GRAND CANYON INSTITUTE

Arizona's Pensions: On Track to Financial Sustainability with Retirement Security

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Executive Summary

Ten years ago Arizona's pension funds were fully funded and had been so for about two decades. After the dramatic losses in equity markets experienced in 2008 and 2009 and the dot com bust seven years earlier, Arizona's public pension funds now have unfunded accrued actuarial liabilities totaling $14.5 billion, and collectively have assets that meet 72% of accrued liabilities, ranging from 59% for the Public Safety Personnel Retirement System to 75% for the Arizona State Retirement System. Consequently, public employer (taxpayer) obligations to fund them have risen substantially, causing concern about their long-term stability.

Arizona, similar to the rest of America, faces an impending retirement security crisis – but not because of these unfunded liabilities of public sector pensions that have preoccupied lawmakers and the media. While unfunded liabilities are significant, Arizona's public sector pensions are on a path toward fiscal health and in better shape than those in many other states. They also have a number of features, some of them as a result of recent reforms, which will help maintain financial sustainability in the future. These features include a unique arrangement through which public employees share the risk of financial market downturns by automatically increasing employee contributions if investment returns disappoint.

Arizona lawmakers showed great foresight in strengthening the financial situation of the state's pensions with Senate Bill 1609 passed in 2011. The 2011 reforms, and other modifications to the Arizona State Pension plan since 2004, curtailed the growth of future pension liabilities, and increased cost-sharing with employees.

Arizona's real impending retirement security crisis results from inadequate retirement savings, partly due to the decline in the use of defined benefit pensions in the private sector. Defined contribution (401(k)-type) savings plans have proven risky and inadequate to deliver retirement security. Properly managed defined benefit pensions are a far superior option for workers and employers (and for taxpayers) in the public sector, costing less and safeguarding modest middle-class retirement.

Arizona lawmakers showed great foresight in strengthening the financial situation of the state's pensions with Senate Bill 1609 passed in 2011. The 2011 reforms, and other modifications to the Arizona State Pension plan since 2004, curtailed the growth of future pension liabilities, and increased cost-sharing with employees. While the benefits to taxpayers are already being felt, bigger gains will be seen in coming decades, as many changes impact new enrollees more than current enrollees.

Given these realities, Arizona does not need a radical overhaul of its public sector pension plans. In fact, the options for replacing Arizona's defined benefit pensions risk delivering to the state a double whammy. These options could increase costs to taxpayers in two ways (a) substituting more expensive retirement savings plans for cost-effective defined benefit pensions that deliver greater retirement savings for any given level of contributions; and (b) lowering investment returns on assets of the existing pension plans, increasing Arizona's pension debt. These options could also erode the pensions of public sector retirees, exacerbating Arizona's retirement security crisis.

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- Arizona's pension funds are recovering and on a path toward financial health. As Arizona State Treasurer Doug Ducey has noted, Arizona is "fortunate that our pensions are in far better shape than many other states."[2] Despite two stock market declines, the Arizona State Retirement System (ASRS), far and away the state's biggest public sector pension, is 75% funded, close to the 80% level that pension experts consider financially healthy. In 2011 the passage of Senate Bill 1609 (SB 1609) increased employee contributions for Arizona's other state pensions and reduced benefits for new employees, improving the financial sustainability of these plans.

- Arizona state pension plan members already share the cost of financial market downturns, reducing the risk for taxpayers. Much of the criticism of defined benefit pensions across the country relates to concerns that underperforming financial markets – similar to those of the 2000s – could lead to future unfunded liabilities that taxpayers must pay down. To protect against this possibility, ASRS, which accounts for three quarters of the total assets and liabilities of Arizona state pension plans, already has one of the strongest risk sharing features of any state defined-benefit pension plan, requiring that employees split, 50-50, with their employers the contributions needed to maintain pension fund health (the "Annual Required Contribution" (ARC)). As a result of this unique feature, after financial markets plunged last decade, employee contributions to ASRS increased over five-fold – automatically without any change in policy – from 2% of salaries in 2002/03 to nearly 11% in 2012/13. This increase kept to manageable levels the increase in employer contribution rates, which are projected to peak at about 12% of salaries, less than half the peak of employer contributions in some other state pension plans. SB 1609 phases in a 50-50 split of the ARC into the Corrections Officers Retirement Plan (CORP) and a transition within the Public Security Personnel Retirement System (PSPRS)to employees paying one-third of the ARC. From a retirement security perspective, this unique Arizona approach to employee sharing of financial market risk – automatic increases in employee contributions – is preferable to sharing risk by reducing retirement benefits.

