arizona State Retirement System (ASRS) and its members, highlighting two personal examples through the stories of two fictional teachers, Emma and George. Some ASRS members are going to receive reasonable retirement benefits, with guaranteed lifetime income in the form of a pension, but the amount they are paying for this benefit has been increasing rapidly. Other ASRS members are not on a path to retirement security at all.

Want more details on how this stuff works? See "Appendix A. How ASRS Pensions Work" on page 31 and "Appendix B. How Are Teachers' Pensions Calculated under ASRS?" on page 32

Challenges to Public Pensions in Arizona

ASRS is not just a retirement plan for teachers. Any public school employee, as well as state agencies and municipalities (other than Phoenix and Tucson), is included.¹ The primary benefit is guaranteed lifetime income in retirement — known as a pension. Members participating in ASRS also receive their state health insurance through the system.

The amount of an individual's pension depends on how long that person works for an ASRS employer, as well as the average salary of their highest-earning five working years before retirement. Employers and employees make contributions into ASRS to pay for these promised benefits, with the rate determined by financial experts — known as actuaries — working for the pension plan.

Unfortunately, ASRS investments are facing serious risks today as the system has accumulated more than \$14 billion in pension debt over the past two decades. This funding challenge has triggered an increase in the amount of money that needs to be paid into ASRS — from the state, local employers, and employees. In fact, the amount of money required from employee paychecks today has more than *quintupled* since Emma and George started teaching in 2001. The size of the benefits, however, has not increased during that time.

For individuals who have spent a full career participating in ASRS, this level of underfunding is really disconcerting. While the state constitution explicitly prohibits the government from cutting pension benefits, it is unclear to the typical employee or retiree how the state will be able to handle paying off this pension debt. Retirees continue to receive their monthly pension checks and currently are not at risk of getting a reduced payment. Still, the size of unfunded promised benefits is worrisome.

The concerns are slightly different for those who are still in the midst of their careers working in the public sector. Ever growing contribution rates are cutting into their take home pay, and to the typical ASRS member there isn't a clear reason as to why.

KEY FACT: While the state constitution explicitly prohibits the government from cutting pension benefits, it is unclear to the typical employee or retiree how the state will be able to handle paying off this pension debt.

1 Some public charter schools in Arizona have opted out of participating in ASRS. This decision would have to have been made upon the initial chartering. Teachers or other school employees who move to a charter school that has opted out of ASRS are no longer covered by the retirement system while employed there; but they can rejoin the retirement system if they later return to a school participating in ASRS.

The increased contribution rates may be tolerable for some ASRS participants — after all, the promise of guaranteed lifetime income is a strong retirement benefit that is not available from most private sector employers. But as it turns out, far fewer people wind up earning an adequate pension than would be expected for such a large, statewide retirement system. As we will highlight in this paper, research compiled from three separate organizations shows that less than 20% of teachers, state workers, and municipal employees in Arizona are earning a full pension.²

With more than 220,000 active members in ASRS, and just as many individuals who worked in an ASRS-covered job but have since left public sector employment, this means there are tens of thousands of individuals who are not on a path to retirement security.

Ultimately, the Arizona State Retirement System is an important component of compensation for public sector workers. It works for some teachers, state workers, and municipal employees, providing retirement security that should be respected and protected. That respect and protection should come in the form of an increased effort to get ASRS pension debt paid down quickly, while also looking closely at the growing contribution rates for active employees. But since it does not work for all participants, Arizona leaders should also ensure that ASRS is providing retirement security for those members as well.

2 We define earning a “full pension” as spending a whole career at an ASRS-participating employer and then reaching what ASRS calls “normal retirement” eligibility. See Appendix H for more details on the criteria.

Part 1. Perpetual Growth in Employee Contributions: Today's Urgent Problem

Both Emma and George were enrolled in ASRS upon joining the public school system in 2001, with mandatory contribution rates of 2% of their paychecks. In their first year of teaching, they each made ASRS contributions of \$486 total (or about \$40/month). Fairly quickly, however, George and Emma began experiencing sharply rising contribution rates.

1.1 Skyrocketing Contribution Rates

Employers, such as Emma and George's school district and the state of Arizona, make equal contributions into ASRS on behalf of their employees. The specific contribution rates for both plan members and employers are set annually by ASRS's board of trustees to reflect what the actuaries working for the system have determined is necessary to fund all promised benefits.

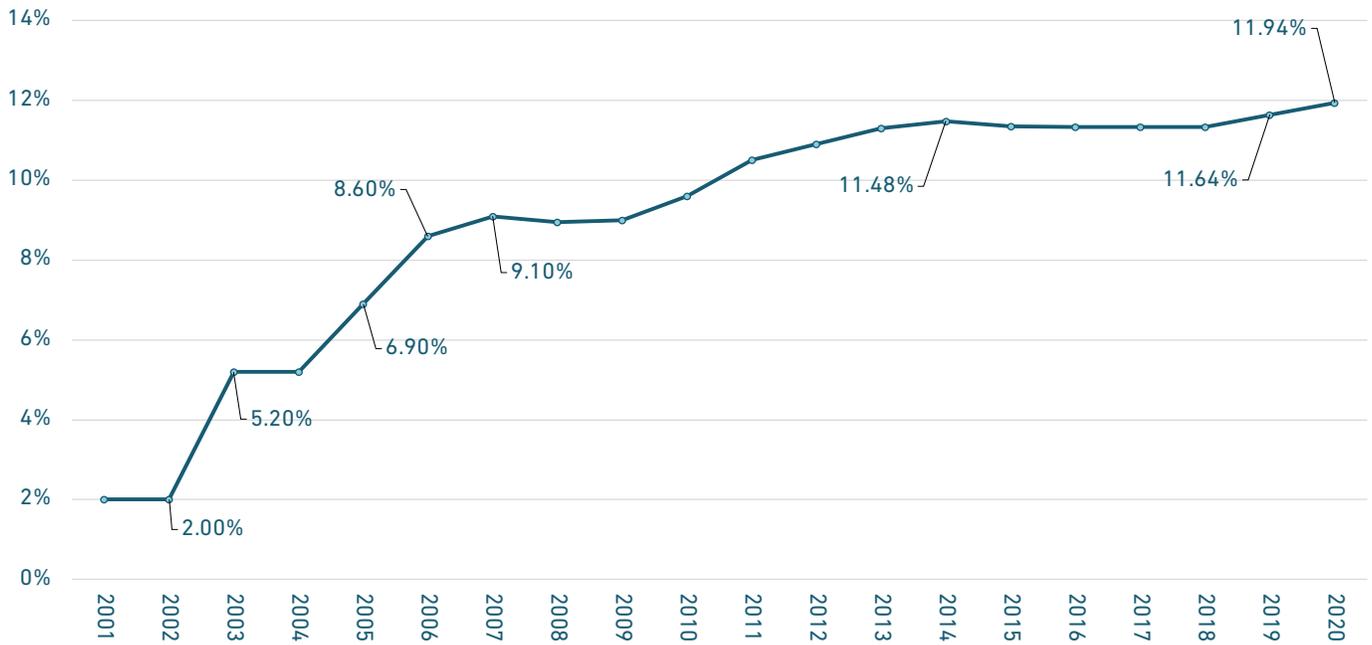
ASRS, unlike many other pension plans around the country, uses a cost-sharing approach in which employees and employers make equal contributions. So as required contribution rates increased, they grew for employees as well as employers. Figure 1 shows that back in 2002 — the last time ASRS was fully funded — total contributions were 4% of payroll (meaning employees paid 2% of their paychecks). But ASRS suffered large investment losses during the market slowdown in the fiscal years 2001 through 2003. As a result, in 2003 ASRS's board more than doubled the employee contribution rate to 5.2% to avoid underfunding the plan.

As losses continued to mount, ASRS continued to raise contribution rates. In 2005, the rate increased to 6.9%; in 2006, it went up to 8.6%; and then, when the financial crisis hit in 2007, the contribution rate was again raised, to 9.1%.

The steep rise in contribution rates between 2002 and 2007 affected George and Emma's paychecks. While they received pay raises during that time as they became more seasoned teachers, the increased contributions affected the amount of pay they received, effectively cutting their raises. The effect of these rising contribution rates was quite significant on George and Emma's quality of living.

George left Arizona at the end of the 2007-08 school year. In the seven years of his employment, he had contributed a total of \$15,014 into ASRS. By contrast, had contribution rates not been forced up due to ASRS's underperforming investments, he would have only paid \$4,769.

Figure 1: ASRS Employee Contribution Rates, for Fiscal Years Ending 2001-2020



Source: ASRS Valuation Reports

Meanwhile, Emma’s contributions into ASRS have continued to increase since 2007. In 2014, well into the economic recovery, contribution rates were set at 11.48%. Since then, rates have moved up toward 12%. They were 11.64% in 2019 and starting July 1, 2019, the contribution rate is set to rise to 11.94%. Under the current funding policy, employee contribution rates will continue to be ramped up to 12.33% by 2025.

1.2. Understanding the 50/50 Contribution Rate Funding Policy

ASRS is funded through three sources:

1. Employee contributions, provided via payroll deductions
2. Employer contributions, paid by the relevant state or local agency
3. Investment returns on those contributions and other assets in the pension fund

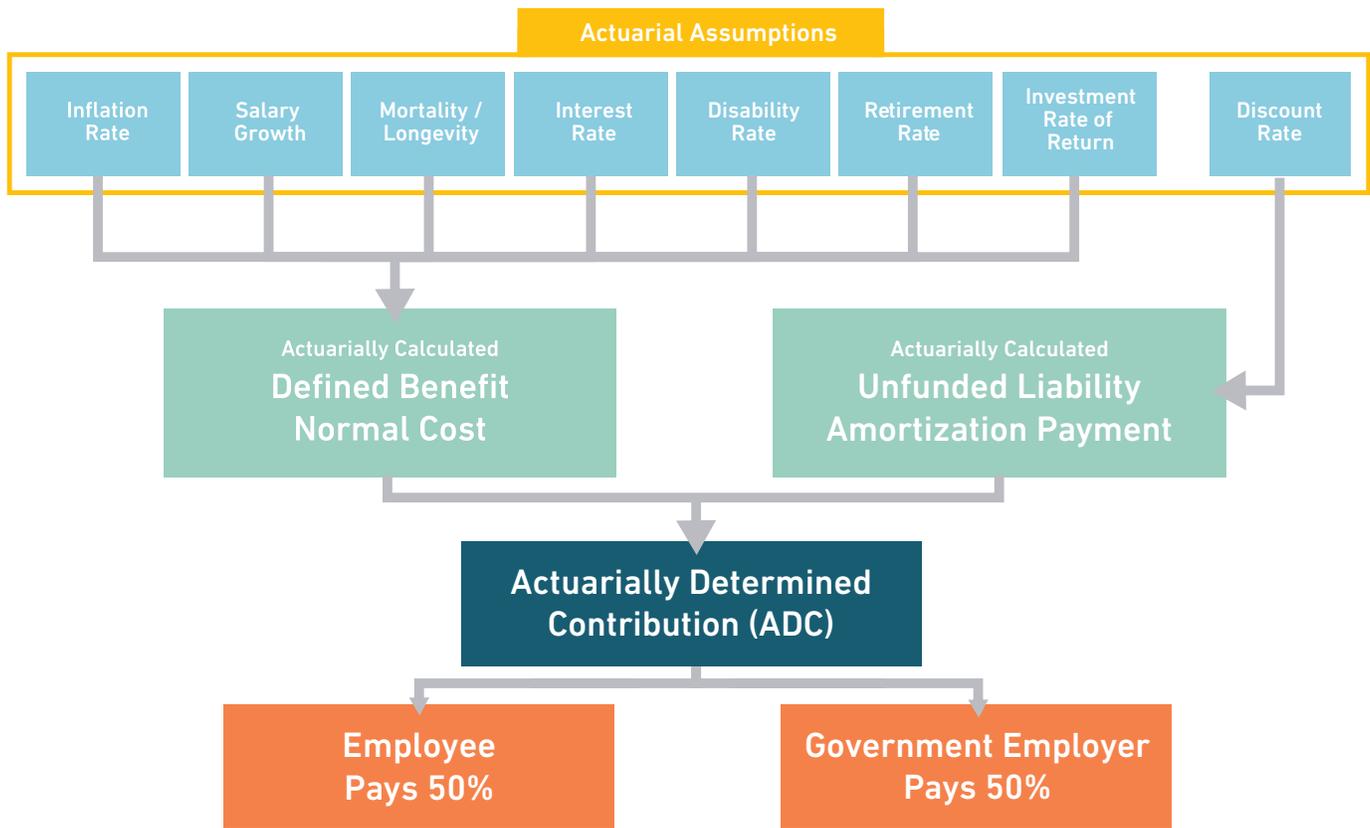
Each year, actuaries estimate the value of all benefits that will be earned in the coming year. They also determine how much money, if any, should be paid toward reducing unfunded liabilities, based on policies established by the ASRS board of trustees. Collectively, this amount determines the total contribution rate to “pre-fund” pension benefits.