Arizona's state pension plans now follow best practices for public pension plans that will help ensure their financial sustainability in the future.

- Arizona's state pension plans now follow best practices for public pension plans that will help ensure their financial sustainability in the future. The National Institute on Retirement Security recently profiled six public pension plans that remained well funded through the financial market storms of the last decade and identified best practices of these plans. Arizona's pension plans now follow these practices:
  - They make 100% of their annual required contributions every year, even during economically challenging times.
  - They have strong cost-sharing between employees and employers.
  - They grant inflation (COLA) adjustments to pensions responsibly, when the pension plans meet their investment return targets and when the plans are funded well enough to absorb the costs. PSPRS did not formerly meet this requirement, but due to a change in the benefit-increase formula in SB 1609 that went into effect in 2013, does now. Had the current PSPRS formula been in effect since 1997, the pension fund's assets would now be 17% higher.

[2] Doug Ducey, (2013), *Inside the Vault: The Arizona State Treasurer's Quarterly Update*, Quarter 1 http://www.aztreasury.gov/wp-content/uploads/2012/02/Inside-the-Vault-Q1-20131.pdf (accessed November 29, 2013)

- They include effective anti-spiking measures. All three state retirement systems now rely on a highest 60-consecutive-month period for calculating the "final average salary" used to set pension amounts. This ensures pensions are based on more representative salaries. In addition, termination pay, including sick and vacation time are excluded in computing final average salary.
- They make economic return assumptions that are likely to be met. All Arizona pensions now assume a rate of return on pension assets from 7.85% to 8.0%, in the middle of the range for state pension plans nationally. ASRS has consistently followed this practice. PSPRS has not always done so and used a rate as high as 9% as recently as 2003, which was then gradually reduced. While Arizona pension fund returns have fallen below the 7.85% to 8% range in the last 10 years, over longer time horizons – including since inception (45 years for PSPRS and 38 for ASRS) – they have met or exceeded the current assumed rates of return.

- The employer share of additional pension benefits earned by Arizona public employees each year (technically, employer normal costs) now cost employers (hence taxpayers) about 3.5% of salary on average, a modest amount that will be difficult for any new pension plan to beat. Though the contribution is considerably higher for PSPRS, nearly all firefighters and most police officers participating in PSPRS do not qualify for Social Security, and since the employer 6.2% Social Security payroll tax is not paid in those cases, the employer normal cost is quite reasonable.

- Arizona's pensions are modest and too low to offset the large amount by which public sector salaries trail those of comparable private employees. Across the three Arizona pension plans taken together, pension benefits average only $22,000. Only 1 in every 393 Arizona pensions exceeds $100,000.[3] If Sun Devil Stadium were filled to capacity (71,706 people) with pension recipients, 181 people in the crowd would have a pension of over $100,000. ASRS pensions average about $20,000 annually. While PSPRS pensions average nearly $50,000, the majority of PSPRS members do not participate in Social Security; thus they do not receive about $14,000 in annual Social Security payments for which employees with similar incomes are eligible at age 62 are if their employers do participate in Social Security. Those employed before 1986 do not qualify for Medicare either, meaning they have significant health insurance costs as well. Even with better pension (and other) benefits than the private sector, Arizona public sector compensation (wages plus benefits) per hour still lags behind the private sector by 6%. The Arizona public-sector salary and compensation gaps are especially large among college-educated employees such as teachers. If pensions are further eroded, what incentive do teachers have to give their lives to educating Arizona's children or other public employees to devote themselves to a career in public service?

If Sun Devil Stadium were filled to capacity (71,706 people) with pension recipients, 181 people in the crowd would have a pension of over $100,000.

Despite the modesty and financial sustainability of Arizona's pensions, some observers have argued that Arizona should partially or completely eliminate its defined benefit pensions in favor of 401(k)-type individual savings accounts or the less familiar options of a "cash balance" plan or a "hybrid" plan.

[3] As detailed in the body of this report, this estimate is based on ASRS and PSPRS pension data. ASRS and PSPRS account for 97% of all Arizona pensions.

Research and experience with these alternatives suggest that, while put forward in the name of taxpayers, they could actually increase costs to the state while weakening retirement security.

401(k)-type pensions: billions in transition costs plus "less bang for the buck." The most prominent alternative pension approach under discussion would establish 401(k)-style individual accounts for new employees, closing the existing defined benefit plans to new members. In place of defined benefits tied to final salary and years of service, employees would be guaranteed only the contributions made by employees and employers each year, plus investment returns net of costs.

A switch to individual defined contribution accounts for new employees could also increase the cost of paying down the unfunded liabilities of Arizona's current pension plans, because it could erode investment returns on the assets of the current pensions.

Research shows that defined contribution (DC) 401(k)-type retirement plans earn lower investment returns than defined benefit plans, have higher fees, and also have high costs because of the high price for individuals to convert accumulated savings into a regular pension check (or "annuity") that will be received until death.

Taking into account all the inefficiencies of defined contribution retirement plans, the National Institute on Retirement Security (NIRS) estimates that these plans require 45% to 85% more in contributions to deliver the same level of retirement security.

A switch to individual defined contribution accounts for new employees could also increase the cost of paying down the unfunded liabilities of Arizona's current pension plans, because it could erode investment returns on the assets of the current pensions. This erosion happens because, once the existing pensions are closed to new employees, they lack a balance between young, mid-career, and retired workers. Pension managers can no longer invest for the long term and have to keep a larger share of pension assets in liquid form, ready to convert into pension checks. A more conservative investment strategy results, lowering investment returns. If asset growth pays for less of Arizona's existing pension obligations, taxpayers will have to pay more. In sum, a switch to defined contributions plans would increase the cost of paying off the existing plans unfunded liabilities, currently estimated at $14.5 billion.

Cash balance: a new fad but less retirement security and potentially higher costs. A new pension favorite, now being promoted by the Pew Trust and the Arnold Foundation, is a "cash balance" (CB) pension. Similar to defined contribution plans, cash balance pensions do not guarantee a specific benefit tied to years of service. Instead they guarantee contributions from employees and employers each year plus at least a minimum annual interest rate on benefits (e.g., 4%).

- While their impact depends on the specific features of the plan, many cash balance variations would reduce benefits on average and deeply slash benefits for career public employees.
- Since they tend to reduce the pension incentive to stay in public service and increase pensions for those who leave mid-career, cash balance plans could increase turnover among teachers, nurses, and other public servants. This could erode the quality of public services, and require wage increases to increase retention.
- Cash balance plans risk lower investment returns, increasing costs to achieve a given level of retirement security and lowering pension benefits in plans that provide employees with a share of returns above the minimum. If the pension is only on the hook to pay a relatively low annual interest on employees' cash balance accounts (e.g., 4%), pension plan managers may choose to target returns closer to this lower guaranteed interest rate than the 7.5% to 8% now targeted by Arizona's pensions. Once cash balance plans are enacted, the same advocates that have pressed

state defined benefit plans to lower assumed returns may press lawmakers to direct pension plan managers to lower their targeted rate of return.

- Similar to Arizona's current pensions, many cash balance plans build in employee sharing of financial market risk with taxpayers. But with cash balance plans, employees share risk by automatically lowering their benefits, while in Arizona's current pensions employees share risk by increasing contributions. Arizona's current approach better protects retirement security.

Hybrid pensions: mixing and matching flawed options. So-called "hybrid" pension plans usually combine two types of pensions – the current design and a defined contribution or cash balance plan, or a mix of DC and cash balance plans. Given the almost limitless variations possible, detailed analysis of hybrid pensions is only possible once a specific proposal has been made. Nonetheless, to the extent that they include defined contribution or cash balance components hybrid pensions likely bring with them the limitations of these other plan designs.

America's – and Arizona's – real retirement crisis: the erosion of retirement security. Already today, close to half (43%) of Arizona's elderly population is economically vulnerable according to a recent Economic Policy Institute report. Americans approaching retirement also have low levels of retirement savings, suggesting that retirement insecurity will grow. A major reason for the emerging retirement security crisis is the rise of 401(k) savings plans in the private sector, and the parallel decline of defined benefit pensions, which once offered middle-class retirement to many private sector working families. As documented below, most 401(k)-type savings plans have low levels of savings even while a few have half a million dollars or more. Thus 401(k)s contribute to a growing retirement income gap between the most affluent seniors and middle- and lower-income ones, exacerbating the nation's retirement security crisis.