ASRS divides this total contribution rate equally between employees and employers, as shown in the nearby

Figure 2. Under this 50/50 funding policy, any shift in contribution rates does not result in one party having to bear a larger financial burden. While there are advantages to the 50/50 funding policy, one drawback of this method is that it results in more volatility of employees' annual contributions than other retirement systems where employers must bear all or most of the costs of weaker-than-expected investment returns or other missed actuarial assumptions. This increased variance can result in less predictable salaries for teachers and other ASRS employees, as the amount withheld each month for their employee contribution can change significantly from year to year, as was the case for Emma, George, and all employees within ASRS since 2001.

 **KEY FACT:** Contributions have no relationship to the amount of the pension benefits paid to retirees. Instead, benefits are determined using a formula based on years of service and final average salary.

Figure 2: How Contribution Rates for ASRS Employers and Employees Are Determined



Source: Pension Integrity Project

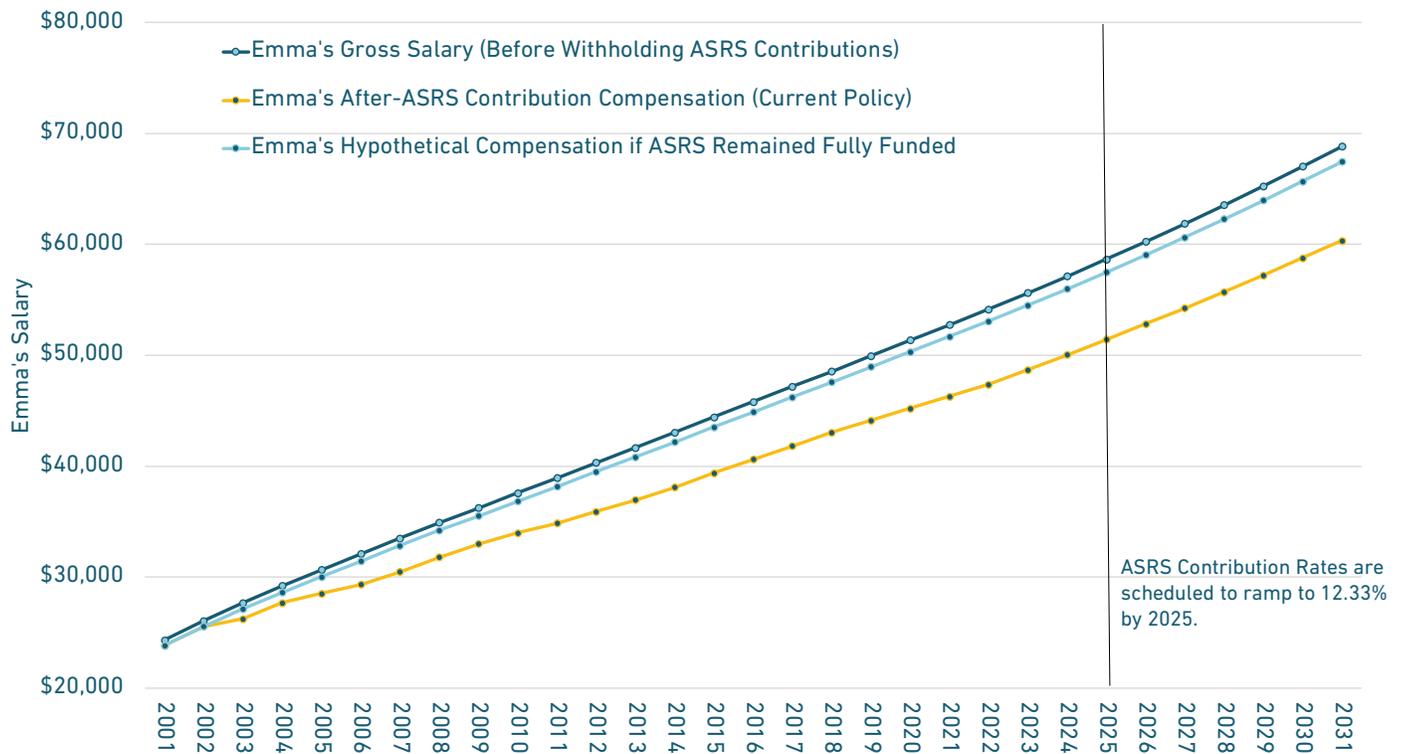
Note: Contribution rates are actuarially determined and are expected to finance the costs of benefits earned by members during the year plus any unfunded accrued liability. The flowchart shows the inputs into the actuarially calculated contributions by employees and employers into ASRS.

1.3 Contributions Have Increased, but Benefits Have Not

While one may expect that increased contributions translate into increased payouts, this is not necessarily true. Contributions, in fact, have no relationship to the amount of the pension benefits paid to retirees. Instead, these benefits are determined using a formula based on years of service and final average salary. In other words, higher contribution rates do not mean more benefits earned, but instead reflect that the costs of providing those benefits have changed. From the standpoint of teachers like Emma, the skyrocketing cost of their pensions is a growing expense that gets deducted automatically from their paychecks.

Figure 3 illustrates how the increase in the contribution rate under this 50/50-contribution-rate funding policy has and will affect Emma’s take-home salary over the course of her career.

Figure 3: Effect of Rising ASRS Contribution Rates on Emma's Career Compensation



Source: ASRS Valuation Reports and Equable Institute estimates based on ASRS payroll growth and merit salary increase assumptions.
 Note: Figures shown are not adjusted for inflation.

The difference in the amount Emma has paid for her benefits from the increased contribution rates starts small, costing roughly \$900 more by 2004 (around the time Emma received a 5.2% merit pay raise). However, with each passing year, the cost of the increased contribution rates compounded in response to her normal salary increases (in addition to even more increases in the contribution rate).

In 2019, the difference between Emma's gross salary and her after-ASRS contribution compensation will have widened to more than \$5,500. This trend is projected to continue such that, by the end of her career, Emma will be paying more than \$7,000 a year more in contributions to ASRS than if the rates had stayed at 2% (i.e., if ASRS had remained fully funded).³

³ For the purposes of this estimate, we assume Emma would work a "full" 30-year career, to reach the normal retirement eligibility age with the maximum benefit multiplier of 2.3%.

As a result of the increased contribution rates, we estimate that Emma will pay roughly \$125,000 more to ASRS for her retirement benefits than if the system had been fully funded and held contribution rates at 2% — all to earn the same benefit promised when she first joined ASRS.

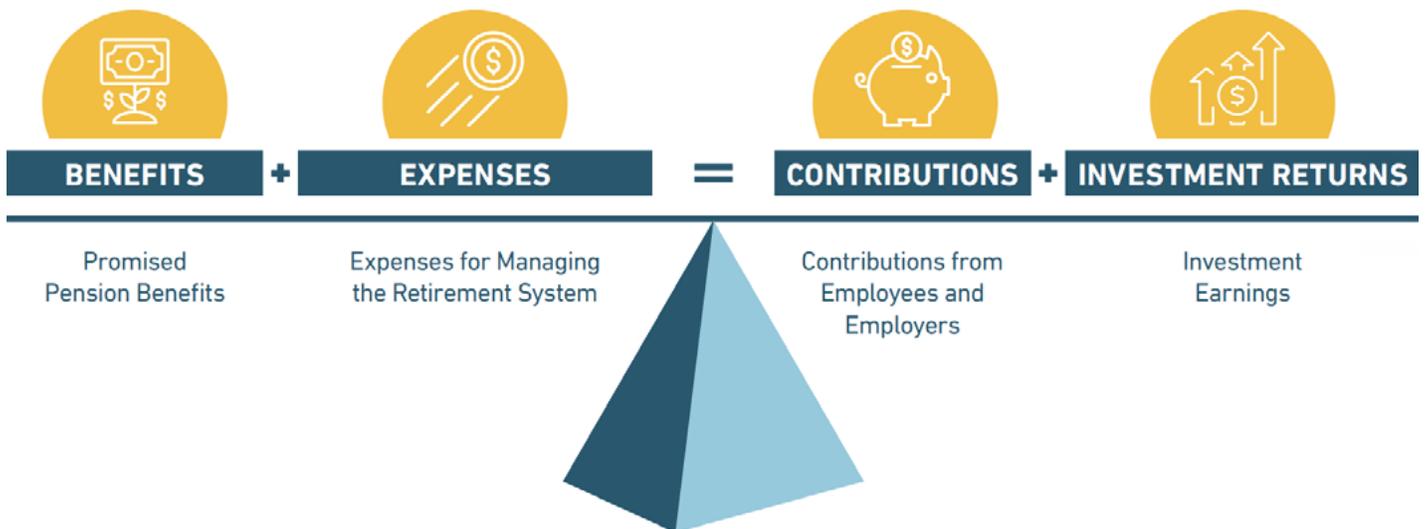
KEY FACT: Teachers like Emma have seen their ASRS contribution rates grow from 2% to 12% of salary, and all to earn the same retirement benefit promised when they started in 2001.

Part 2. Funding Challenges: Why Higher Contributions Are Driven by Weaker Than Expected Investment Performance

Emma understood that ASRS used money from her contributions to invest and earn enough money to ultimately pay out the benefits promised to her, but it was difficult to fathom how ASRS could have racked up so much debt — more than \$14 billion — when her contributions had increased so significantly.

2.1 A Simple Funding Formula

As noted earlier, traditional pension plans are funded based on contributions and investment returns being enough to pay for promised benefits.⁴ A helpful visual for understanding the funding method looks like this:



To keep the system fully funded, both contributions and investment returns must total the full amount calculated by the plan actuaries each year. If investment returns are not high enough, employee and employer contributions must be increased to help make up for the shortfall. This is because the value of benefits being promised is determined separately and is not predicated on the dollars available to pay benefits. Ultimately, Contributions + Investments should equal Benefits + Expenses.

⁴ Formally, pensions are “defined benefit” plans based on final-average salary. This differs from guaranteed return plans, which are also “defined benefit” plans based on employer and employee contributions that are invested by the state with a minimum investment return promised to the participant, and defined contribution plans, which are individual accounts that receive employer and employee contributions.

This is a fairly simple way of looking at how ASRS is funded. But the amounts used in the financial analysis of pensions are actuarially adjusted to reflect certain assumptions that affect the amount of benefits promised and how much ASRS can earn on investments.

If the board of trustees for ASRS knows the amount of money needed to pay benefits and expenses, the board can then figure out how much should be paid by employers and employees in contributions by factoring in what the ASRS investment team can earn on its investments — called the “assumed rate of return.” From the 1980s through 2016, the ASRS board thought it could make an 8% return over the long-run. However, this assumption has turned out to be overly optimistic. Over the past two decades, as markets have changed, it has become increasingly difficult to earn the kind of sizable returns on investments that pension funds were used to in the 1980s and 1990s.