Recommendations. Considering the interests of taxpayers alone, given the risk sharing, low cost of future benefits, and sustainability of Arizona's pension plans – especially after recent reforms – Arizona would be ill advised to shift its basic pension plan design. A radical new pension design would also be ill advised given the importance of state pensions in ensuring retirement security. Just as a home-owner does not need assets in liquid form today to pay off a 30-year home mortgage, pension systems do not need on hand today 100% of the assets needed to pay all existing pension obligations. The body of this report suggests that Arizona's pension plans do have credible plans to sustain contributions adequate to meet their obligations long term.

To safeguard taxpayers and further guard against future underfunding, Arizona could take some more modest steps. The state could adopt a rule to always pay the larger of the Annual Required Contribution (ARC) or the full cost of additional pension benefits earned each year ("normal cost"). (Currently the pension plans pay the ARC each year.) With this modified annual contribution rule, when the pension systems have a funded ratio over 100%, they would continue to pay full normal costs – and not the lower ARC – and thus would build up a reserve. When pension funds are underfunded, they would – as now – pay normal costs plus a contribution to pay off the unfunded liability. Over long spans of time, the pension funds would develop a healthy reserve in good times that help covers the cost of pensions in lean times without sharply or substantially raising employer contributions. If this policy had been in effect from 1997 to 2005, the state could have accrued an additional

The state could adopt a rule to always pay the larger of the Annual Required Contribution (ARC) or the full cost of additional pension benefits earned each year ("normal cost")… Arizona would have significantly better funded pensions and lower employer (and employee) costs today.

24% of plan assets in ASRS and 15% of plan assets in PSPRS: in sum, Arizona would have significantly better funded pensions and lower employer (and employee) costs today.

To further protect against future underfunding, Arizona could also consider shortening the period over which Arizona pensions average (or "smooth") the value of assets and liabilities in annual financial reporting. While some experts recommend smoothing over as much as 20 years to more fully reflect the long-term trends, the downside of long smoothing periods (ASRS uses 10 years now and PSPRS seven years) is that they distance book funding levels from what contributions would be using current market values (of assets and liabilities). In practice, the lengthening the ASRS and PSPRS smoothing periods after the dot com bust, reduced contributions over the past decade, lowering today's funding ratios.

Going forward, Arizona's lawmakers should also focus on a two-pronged strategy for achieving retirement security for all: maintaining public sector pensions and taking steps to improve retirement security in the private sector.

Arizona's Pensions: A Modest Reward for a Career of Economic Sacrifice

Table 1 provides an overview of Arizona's three large state pension plans. By far the largest is the Arizona State Retirement System (ASRS), which covers state and school employees and has nearly 540,000 members counting retirees, active members (still in public service), and non-active members who no longer work in public service but are eligible for pensions once they reach retirement age. The two other systems – the Public Safety Personnel Retirement System (over 31,000 members in all categories) and the Corrections Officers Retirement Plan (nearly 20,000) – each has fewer than 10% as many total members as ASRS.

The average benefit received by beneficiaries of the three pension plans equals about $22,000 dollars. While some media coverage in recent years has implied that many Arizona pension plan recipients receive outsize pensions, the facts make clear that this is a rare exception.[4] Within ASRS and PSPRS combined (97% of Arizona pensions), only one in every 393 pensions exceeds $100,000 (Table 2). Thus, if Sun Devil Stadium were filled to capacity (71,706 people) with pension recipients, 181 people in the crowd would have a pension of over 100,000. Over 45,000 of those in attendance would have a pension under $25,000. The very small number of large pensions also means that most of the money paid out goes to retirees with modest benefits. For example, less than 5% of pension benefits go to retirees with annual pensions over $75,000.[5]

While PSPRS pensions average nearly $50,000, the majority of PSPRS members do not qualify for the approximately $14,000 in Social Security benefits which those with similar incomes are eligible to receive at age 62 if their employer participates in Social Security. Employees hired before 1986 also do not qualify for Medicare, meaning they have significant health insurance costs as well.[6]

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[4] See *"Arizona Republic* Investigation: Public Pensions," Parts 1-8, November 12-21, 2010.