While it took a long time, the ASRS board finally recognized in 2017 the need to adapt to changing markets. The board took steps to lower its assumed rate of return on investments to 7.5% for now, but this may not be realistic enough.⁵

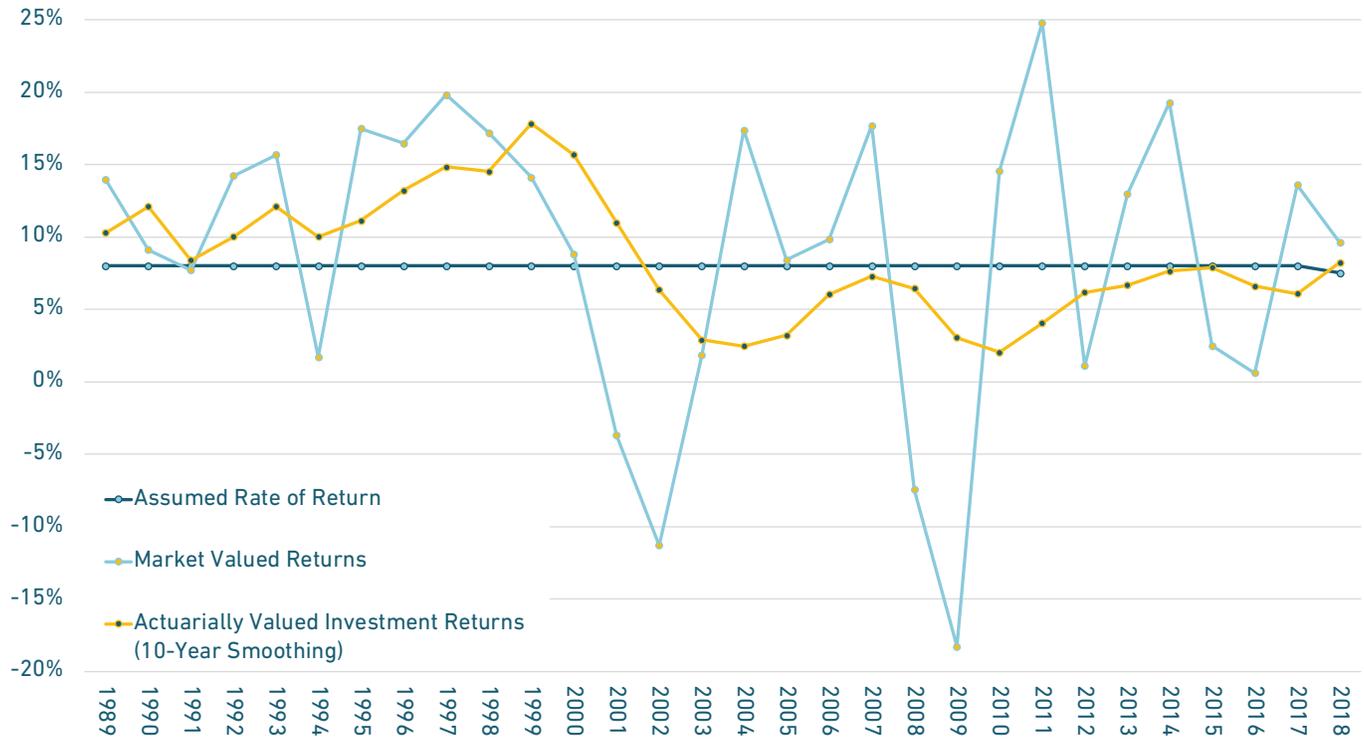
2.2 Actuarially Valued Investment Returns

In determining if the investment performance is strong enough to support ASRS funding requirements, actuaries don't always use actual market returns; they adjust the investment returns they report by only recognizing a portion of the actual gains or losses each year. In effect, they spread out the investment gains and losses over a 10-year period. So, for any given year, they are putting on the books one-tenth of the investment results for each of the last nine years, plus the current year. This serves to reduce volatility in their accounting of returns over time and in calculating year-to-year contribution rates — a worthwhile goal. This accounting adjustment, however, means that while recognized losses aren't as severe, the plan doesn't immediately recognize benefits from the major gains in the markets either.

ASRS measures these “actuarially adjusted” investment returns against their assumed rate of return in deciding on the contribution rates that will be required. Unfortunately, even after adjustments, ASRS's returns have tended to be below their assumed rate of return (as can be seen in Figure 4).

5 As of the summer of 2019, most major forecasts of investment returns (known as capital market forecasts) suggest that for large investors such as ASRS the average return over the next 10-years is likely be closer to 6% than 7%. Also, the average assumed rate of return by similarly large pension plans has dropped below 7.2%. Even with the recent moves by the ASRS board to increase real estate investments, all signs are pointing toward ASRS eventually lowering its assumed rate of return again.

Figure 4: ASRS Investment Return History Shows the Strong Performance of the 1990s Has Turned into Persistent Underperformance in the 2000s



Source: ASRS Actuarial Valuation Reports and CAFRs

While in some years ASRS’s market valued returns (light blue line) have met or exceeded the assumed rate of return (dark blue line), the actuarially-adjusted investment returns (yellow line) have been below expectations for most of the 2000s.

It can be tempting to look at single periods of time and make judgements about the health of a pension plan. For example, the current ASRS 30-year average investment return (1989 to 2018) is 8.5%, which is better than expected. However, the 20-year average return (1999 to 2018) is 6.25%, which is much worse than expected.

The reality is that single period of time snapshots can be misleading. It is better to look at trendlines and expectations of the future.

The trendline for ASRS shows that the last two decades have not been as strong as the 1990s. And most financial market experts say the next decade will be weaker than the last few decades. As a result, the strong performance in the 1990s is effectively irrelevant for measuring the health of ASRS going forward.

In 2018, the actuarially-adjusted investment return was finally back above the 8% line. But that is just one year where the investment returns beat expectations. Many more will be necessary to counteract the underperformance of the past two decades. In fact, that underperformance is the primary cause of Arizona's pension debt in the first place, which we discuss next.

KEY FACT: The strong performance in the 1990s is effectively irrelevant for measuring the health of ASRS going forward.

2.3 Growing Pension Debt and Declining “Funded Ratios”

Pension funds invest over the long run, so they also measure their investments in the long run. Individual positive or negative investment returns are not to be taken with too much weight; however, a pattern of investment performance producing returns that were less than expected does start to create problems.

For ASRS, those problems have emerged as pension debt — or what is known formally as *unfunded liabilities*. Since previous calculations about contributions were dependent on ASRS earning a certain amount of investment income and those returns have failed to materialize, there is less money in the ASRS pension fund to pay promised benefits than anticipated.

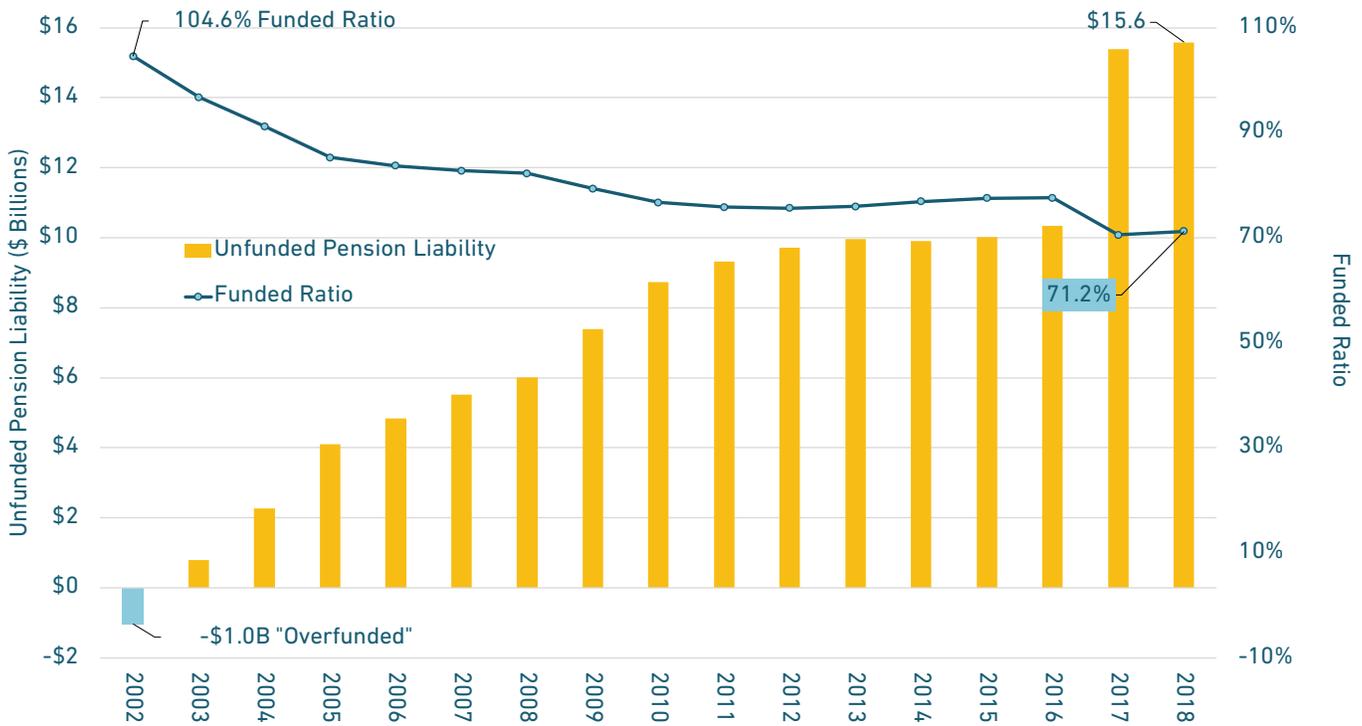
Figure 5 shows ASRS's funded status — as measured by their unfunded liabilities and funded ratio — has been worsening since 2002. The year 2002 is noteworthy because that was the last time ASRS had no pension debt. In fact, the plan was actually running a funding surplus of over \$1 billion. Since then, the situation has grown worse as the underperforming investment returns have resulted in steadily growing unfunded liabilities.

In 2017, the unfunded liabilities spiked because the ASRS board of trustees lowered the assumed rate of return on its investments. A change to the rate of return assumption means changing the accounting of future assets. And actuaries also change their accounting of the value of promised benefits. Whenever the assumed rate of return is increased, the reported value of pension benefits goes *down*. Whenever the assumed rate of return is lowered, the reported value of promised benefits goes *up*.

So, when the ASRS board lowered the assumed rate of return, actuaries changed their accounting and said more pensions had been promised than previously recognized on the books. And that meant the size of unfunded liabilities was higher.

It is important to note that with a lower assumed rate of return, the risk of underperforming investments continuing is lower. And ultimately, this is purely an accounting change having to do with the way pension fund liabilities are actuarially adjusted and reported, with no change to retirees actual pension benefit payments.

Figure 5: The Recent Funding History of ASRS Shows A Steady Growth in Pension Debt



Source: ASRS Actuarial Valuation Reports, based on actuarial value of assets

The funded ratio is a simple measure that provides a snapshot of how much of the promised benefit obligations can be covered by current plan assets. The ratio reports the actuarial value of plan assets relative to the actuarial value of accrued liabilities. If the funded ratio is less than 100%, the plan is underfunded.

ASRS’s funded ratio tells us that the fund that finances retirement benefits for state employees is currently insufficient. As of the start of fiscal year 2019, the plan’s actuaries calculate that the system holds enough funds to cover only 71% of the promised benefit obligations.⁶

While the current funding policy for ASRS will required increased contribution rates through 2025 and projects that the system will be fully funded before 2050, the true financial situation of ASRS may be even worse than recognized, according to the Urban Institute. They argue that ASRS’s projections and funding policy are based on optimistic assumptions about how much the plan assets will earn over time. According to their analysis, the system’s funded status may be even more precarious as another recession (even a small one), continued underperformance from the investments, or other missed assumptions could result in much higher contribution

⁶ Notably, because the liabilities are one of the variables included in the ratio, just as pension debt rose sharply when the assumed rate of return was lowered, the funded ratio plunged as well.

rates to reach ASRS's funding goals.

TO CONSIDER: The Urban Institute argues that ASRS's projections and funding policy are based on optimistic assumptions about how much the pension plan's assets will earn over time from investment returns.

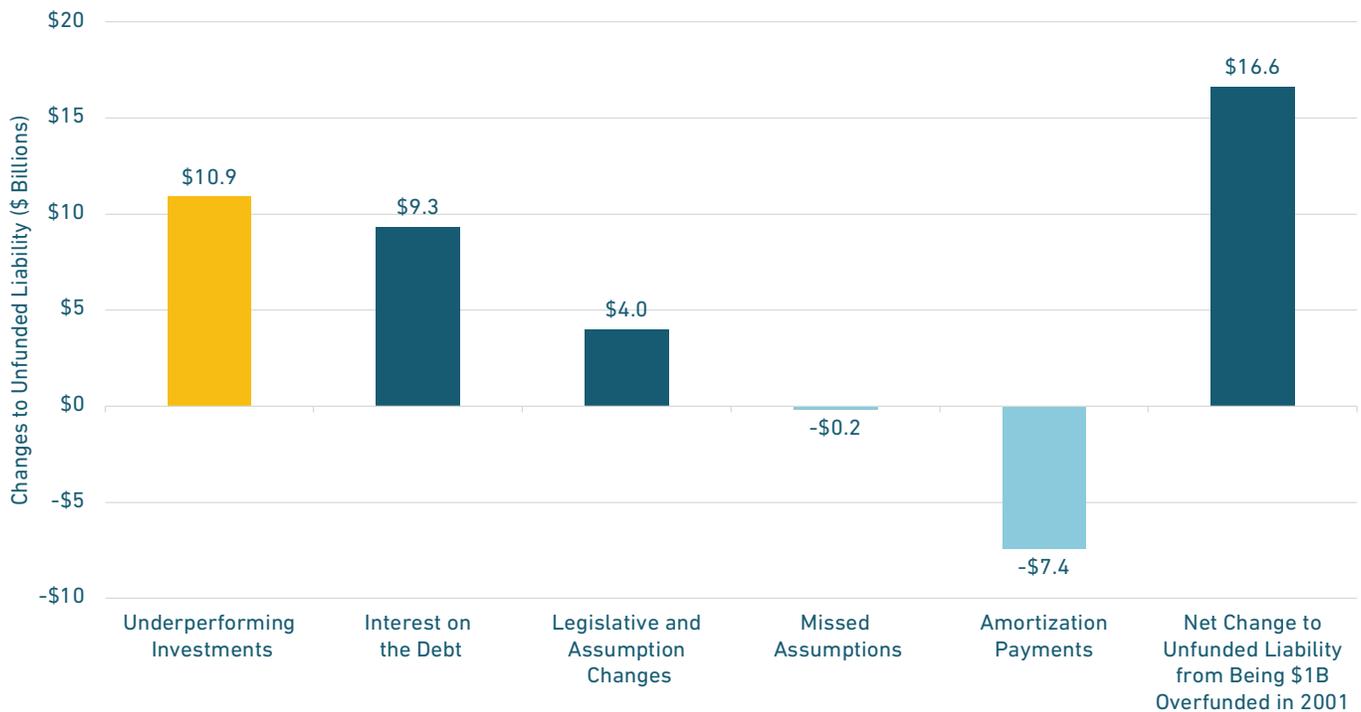
2.4 Primary Causes of ASRS's Pension Debt

How in the world did all that pension debt accumulate? Back in 2002, ASRS had zero pension debt and the funded ratio was 105%. Unfunded liabilities began to increase shortly after that, as the Internet bubble burst and the stock market declined. During the market slowdown in fiscal years 2001 through 2003, ASRS suffered large investment losses, and, by 2004, the funded ratio was down to 91%. The financial crisis in 2007 accelerated ASRS's declining financial health, but the unfunded liabilities were already mounting before that. In the years since the Great Recession of 2008-09, unfunded liabilities have continued to increase and the funded ratio has fallen further — despite more than a decade of economic growth since the end of the recession.

The most recent measurement from ASRS showed a funded ratio around 71%, with between \$14 billion and \$16 billion in pension debt (depending on the accounting method used).

Want more details on how this stuff works? See “Appendix C. What Is the Future in Funding ASRS Pensions?” on page 34

Figure 6: Causes of the ASRS Pension Debt, Actuarial Experience during Fiscal Years 2002-2018



Source: Pension Integrity Project analysis of ASRS valuations

As Figure 6 highlights, the top driver of ASRS’s unfunded liabilities has been investment returns coming in less than expected. But underperforming investments are not the only source of problems creating pension debt. Using data from ASRS showing the sources of the plan’s unfunded liabilities since 2002 — the Pension Integrity Project identified interest on the debt as the second biggest cause of growth of unfunded liabilities.

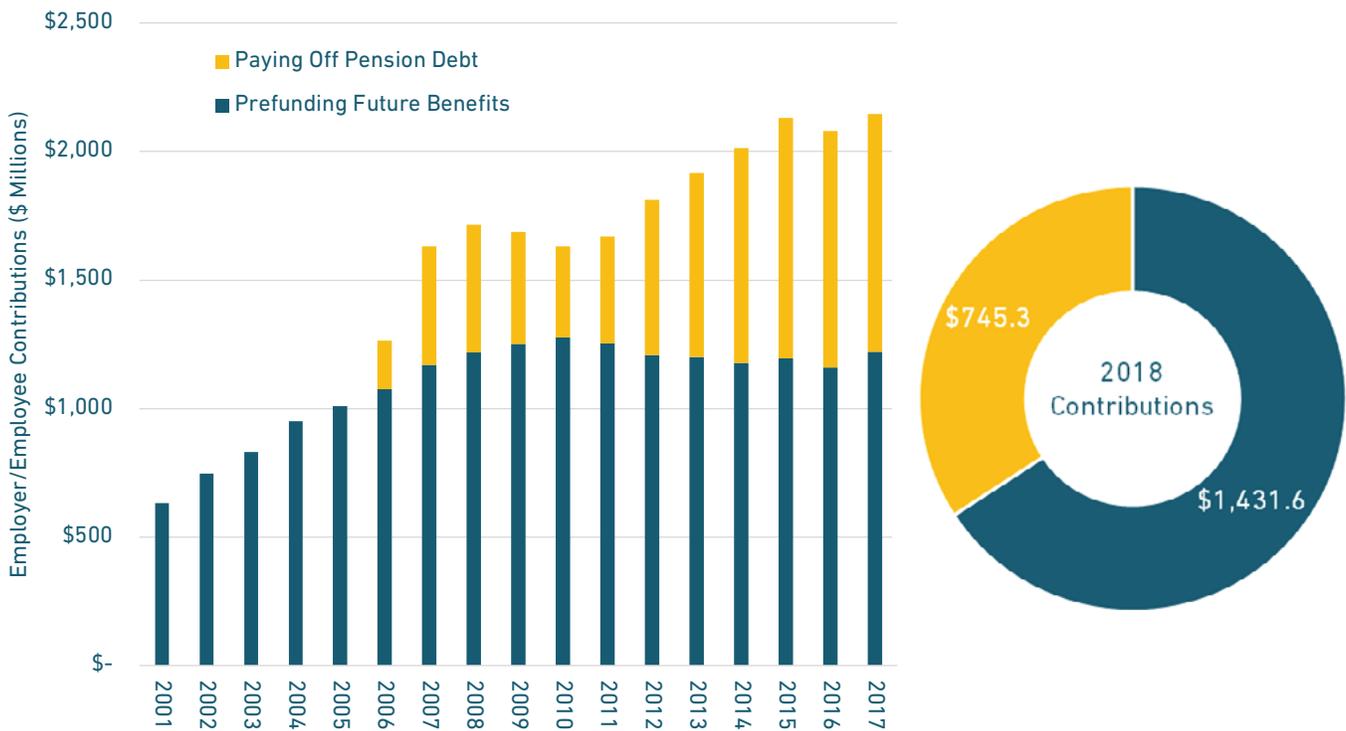
Each year actuaries determine if ASRS has earned new pension debt. If so, they divide the payments necessary to add those missing dollars into the pension fund over a 30-year period. The payments are typically designed to equal the same amount each year as a percentage of total salaries paid to ASRS employees. And those “amortization” debt payments are added to the total actuarially required contribution rate.

But this 30-year approach can mean that for certain years the calculated payments are actually less than the interest accruing on the pension debt. Since 2003, when ASRS went from overfunded to underfunded, the interest accrued has been \$9.3 billion. However, amortization payments have been just \$7.4 billion. This means that the interest that has accrued has exceeded the amortization payments over that period by about \$2 billion (see Appendix D: “Interest on the Pension Debt”).

2.5 Growing Contribution Rates Are Due to Higher Pension Debt Payments

An increasing share of contributions into ASRS is being used to pay off pension debt rather than to prefund future retirement benefits. The growth in pension debt has meant that payments toward that debt have had to increase, as displayed in Figure 7. In fact, we find that in 2018 more than one-third of all contributions were used to pay off pension debt — a trend that shows no signs of abating.

Figure 7: Contributions to Amortize the Unfunded Liabilities Are Growing



Source: Pension Integrity Project

Another complicating factor is the change in ASRS’s funding policy that came from lowering its assumed rate of return. ASRS believes its investments can perform favorably, but even if that is true there are still 30-years of pension debt payments to deal with — which is a long time to sustain an investment performance that can beat the market.

Changing the assumed rate of return on investments has the effect of increasing the amount of pension debt *that is recognized* by ASRS, and, as a by-product, the contribution rate required to bring ASRS back to full funding also must increase. The ASRS board made a policy decision to phase-in this change over a five-year period to provide a smoother transition to the higher contribution rates. This means that employees like Emma can expect a further steady increase in contributions over the next few years.

Keeping contribution rates stable, given the pension debt situation, is a worthwhile goal. Rising contribution rates are a concern for both policymakers and employees, as each increase in contributions will cut further into the state budget as well as employee paychecks. But this stability is fragile and depends heavily on ASRS's investments earning returns that meet or exceed their assumptions. As noted by the Urban Institute, if all the assumptions used by ASRS are correct, then the contribution rate could stabilize around 12% over the next decade. But they emphasize that if ASRS were to adopt a more conservative assumed rate of return, like the 5.3% rate used by the Social Security Administration, it would reduce the risk of their investments underperforming and increasing the system underfunding. However, adopting a 5.3% assumed rate of return would cause contribution rates to rise above 20% for both employers and employees, meaning that Emma and her colleagues would bring home even less of their pay.

To illustrate this point, based on Emma's 2019 annual salary of \$49,952, if the contribution rate is set at 12%, Emma's annual contribution to ASRS would be nearly \$6,000. If the contribution rate was raised to 20%, as Urban's models suggest would be necessary to adjust the assumed rate of return down to 5.2%, the amount deducted from her pay annually would be close to \$10,000.

Want to see more information on alternative forecasts for ASRS contributions? See "Appendix E. What Would Happen to Future Contribution Rates if ASRS Lowers Its Investment Rate of Return Target Further?" on page 36

Part 3 . Who Has a Path to Adequate Retirement Security?

George recently returned to Arizona for a visit with some of his old colleagues and was shocked to learn of the spike in contributions into ASRS from teachers and other plan members. His friends said he was lucky to have avoided these increases, but George quickly pointed out that he actually didn't come away unscathed. Although he was spared the ramp-up in contribution rates, he hadn't really accumulated any meaningful retirement benefits from ASRS, despite his years teaching in Arizona.

In 2008, when George and his family moved out state, he received a choice for how to claim his retirement benefits — (a) wait until age 65 and receive a pension of 14% of his final average pay of \$32,070, or (b) get a refund of his contributions. The pension benefit would be worth less than \$4,500 a year, and would not be adjusted for inflation, meaning that by the time he could start collecting a check, it would not cover much of his living expenses.⁷ George told his friends he felt he had no choice but to take the refund of his contributions and start over on his retirement planning.

3.1 Understanding the Way Pension Benefits Are Designed

By design, pension benefits accrue very slowly during the majority of a teacher's career and then increase rapidly when approaching retirement age. This is because the value of the benefit is based on both an average salary from within the last ten years of a member's working years — and the highest paid years are typically at the end of one's career — and the number of years working in the system.

In addition, because pension benefits are not based on the contributions that flow into the fund, most pension plans do not pay out employer contributions to individuals who want their money back when they leave. Thankfully for George, ASRS happens to buck the standard design of most final average salary-style defined benefit plans. For individuals hired before 2011, it offers 25% of the total employer contributions for those leaving after five years of service, plus 15% for each additional year of service. Under this formula, those who chose to withdraw from ASRS with 10 years of service (or more) were able to receive 100% of the contributions made by their employer to their benefit.