[5] ASRS and PSPRS both provided data on the number of retirees receiving benefits in each of the five $25,000 ranges zero to $125,000 and also on the number of beneficiaries (72) receiving benefits of over $125,000. Using data or reasonable assumptions about the average benefit in each range enable estimation of the share of benefits paid to individuals in each range.

[6] Retired PSPRS members average 63.5 years old. Based on PSPRS data, the annual salary for determining a PSPRS pension was estimated at $57,000. See PSPRS, *45th CAFR for the Year Ending June 30, 2013*, p. 86 and PSPRS, *Summary of Benefits*, Sept. 2013, online at

Table 1. Arizona Pension Funds				
	Arizona State Retirement System (ASRS)	*Public Safety Personnel Retirement System (PSPRS)*	*Corrections Officers Retirement Plan (CORP)*	Total for All Three
Active Members	207,572 (p. 33)	18,436 (p. 84)	14,580 (p. 82)	240,588
Non-Active Vested	208,573 (p. 33)	1,442 (p. 84)	1,463 (p. 82)	211,478
DROP Members		1,482 (p. 84)		1,482
Retired Members (including beneficiaries)	122,257 (p. 33)	10,159 (p. 84)	3,810 (p. 82)	136,226
Employee Contribution	10.9% (p. 151)	9.55% (p. 83)	8.41% (p. 81)	
Employer Contribution	10.25% (p. 151)	25.70% (p. 83)[7]	11.31% (p. 81)	
Average Annual Benefit	$19,560 (p. 101)	$49,571 (p. 86)	$25,319 (p. 84)	$21,959
Participates in Social Security	Yes	Primarily No[8]	Yes	
Assumed Rate of Return (2013)	8%	7.85%	7.85%	
Actuarial Value of Assets (billions)	$28.9 (p. 53)	$6.19 (p. 40)	$1.56 (p. 40)	$36.7
Unfunded Liabilities (billions)	$9.5 (p. 53)	$4.36 (p. 40)	$0.677 (p. 40)	$14.5
Funded Ratio	75.3% (p. 53)	58.7% (p. 40)	69.7% (p. 40)	71.6%
Note. Page numbers in parenthesis indicate where within each source document information can be found.				
Sources				
Arizona State Retirement System (ASRS), *2013 Comprehensive Annual Financial Report for Fiscal Year Ended June 30, 2013*, online at https://www.azasrs.gov/content/pdf/financials/2013_CAFR.pdf				
Public Safety Personnel Retirement System (PSPRS), 45*th Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2013*, online at http://www.psprs.com/Admin_Investments_and_Finance/CAFR2013/2013%20PSPRS%20FINAL%20131212.pdf				
Corrections Officers Retirement Plan (CORP), 27th Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2013, online at http://www.psprs.com/Admin_Investments_and_Finance/CAFR2013/2013%20CORP%20FINAL%20131212.pdf				