For George, having worked seven years, he was refunded all of his contributions and 55% of the employer contributions made on his behalf. In both cases, ASRS provides 2% interest on the contributions that were made,

⁷ To be clear, the \$4,500 annual pension is based on the payment formula, seven years of service x 2% multiplier (for less than 20 years served) x his final average salary of around \$32,000. Put another way, the pension earned was a 14% replacement income of \$32,000.

meaning he would have left with about \$19,313 in retirement savings for seven years of work.⁸

If George had left his money in the pension plan, he could have had two pensions upon retirement, a small one from ASRS and another one from where he moved to teach. But the sum of these two pensions would likely be worth less than if he had remained in just one retirement system for his entire career. And, again, this is because pension benefits are designed to increase in value at the end of a full career, instead of building proportionately throughout one's working years.

KEY FACT: Current ASRS participants may not be on a path toward adequate retirement savings if they are not planning on working a full career in a public sector job covered by ASRS.

In other words, the lack of benefit portability hurt George's ability to stay on a path toward retirement security. And similarly, any individuals working in an ASRS-covered job today might not be on a path toward adequate retirement savings if they are not planning on working a full career in a public sector job covered by ASRS. In fact, this could be the case even for individuals staying in the public sector but moving within Arizona. For example, a county clerk in Yuma who moves to Phoenix and gets a job with the city council would have two pensions because Phoenix has its own pension plan for civilian workers.

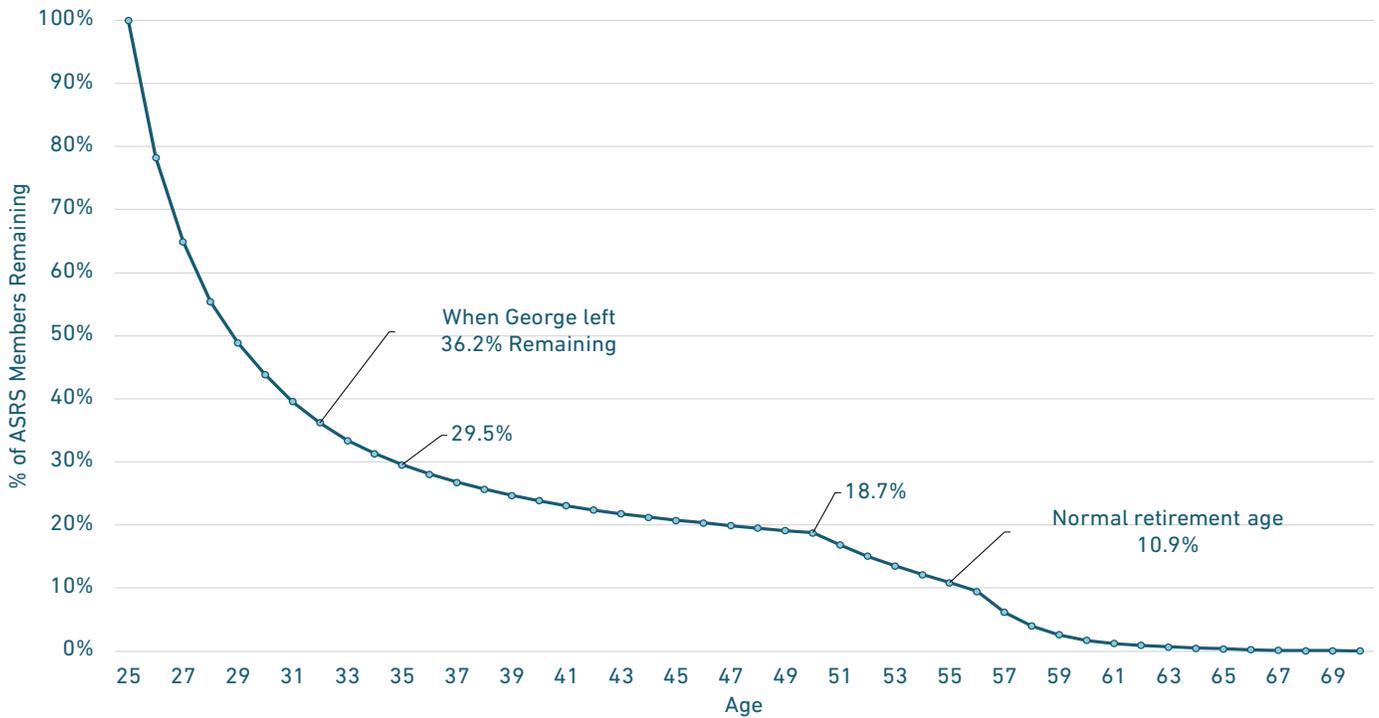
Emma, by contrast, has steadily accumulated benefits within ASRS. She moved from Deer Valley to Scottsdale, Arizona with her husband and two children. Those public school systems are both ASRS participants, so all of her teaching service continues to count toward her pension, helping keep her on a path toward retirement security.

3.2 George's Situation Is Not an Outlier

George is representative of the vast majority of Arizona's teachers, state agency workers, and municipal employees who leave the state or leave jobs covered by ASRS early in their careers or after a relatively short period of time. As can be seen in Figure 8, fewer than 11% of new ASRS members are expected to remain in the system after 30 years; while the vast majority leave well before then. In fact, more than 70% of ASRS participants leave within the first ten years of service. Like George, they received the choice between a meager pension or having their contributions refunded. After 25 years of service (at age 50 in this chart), when workers are allowed to apply for early retirement and obtain reduced benefits, only 18.75% are expected to still be remaining in ASRS (see Appendix G: "Eligibility Criteria for ASRS Pensions").

⁸ Note that final average salary is calculated slightly differently depending on hire date. For full details see Appendix B: "How Are Teachers' Pensions Calculated under ASRS?"

Figure 8: ASRS Member Retention Rates by Age



Source: Bellwether Education Partners

Note: Projections are based on retention assumptions provided by ASRS. Percentages reported assume a 25-year-old, new, female teacher. Retention patterns for non-teacher ASRS members are comparable.

3.3 How Valuable Are ASRS Pension Benefits?

Lifetime pension wealth is the total value of retirement benefits that ASRS members who complete a certain number of service years can expect to receive over their lifetime, discounted to the time of separation. Lifetime pension benefits are shown to 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 will receive over their lifetime by delaying retirement.⁹

To measure the amount of benefits that ASRS provides and how these benefits are distributed, the Urban Institute performed an actuarial analysis that tracks lifetime pension wealth over the career of a typical worker. In an actuarial analysis of pension benefits, the present value of a pension benefit reports how much it is worth today.

⁹ It is worth highlighting that changes made in 2011 extended the retirement eligibility criteria to require additional working years. Consistent with the idea that the more years worked, the fewer pension checks received, such a change reduced the value of ASRS benefits. To read more see Appendix I: “Newly Hired Teachers in Arizona Will Receive Less Valuable Pensions Than Those Hired Earlier.”

The benefits that have been promised to participants are “discounted” to present value — a financial turn of phrase that references adjusting downward the value of a future amount of money based on certain expectations of risk related to that money.

The specific “discount rate” used in actuarial analysis has a very large impact on the value of these benefits that will be paid in the future — higher discount rates reduce the present value of future benefits, while lower discount rates tend to result in higher present values of benefits. ASRS uses a 7.5% discount rate, the same as the assumed rate of investment returns, to calculate the present value of future retirement benefits.

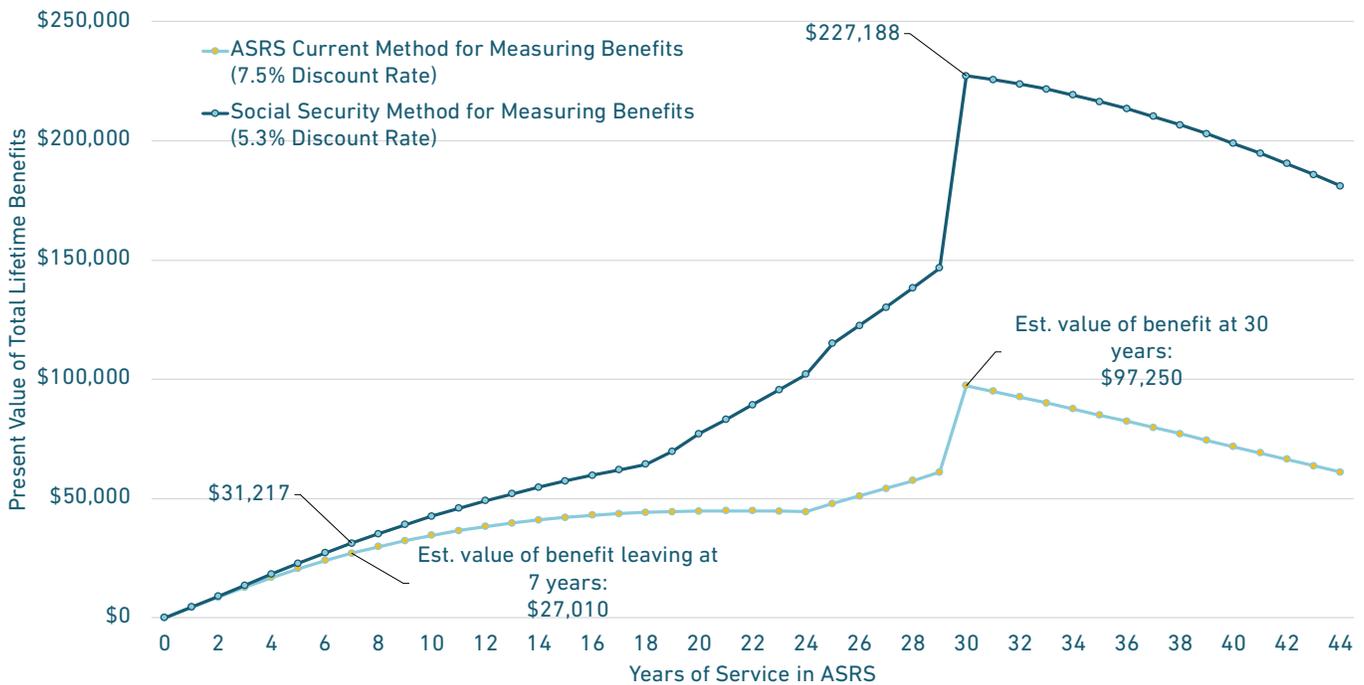
Researchers at the Urban Institute point out that a 5.3% assumed rate of return is similar to what many private sector firms use and it matches the intermediate assumption used by Social Security in 2018. However, shifting the assumed rate of return to 5.3% would come with a matching change to the discount rate, which has a significant impact on the present value estimates for ASRS members’ retirement benefits. (For more information on why the Urban Institute thinks 5.3% is a more reasonable return assumption and discount rate see Appendix H: “Probability of Achieving Targeted Investment Returns”).

Figure 9 displays the results of Urban’s modeling. As one can clearly see, a discount rate of 7.5% produces lower values for pension wealth because the same future benefit levels are being discounted at a higher rate. Pension benefits peak at around 30 years for both scenarios, reflecting the activation of retirement conditions at that time.

Curious how much you might be entitled to depending on how early you leave an ASRS participating employer? Want to know how the rules changed after 2011? See “Appendix F. ASRS Benefits for Participants Who Leave Early” on page 39

For George and Emma, the discount rate makes a significant difference in their benefits. If George chose to keep his retirement benefits with ASRS, using the 7.5% discount rate, his lifetime benefits from ASRS would be worth only \$27,010 in today’s dollars when he is eligible to retire. His benefit would be divided into equal monthly pension checks that are worth that total between his retirement and his estimated date of death. In contrast, since Emma plans to teach for 30 years, her lifetime retirement benefits in today’s dollars under this scenario would be \$97,250. However, under the 5.3% discount scenario presented by the Urban Institute, both George’s and Emma’s benefits would be worth more — an increase of roughly \$4,000 for George and more than \$120,000 for Emma (also shown in Figure 9).

Figure 9: Present Value of Total Lifetime Benefits



Source: Urban Institute

It is important to note that Emma’s lifetime benefits will be significantly higher than George’s for several reasons.

- First, Emma will have a higher final average salary in ASRS, having stayed in an ASRS teaching position for her entire career.
- Second, she will have more years of service credits, also for staying in an ASRS-enrolled teaching position.
- Last, ASRS benefits, like most pensions, are structured so they accumulate more rapidly late in a participant’s career. This can be seen in the chart if you compare lifetime benefits after 25 years of service to lifetime benefits after 30 years of service. Under the current 7.5% discount rate, the difference is nearly \$50,000 worth of benefits earned in only five years.

Ultimately, there is no inherent problem with this backloaded design if the objective of a retirement plan is only to provide retirement security to those who work a full career. Some experts argue that pensions should be considered more of a “reward” than as a retirement savings plan for participants. However, if the objective of a retirement plan is to provide a path to retirement security for all, then only offering traditional pensions fails that goal because it clearly only works for certain participants.

Part 4. A Framework for Improving ASRS

In the fall of 2017, the board of trustees at ASRS voted to lower the assumed rate of return used for determining contribution rates and accounting for the value of benefits from 8% down to 7.5%. This change went into effect in December 2017. It was a prudent decision given the level of risk the previous rate posed, the historic pattern of underperformance that was the primary driver of today's unfunded liabilities, and future outlooks on probable investment returns for any pension system's portfolio. And yet, in the spring of 2019, Fitch Ratings — one of the top three rating agencies that put out guidance on government finances — ranked Arizona as the riskiest state for pension fund investment.¹⁰

The reality is that the problems with ASRS could get much worse if nothing is done to improve the status quo. As noted by the Urban Institute, if all of the assumptions used by financial experts for ASRS turn out to be correct, then things could be okay. But everything has to go just right and, if the past is any guide, this is a big risk.

The Pension Integrity Project at Reason Foundation also notes that total contributions could grow to more than 40% — split 50/50 between employees and employers — if investment returns over the next decade are weak.¹¹

While Emma can be confident that ASRS is placing her on a path toward a secure retirement — the Arizona Constitution protects the benefits that she has earned, regardless of the system's funded status — she should be very concerned about future contribution rate increases if the funded ratio declines. She may end up paying significantly more for her retirement benefits if a serious plan isn't adopted soon to address these challenges.

As we have highlighted throughout this paper, investment returns have a major effect on actuarially calculated contributions over the long term. Therefore, if the current economic expansion ends and markets decline, there is a real likelihood that contribution rates will need to be increased. Current forecasts call for ASRS contribution rates to remain around 12% for the next 10 years. That's good news for Emma and current employees. While contribution rates are nowhere near the 2% Emma paid when she first started teaching, at least they aren't expected to rise as much as they did in the mid-2000's. For new teachers, however, if investment returns are weak in the near term, contributions could be forced up toward 20% through the 2030s before recovering.

Though George has already moved on, there are more individuals like him all over the state who are not on a path to retirement security based on the status quo plan design. Something should be done to ensure that ASRS is designed so that it can work well for all.

10 Fitch: Arizona Riskiest Pension Investor in Nation" <https://medium.com/equable-institute/fitch-arizona-riskiest-pension-investor-in-nation-a13da2a9efac>.

11 For more analysis of ASRS sustainability, see previously mentioned discussions in Appendix E: "What Would Happen to Future Contribution Rates if ASRS Lowers Its Investment Rate of Return Target Further?" and Appendix H: "Probability of Achieving Targeted Investment Returns."

4.1 Questions to Shape an ASRS Improvement Effort

Stakeholders in ASRS need to ask three sets of questions, and have mutually agreed upon answers, to identify what improvements are necessary to strengthen the sustainability of ASRS and improve its capacity to provide retirement security:

- 1. Are there additional factors threatening the sustainability of ASRS that could lead to growth in unfunded ASRS pension liabilities?**
 - A primary factor that created today's ASRS pension debt is the underperformance of investment returns, as demonstrated in this paper citing a range of research from other organizations and data provided by ASRS itself. Given that financial markets are at historic peaks and ASRS has not meaningfully improved its funded status since the financial crisis, there are likely additional challenges ahead for Arizona's leading retirement system.
 - What additional risks exist that could cause today's problems to get worse over the next few years instead of better?
- 2. Is the current oversight structure for ASRS working?**
 - ASRS fell from being fully funded in 2002 to around 80% funded before the financial crisis. Over the past decade as the economy has recovered ASRS has continued its solvency decline to around 70% funded today.
 - Is the legislature aware of the financial risks and underperformance risks that the ASRS fiduciaries have embraced?
 - Are employees as stakeholders comfortable with the trade-off of increased risk to avoid near-term cost increases, knowing that they have 50% of the downside risk?
- 3. Is ASRS delivering on its promise of providing retirement security for all of its members?**
 - Data provided by ASRS shows that the retirement system does not expect most new members to accumulate adequate retirement savings. Our research shows that current employees like Emma are accumulating adequate retirement savings as long as they work to normal retirement age, but they are penalized greatly if they leave early like George.
 - Is this approach meeting the retirement security and workforce goals of all stakeholders for ASRS?

4.2 Setting a Collaborative Path Forward Based on Objectives

Whatever the solution set looks like for ASRS, it should engage these sets of questions and identify a clear set of objectives, which Equable proposes should be something like the following:

1. Retirement systems should be designed to be resilient, affordable, and capable of successfully providing retirement security to their participants.
2. Retirement systems should offer a path to a safe and secure retirement for all members.
3. Retirement systems and their trustees should be accountable to their participants, elected officials, and taxpayers.

For Arizona to thrive and for its state agencies, municipalities, and school districts to be effective, ASRS must be prepared for negative shocks and tail risk events. Sustainability of public pensions requires consistent and adequate funding, effectively diversified assets, conservatively managing the risk of actuarial experience underperforming assumptions, low investment management fees, the capacity for Arizona's public employers to afford the cost of benefits, and year-to-year budgetary predictability.

Further, ASRS should be able to adapt to changing economic and demographic situations so that risks do not build up so much over time that they threaten the retirement security of members and the fiscal stability of the state and local governments. To accomplish this, the stakeholders in ASRS need to carefully review the fragility of the retirement systems and work to reduce high consequence tail risks, all while working to ensure the ability to respond to changing circumstances and be resilient in the face of negative events when they come.

There is a range of trade-offs in how to manage the costs of adjusting to risk, setting benefit levels, and assigning which stakeholders pay for what parts of those benefits. What is important is that those near-term and long-term costs should be known and paid for within existing budgetary resources. And that all stakeholders have their voices heard in a collaborative process of working through the best course of action in dealing with those trade-offs.

Appendices



Appendix A. How ASRS Pensions Work

The Arizona State Retirement System (ASRS) serves teachers, public school administrative staff, state agency workers, legislative staff, state university employees, and most non-public safety municipal workers across the state outside of Phoenix and Tucson (which have its own municipal retirement system). Certain public charter schools do not participate in ASRS either. ASRS provides a final average salary-based defined benefit retirement plan for those who work long enough to qualify, and healthcare benefits for active workers.

Arizona provides constitutional protection of its public pension benefits. Specifically, the Arizona Constitution stipulates that membership in a public retirement system is a contractual relationship and public retirement system benefits shall not be diminished or impaired. Thus, the Arizona Constitution prohibits a reduction in benefit payments to retirees and in future benefits to current employees. Changes to the eligibility requirements and pension benefit calculations are made by the state legislature and affect new hires after the legislation takes effect. Arizona's most recent changes to eligibility and benefits went into effect on July 1, 2011 and only affect members hired on that date and later.

ASRS's retirement plan uses a cost-sharing approach in which employees and employers make the same contribution, defined as a fraction of employee salary. The contribution percentage assessed on teachers and employers is set annually to reflect the plan's actuaries' expectations of the plan's funding requirements. And as members of ASRS, teachers will receive a pension based on their years of service and final average salary, when they are eligible. In addition to regular pension benefits, members are also eligible to receive health insurance through ASRS. Employers contribute 0.44% of employee salaries to help finance these health insurance benefits. Employees do not contribute to the costs of health insurance.

Most state pension plans, including ASRS, must be actuarially funded. They are required to set aside some money today to cover future benefits as they accrue. Plans are funded by contributions from employers and employees that earn investment returns. The amount that must be set aside each year varies and 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. If these assumptions turn out to be overly optimistic, because actual investment returns fall short of expectations, or because retired members live longer (and collect retirement benefits longer) than expected, the plan will become underfunded. This will require an increase in contributions to make up the difference, known as unfunded liability amortization payments.

ASRS administrators manage the process of calculating an individual's retirement benefit, providing them options on how to receive those payments, and then issuing monthly checks that comprise the pension. Retirement benefits that an individual qualifies for are guaranteed for the life of the participant, and in some cases for the life of their beneficiary as well.

Appendix B. How Are Teachers' Pensions Calculated under ASRS?

ASRS is a defined benefit plan that provides guaranteed income to retirees. Pension benefit values and eligibility are set by statute.

The basic structure of Arizona's teacher pension is similar to that of other states. The formula below shows how a teacher pension is calculated in Arizona.

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

Final average salary is calculated differently depending on the member's start date. Note that the most recent changes to the law governing ASRS went into effect on July 1, 2011.

Figure B1: Final Average Salary Rules by Hire Date

Membership Date	Final Average Salary
Prior to 1/1/1984	Highest consecutive 36 or 60 months of the last 120 months of salary reported to ASRS, which could span more than 10 calendar years. For the 60-month period (but not the 36-month period), payments made as a result of termination of employment: such as vacation, sick leave, and termination incentive payments, are included.
1/1/1984 through 6/30/2011	Highest consecutive 36 months of the last 120 months of salary reported to ASRS, which could span more than 10 calendar years. Does not include termination pay.
7/1/2011 or later	Highest consecutive 60 months of the last 120 months of salary reported to ASRS, which could span more than 10 calendar years. Does not include termination pay.

Source: ASRS Valuation Reports

Generally, states use a consistent multiplier, for example 2%, for all participants. However, Arizona is unique and applies one of four different multipliers depending on a teacher or public employee’s number of years of service. This approach provides slightly more generous benefits to those teachers who serve the longest. As shown in the table below, for the first 19 years, a teacher’s pension benefit is calculated using a multiplier of 2.1%. Once they begin their 20th year of service, however, the multiplier increases to 2.15%.

Figure B2: ASRS Multiplier Scale

Years of Service	Multiplier	Notice that the amount of benefits that will be paid to the retiree has no direct relationship to the amount contributed by the retiree or percentage of salary contributed to the plan by either the participating employer or employee.
Less than 20	2.1%	
20 to 24.99	2.15%	
25 to 29.99	2.2%	
More than 30	2.3%	

Source: ASRS Valuation Reports

Appendix C. What Is the Future in Funding ASRS Pensions?

After years of assuming that the ASRS investment team could earn an 8% long-term return, the ASRS board finally adopted a more realistic investment return assumption of 7.5% in 2017. As a result, it had to recognize that it had billions of dollars more in unfunded liabilities than previously reported, causing the recent spike in the unfunded liabilities and drop in the funded ratio. They acknowledge that a lower investment rate of return will require higher contribution rates to pay off the increased unfunded liabilities. This is because the discount rate used in the actuarial calculation is set at the same rate as the investment rate of return.

Each year, ASRS actuaries calculate the contribution rate required to prefund benefits for existing employees and amortize new unfunded liabilities accrued over the past year on a level dollar basis over the next 30 years. The new unfunded liabilities being amortized are discounted to their actuarial present value using the discount rate set by the ASRS board. Because reducing the discount rate causes a significant jump in the required contribution rate, the ASRS board made a policy decision to phase-in this assumption change over a five-year period to provide a smoother transition to the higher contribution rates.

Lower discount rates provide less risk and volatility in funding pension benefits, but they also require greater employer contributions to cover the higher present value of benefits promised to retirees, causing push-back against lowering the discount rate further. Furthermore, since ASRS splits this amount evenly between employees and employers, reducing the discount rate would cut further into employee paychecks. This would be a problem for current employees, who would feel this as a pay cut.