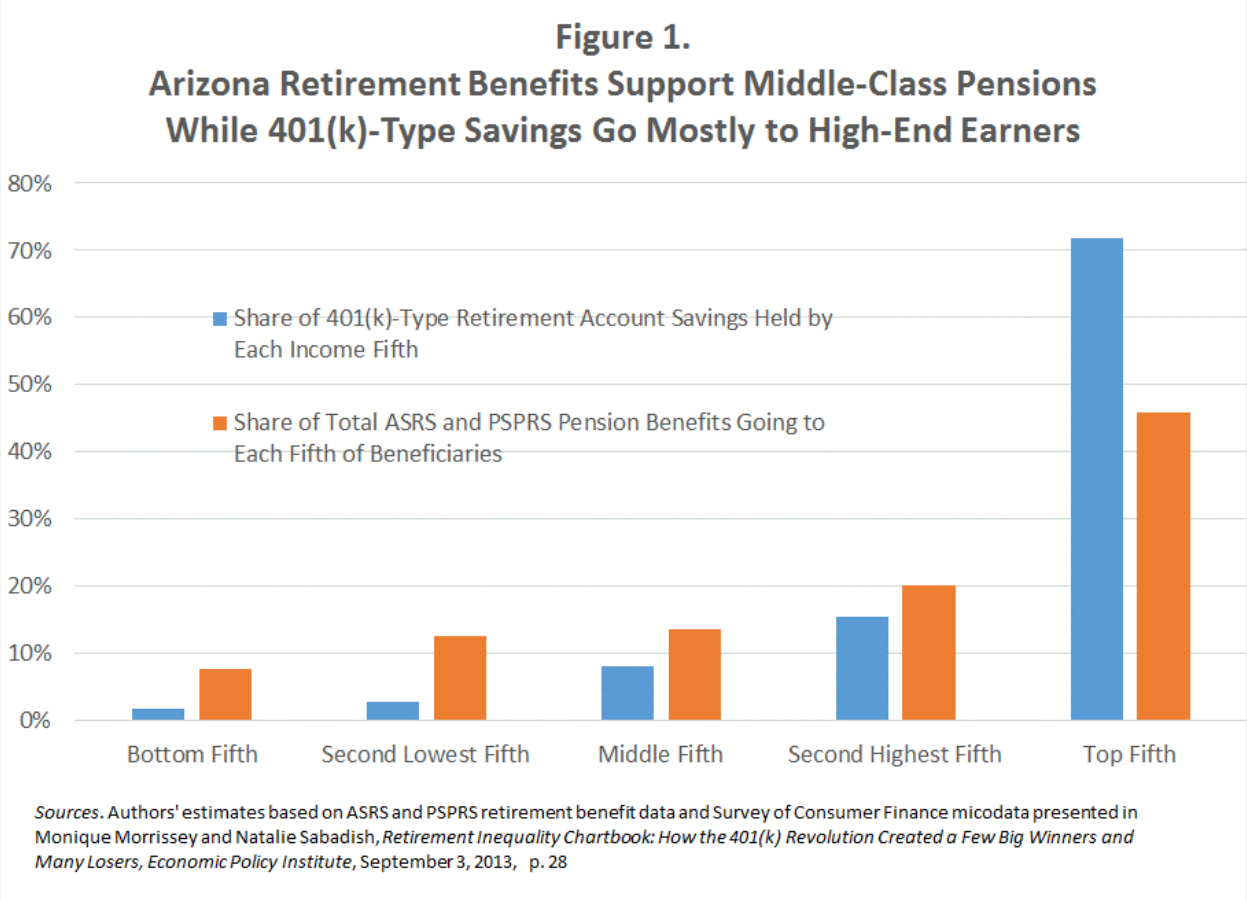
Current pensions enable even lower-paid workers the ability to enjoy modest retirement security. This is because, as Figure 1 shows, Arizona pension benefits tilt much less to high-end recipients than do the 401(k)-type savings accounts that predominate in the private sector. Among those who have 401(k)-type accounts, the lowest fifth of accounts average only $3,238 in savings, 2% of the $541,800 in the top fifth of accounts. By contrast, the lowest fifth of Arizona pensions provide benefits equal to 18% of top-fifth benefits.

http://www.psprs.com/sys_psprs/Forms/2013%20PSPRS%20Summary%20of%20Benefits-FINAL.pdf. The $57,000 was entered into a Social Security Administration quick calculator online at http://www.ssa.gov/oact/quickcalc/ to estimate workers Social Security benefit if they elected to receive Social Security benefits at the earliest year of eligibility (age 62).

[7] The total employer contribution for FY2013 was 27.18 percent, the added cost being associated with a supplemental health insurance benefit. See PSPRS, *2012 Actuarial Valuation*, p. A-2, online at http://www.psprs.com/sys_psprs/ActuarialReports/Actuarial_12_PS.pdf.

[8] Almost all firefighters and most police do not participate in Social Security. The Highway Patrol does participate in Social Security.