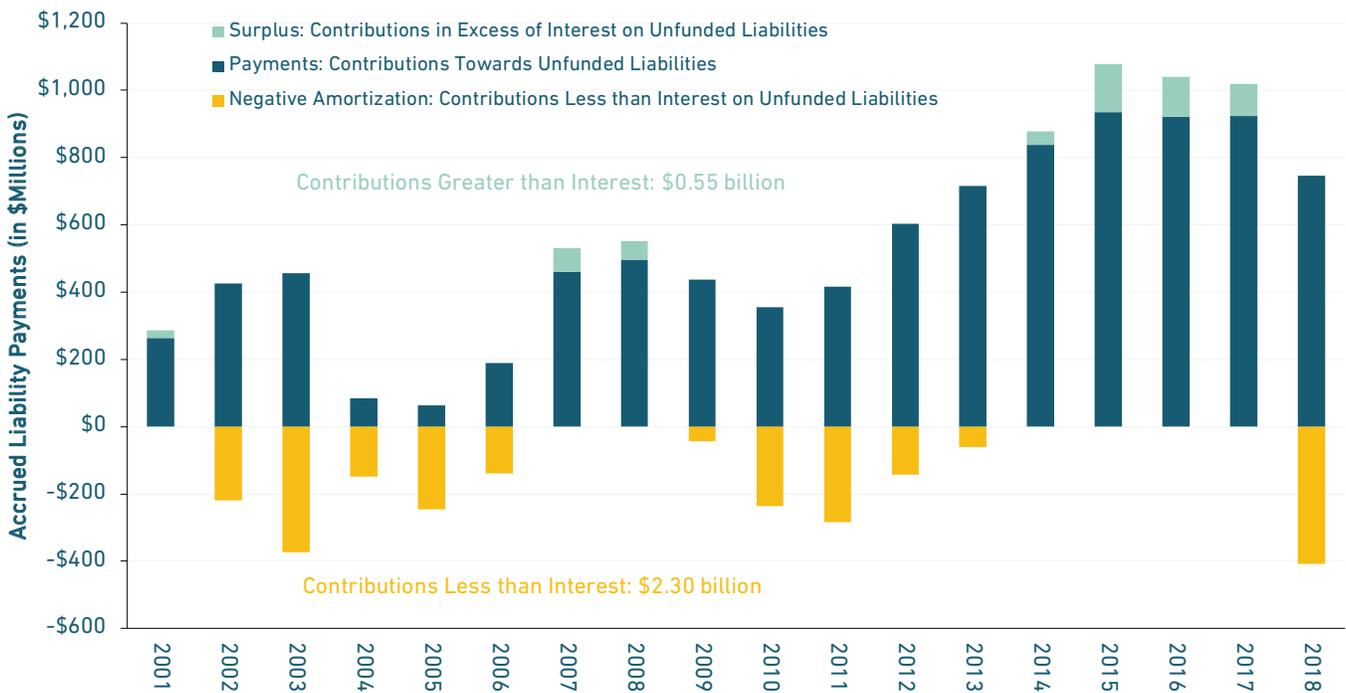
Since current methodology is resulting in contributions that are too low to fully fund ASRS, higher contribution rates to pay for increases in the actuarially calculated unfunded liability amortization payments should be expected to continue. Under the 50/50 funding policy, rising contribution rates are assessed on employees and employers equally and do not result in one party having to bear a larger financial burden. Missed assumptions and underperforming investments result in more variance of employees' annual contributions under a 50/50 cost sharing policy. Many states use a different split in the contribution rates assessed on employees and employers.

Appendix D. Interest on the Pension Debt

The unfunded liabilities of ASRS have varied from year to year since the last time the pension fund was fully funded. In most of those years, ASRS amortized the unfunded liability using a 30-year level dollar amortization method. Because the amortization period was reset in most years, the continued long amortization periods led to negative amortization.

In 11 of the past 17 years, actuarially calculated contributions toward the unfunded liabilities have been less than the interest accrued on the pension debt. Thus, despite receiving the actuarially determined contributions, the plan’s unfunded liability has been growing in absolute terms. This can be seen in the following chart.

Figure D1: Payments Toward ASRS Unfunded Liabilities Relative to Interest Accrued



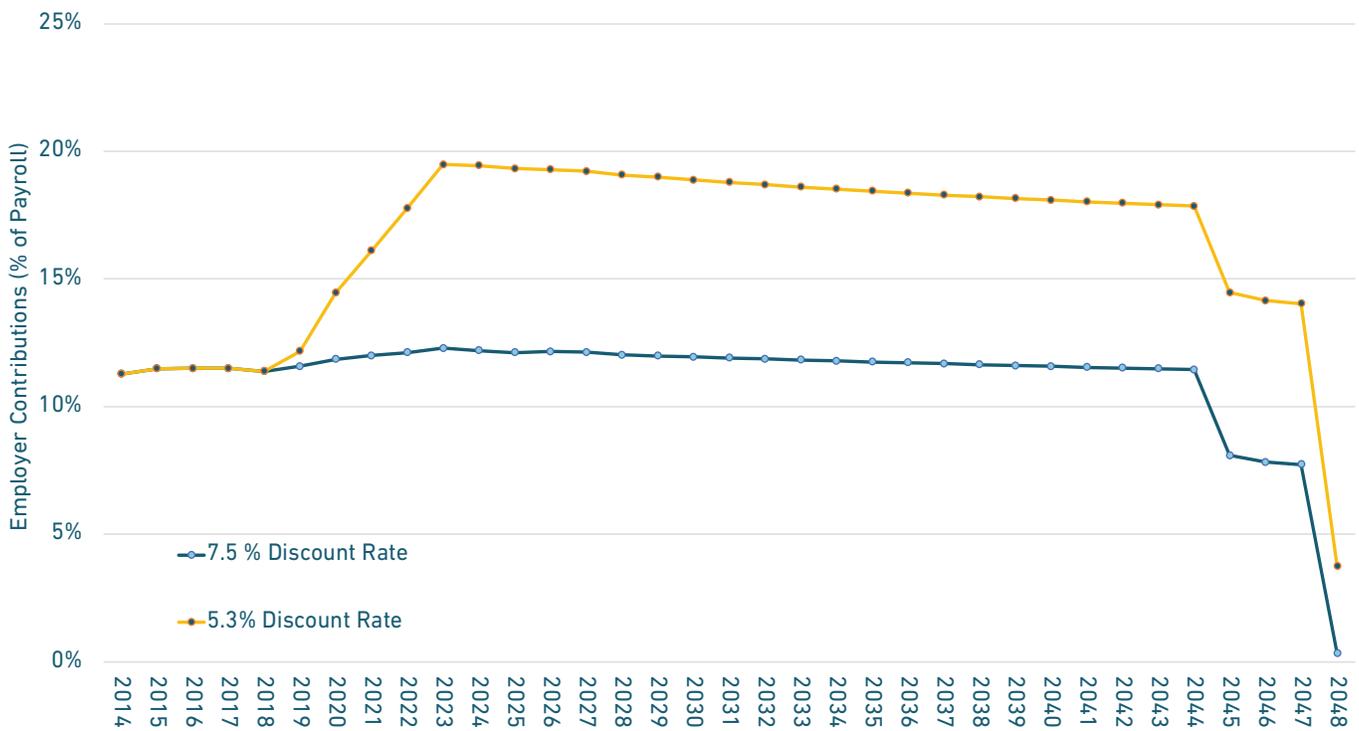
Source: Pension Integrity Project analysis of ASRS Valuation Reports

In 2014, the ASRS board of trustees adopted a new funding policy that created a closed amortization period for the existing unfunded liability, and new amortization base layers for future actuarial losses. Since then most years have avoided negative amortization.

Appendix E. What Would Happen to Future Contribution Rates if ASRS Lowers Its Investment Rate of Return Target Further?

Lowering the target rate from 7.5% to 5.3% for future investment returns would cause even higher contribution rates. When the assumed rate of return is lowered, as in the following chart using projections from the Urban Institute, contributions would increase dramatically. The baseline scenario, using the 7.5% rate of return target, yields a peak employer contribution rate of about 12%. By contrast, the lower investment target scenario, using a 5.3% rate of return target, clearly highlights potential danger for ASRS: a contribution rate peaking just below 20% and staying above 15% until 2045. The authors of Urban Institute’s report argue that a more reasonable assumed rate of return and discount rate is 5.3% because it is similar to what many private sector firms use and it matches the intermediate assumption used by Social Security in 2018.

Figure E1: Projected Annual Employer Contributions Assuming Lower Targeted Rate of Return



Source: Urban Institute

There would be real pushback against lowering the target to 5.3%, however, from anyone who would feel the pinch from increased contributions required relative to such a change. In addition, if contribution rates approach 20%, ASRS employers might begin dealing with really significant retention challenges.

Under both scenarios shown in the chart, the contribution rate collapses toward the end of the projection period as the ASRS finishes making the necessary amortization payments.

Even with the expected rate of return of 7.5%, policymakers and pension board trustees should maintain sound actuarial assumptions and pension funding policy to avoid rapidly rising costs to employees, which ASRS members are already experiencing. And, this should likewise be of concern to current teachers who already have seen their contributions rise dramatically over their careers.

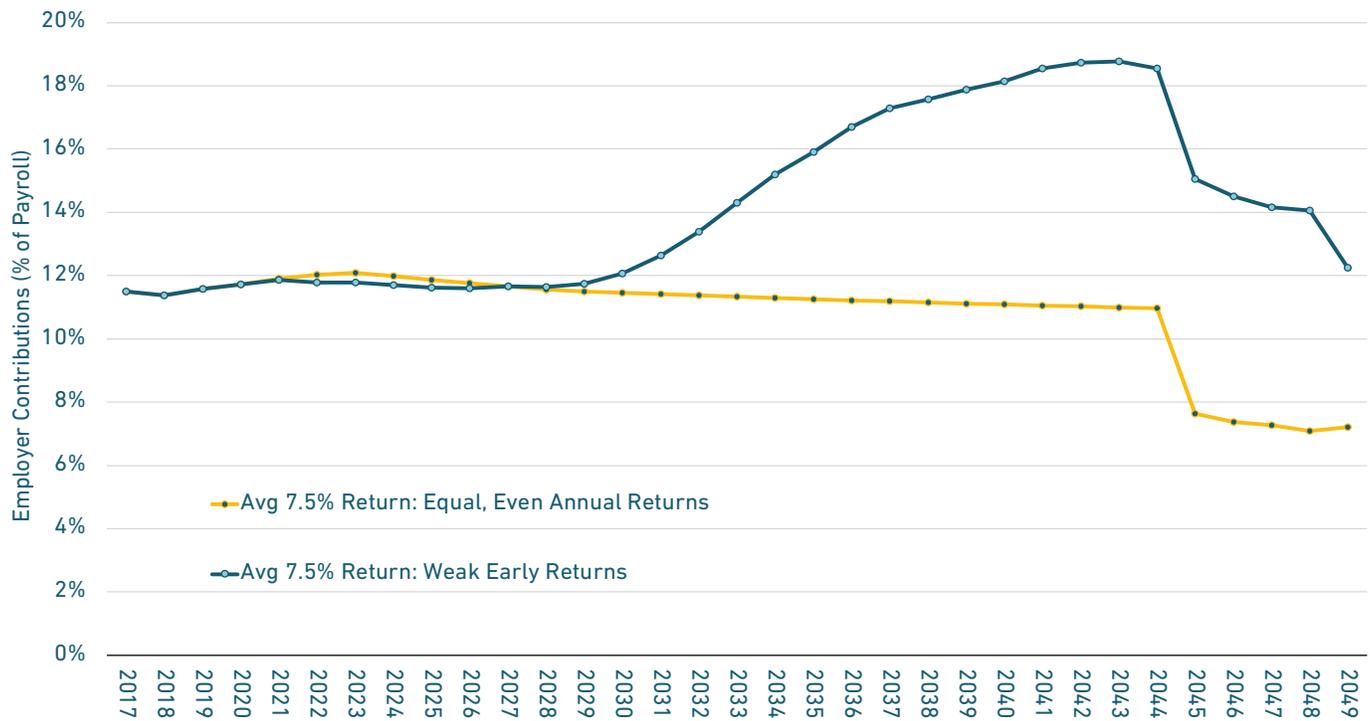
Impact of Future Actuarially Adjusted Investment Returns on Future Contributions

The following chart shows a forecast for future ASRS contributions by employers from the Pension Integrity Project. Since ASRS requires employees to pay the same percentage as employers, this forecast applies to them as well. In this chart, average investment returns of 7.5% are assumed over the entire period. The chart illustrates the effect of the timing of actual investment returns on future contribution rates, even if in the long term, average investment returns achieve their target.