Table 2. Distribution of ASRS and PSPRS Pension Benefits				
	Share of Annual Pension Payments in Each Annual Income Range			
Annual Income Range	ASRS	PSPRS	ASRS and PSPRS Combined	Share of Total Benefits Paid by Income Range
$0-$25,000	68.0%	0.6%	63.9%	37%
> $25,000-$50,000	26.8%	44.9%	27.9%	41%
> $50,000-$75,000	4.5%	45.0%	7.0%	17%
> $75,000-$100,000	0.5%	8.2%	1.0%	3%
> $100,000	0.2%	1.3%	0.3%	1%
Sources. Authors' estimates based on annual benefits by income range provided by ASRS and PSPRS				



While larger, on average, than private sector retirement benefits, Arizona pension benefits do not make up for the amount by which Arizona public employee salaries trail private sector salaries, taking into account education, experience, and other characteristics that impact pay levels. On a per hour basis, Arizona public sector employees earn 14% less in wages, and 6% less in compensation (wages plus

benefits), than comparable private workers.[9] The public sector salary gap is higher still for more educated employees (such as teachers) with a four-year college degree or a master's degree. As pointed out by Keefe and Wells (see previous footnote), the Goldwater Institute compares crude public and private average wages and then claims that public sector workers earn above market rate wages. But crude average wages for all public and all private employees ignore all of the variables that economists' routinely use to explain market-rate wage differences, such as education and experience. In reality, Arizona public sector workers, on average, make substantial sacrifices during their working years by accepting salaries substantially lower than they could earn in the private sector. Eroding benefits for public sector employees will increase the amount by which total public compensation trails private sector, increasing the difficulty of attracting and retaining high quality public employees.

Arizona's Pensions – Holding Their Own in a Difficult Financial Climate

Some analysts have interpreted recent experience as evidence that Arizona's pensions are unsustainable.[10] Related to this, the Ducey Committee maintains that Arizona's pension plans have a "history of unfunded liability." This is factually incorrect (Table A1 and Figure 2). Arizona public pension systems make their actuarially determined annual required contribution (ARC) payments every year. ASRS inherited an underfunded status due to the transition of employees from the prior state retirement system in the early 1970's and then consistently met return assumptions. By 1986 it was 98% funded. It remained fully funded (or very close to it) until after dotcom bust in 2003. PSPRS, for its part, was at least 97% funded in every year from 1984 through 2003 (Table A1) and also has made its ARC payment in every year at least back to 1992. PSPRS also met or exceeded its target rate of return every year from 1971 through 2000.[11] Table 2 presents the investment return experience of Arizona's two biggest pension plans (which account for 95% of the unfunded pension liabilities of the three main systems and 97% of the members). Summing up all of the evidence on the financial status of ASRS and PSPRS since they were first established – ASRS in 1971 and PSPRS in 1968 – these two systems together have been fully funded or moving towards it for seven decades and been significantly underfunded for only parts of two decades (the 2000s for each system).

ASRS since 2002-03. Even since 2000, Arizona's biggest pension plan has demonstrated its long-term financial sustainability. To be sure, poor financial market performance has lowered ASRS's funded ratio since 2002-03. But as soon as this happened, ASRS – unlike many other pension plans – increased contributions steadily from a total employer and employee rate of 4.34% in 2001 to 22.28% in 2012-13 (21.15% to the pension plan), continuing to make its ARC in every single year.[12]