In the chart, the baseline scenario calls for equal, even annual returns of 7.5% over the long-term. Under that scenario, annual contributions would remain in the 11% to 12% range, until the unfunded liability amortization payments are completed, at which time it would drop to a range of 7% to 8%.

However, if early returns are weak, as in the case of a recession or market correction in the near term, annual contribution rates would be negatively affected — reaching close to 19% as they are recognized, before slowly trending downward to 12%, despite achieving the 7.5% average return over the long term. Given how far along we are in the current economic cycle, and some early signs pointing toward the end of the economic expansion, many economists are expecting an economic downturn or recession to occur within the next year or two, making the weak early returns scenario plausible.

Figure E2: Importance of Timing of Investment Returns on Contribution Forecast



Source: Pension Integrity Project

As can be seen, actual annual investment returns have a major impact on actuarially calculated contributions over the long term, since ASRS recognizes investment gains and losses over a 10-year period to reduce volatility. Therefore, under both scenarios, contribution rates are expected to remain around 12% for the next 10 years. That’s good news for current employees, since even though contribution rates are nowhere near the ASRS fully funded rate, at least they aren’t rising as they had been. For new teachers, however, if investment returns are weak in the near term, contributions could be forced up toward 20% through the 2030s before recovering toward 12% at the end of the projection period.

Appendix F. ASRS Benefits for Participants Who Leave Early

Teachers, state employees, municipal agency workers, or other ASRS participants who leave public service before reaching the retirement benchmarks are still entitled to benefits (as long as they've vested). But in those cases, participants typically receive a refund of their own contributions plus interest (currently set at 2.0%). For members hired before July 1, 2011, if they have served more than five years of service and withdraw early, in addition to the refund of their own contributions, they are entitled to share of the employer contributions with interest (again set at 2.0%), through the "enhanced refund" option. Under this option the share of employer contributions that they may receive varies based on the total number of years served.

Figure F1: How Much Can Employer Contributions Be Refunded

Years of Service	% of Employer Contributions to be Refunded
Less than 5	none
5	25%
6	40%
7	55%
8	70%
9	85%
10 and over	100%

Source: ASRS Valuation Reports

For members hired after July 1, 2011, if they have served more than five years of service and withdraw early they are only eligible for the "normal refund" option. Under this option, members are only entitled to receive to their own contributions with interest (also set at 2.0%).

In addition to the refund options, all members who leave after serving at least five years of service are allowed to remain in ASRS by keeping their accounts intact. They will be eligible for reduced early retirement benefits at age 50 or regular retirement benefits at age 65. However, in most cases these benefits will not provide an adequate retirement benefit on their own because ASRS uses final average salary and years of service in calculating the amount of benefits to be paid. Moreover, as a guaranteed income pension plan, ASRS benefits are structured to provide financial security for older workers who have retired, not for people who have worked a short time.

Appendix G. Eligibility Criteria for ASRS Pensions

The state sets specific windows when teachers can retire with full benefits based on age and years of experience. In 2011, Arizona made its latest changes to ASRS retirement eligibility requirements for teachers

Eligibility Criteria to Collect Pensions under ASRS

Employees may begin collecting a pension once they satisfy their plan's retirement eligibility criteria, defined typically by a 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 under their early retirement rules.

Arizona does not have a vesting period. This means that teachers in Arizona qualify for a pension regardless of how long they serve. That pension may not be worth very much, and educators can't begin to collect it until they hit the state's retirement age, but immediate vesting does at least ensure all educators begin to accrue pension benefits immediately.

Changes in Eligibility Requirements for Full Retirement Benefits for Arizona Teachers

Changes to retirement eligibility rules are made by the state legislature and don't affect the benefits and eligibility requirements for existing teachers which are already promised. The most recent eligibility changes went into effect on July 1, 2011, under which a teacher hired after July 1 2011, who starts at age 25 will be eligible to retire after 30 years at age 55. Teachers hired prior to that date are eligible to collect full pension benefits earlier, under the rule of 80, in which retirement eligibility is achieved once the sum of the person's age and years of service equals 80.

Figure G1: Retirement Eligibility Criteria

Membership Date	Requirements to retire with full benefit
Prior to 7/1/2011	80 Points (sum of age and years of service) Age 62 with at least 10 years of experience Age 65
7/1/2011 or later	Age 55 with at least 30 years of experience Age 60 with at least 25 years of experience Age 62 with at least 10 years of experience Age 65

Source: ASRS Valuation Reports

Additionally, Arizona allows early retirement at age 50 with at least 5 years of experience, but teachers taking that option have their benefits reduced based on their years of experience and how early they are retiring.

Appendix H. Probability of Achieving Targeted Investment Returns

In trying to achieve its targeted rate of return, ASRS increased the risk in its portfolio by changing its asset allocation to include a higher share of equity and alternative investments that tend to have higher returns. But even with this change in its portfolio, and the reduction of the targeted rate of return to 7.5%, there are risks that underperformance will continue. The Pension Integrity Project’s model that predicts the likelihood of ASRS achieving a possible rate of return for its target of 7.5%, gives odds of 55% that it will achieve that return over the long term. Forecasts from other market participants for long term investments show that a lower target, 5.5% or 5.0% would much more accurately reflect expected returns in the long term.

Figure H1: Probability of ASRS Achieving a Given Return

Possible Rate of Return	ASRS Expectations	BlackRock 20-Year Forecasts	JP Morgan 10-15-Year Forecasts	BNY Mellon 10-Year Forecasts	Research Affiliates 10-Year Forecasts
8.0%	43%	39%	23%	22%	14%
7.5%	51%	47%	30%	29%	19%
7.0%	57%	54%	37%	36%	25%
6.5%	64%	62%	44%	44%	32%
6.0%	71%	69%	52%	52%	39%
5.5%	77%	75%	60%	60%	46%
5.0%	82%	81%	68%	68%	54%

Source: Pension Integrity Project

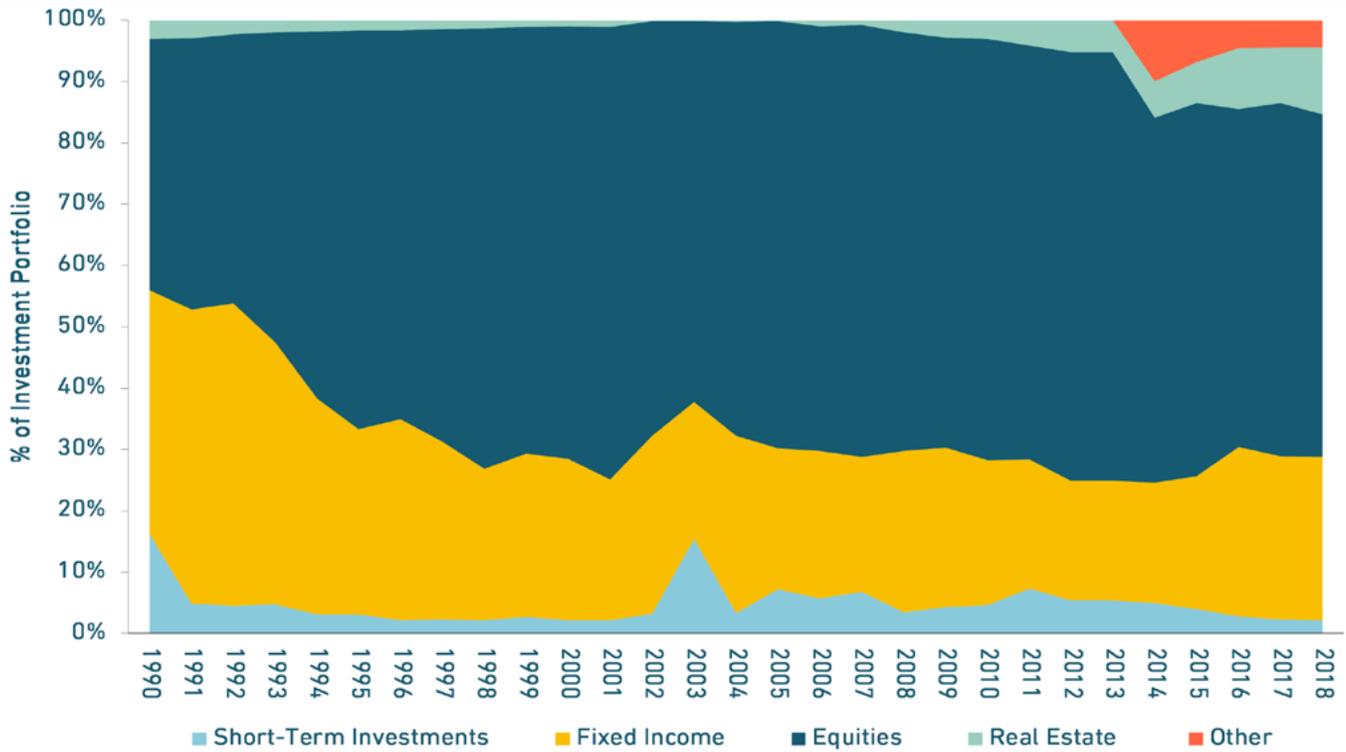
The risk of underperformance is shown in the table above. As can be seen, the status quo contains considerable risk that should be consciously affirmed by elected officials or adjusted based on their risk preferences.

The Search for Higher Yields by ASRS to Improve Investment Returns

Even if they achieve healthy returns on the market value of its assets, ASRS needs to reach its targeted rate of return on the actuarially calculated value of its assets. This has proven to be a much more difficult hurdle. As a result, ASRS had to move its investments into higher risk instruments as shown in the graph below.

Figure H2: ASRS Asset Allocation (1990-2018)

Increased Concentration of Investments in Equities and Alternatives to Achieve Higher Yields



Source: Pension Integrity Project of ASRS Valuation Reports

Appendix I: Newly Hired Teachers in Arizona Will Receive Less Valuable Pensions Than Those Hired Earlier

The lifetime benefits that have been promised to current employees in ASRS are guaranteed by the Arizona constitution. Therefore, any changes to the eligibility requirements and pension benefit calculations made by the state legislature will only affect new hires.

Arizona's most recent changes to eligibility and benefits went into effect on July 1, 2011 and only affected those members hired on or after that date. These changes effectively reduced the value of retirement benefits earned, meaning while members can earn a pension, they will be less valuable on average than for those hired before July 1, 2011.

ASRS was designed to provide adequate pension retirement income for those who work a full career teaching in Arizona's public schools. Emma is on track to do just that and should receive a full pension. But research from Bellwether Education Partners indicates that Arizona teachers' net retirement benefits have decreased due to changes in the system and rising contribution rates. Using teachers hired in 2010 as a baseline, they show the impact of legislation that took effect in 2011, which changed retirement eligibility requirements. As illustrated in Figure 9, the combination of the new retirement eligibility requirements and rising contribution rates has eroded the value of teachers' retirement benefits net of their own contributions.

Figure II: Teachers Retirement Benefit Accruals Net of Employee Contributions



Source: Bellwether Education Partners

About Equable

Equable is dedicated to educating and informing state and local governments about how best to care for the teachers, police officers and firefighters who serve them on a daily basis. We are radically bipartisan, intensely analytical, and unapologetically direct.

Threats to retirement systems are threats to the economic stability of states, cities, and the United States as a whole. These are not threats that exist off in some nebulous future. They affect real people across the country today. And it gets solved with math, not politics. We know because we've seen it work.

We believe impartial, rigorous research and analysis is the key to unlocking creative solutions to tough retirement plan problems. We believe lasting change is hard and takes time, but also worthwhile.

Problems get solved when they are acknowledged and addressed, not kicked down the road. And we believe we can do far more together than apart. When employees, retirees, and policymakers collaborate to solve problems, real progress is possible.

Together, we can create real retirement plan sustainability and affordability with paths to future income security for all.