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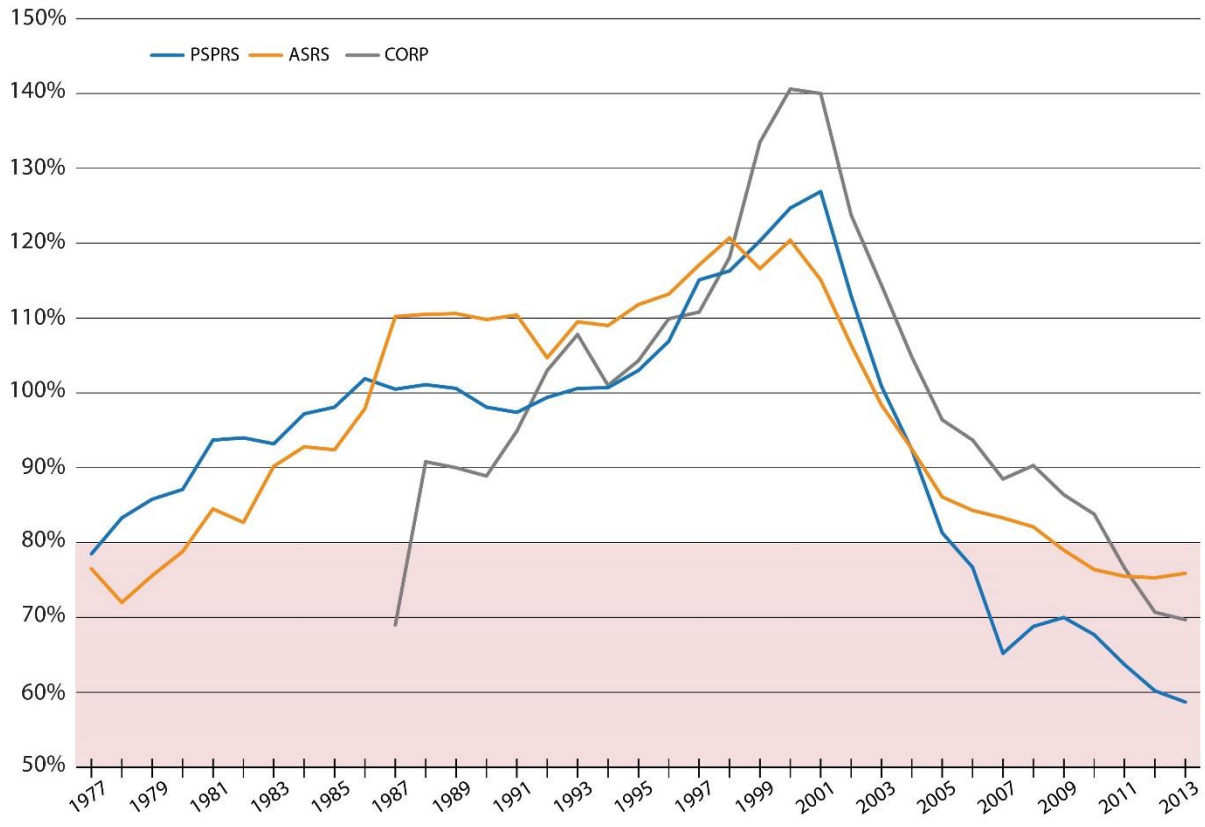
[9] Jeffrey H. Keefe, and Dave Wells, *Are Arizona Public Employees Over Compensated?* Grand Canyon Institute, April 2, 2012, see especially Table 6, p. 15. The higher gap in earnings at higher education levels (referred to in the next sentence in the text) is documented in Table 3, p. 9.

[10] See, for example, *Senate Bill 1609 Defined Contribution and Retirement Study Committee Final Report*, December 21, 2012. (This report is commonly referred to as the Ducey Report, after Arizona Treasure Doug Ducey.) See also *Arizona's Pension Challenges: The Need for an Affordable, Secure, and Sustainable Retirement Plan*, Pew Center on the States and the Laura and John Arnold Foundation, November 2012.

[11] Pension systems routinely average returns over a period of years to "smooth out" the impact of financial market fluctuations, Since PSPRS began operating in 1968, the first seven-year average that can be computed spans 1968 to 1974. Since the middle year of this span is 1971 the convention is to refer to this as the 1971 returns. For the yearly net effective yields see Public Safety Personnel Retirement System, *Thirty-Fourth CAFR for the Fiscal Year Ending June 30,2002*, p. 100; on line at http://www.psprs.com/sys_psprs/AnnualReports/Annual_02_PS.pdf

[12] ASRS, *CAFR for the Year Ending June 30, 2013*, p. 48.

Figure 2. Arizona Pensions: Well Funded Until the 2000s



Sources. ASRS data and PSRS, *PSRS Comprehensive Annual Financial Reports* and *CORP Comprehensive Annual Financial Reports*, various years.

It has been easier for ASRS to maintain ARC payments every year because of the system's unique balance between employer and employee contributions. Each year, employees and employers equally divide the ARC. This means that when disappointing financial markets increase the required ARC, the burden of higher payments does not fall solely on employers. It falls equally on employees. As a result, employee contributions to ASRS increased over five-fold – from 2% of salaries in 2002/03 to nearly 11% 2012/13 – holding down employer (and taxpayer) contribution rates to manageable levels projected to peak at 12%, less than half the employer contributions in some other state pension plans.

The actuary for ASRS estimates that the numerous legislative and non-legislative changes to ASRS since 2004 will reduce the contribution rate by 4.01% over the next 30 years.

In addition, the actuary for ASRS estimates that the numerous legislative and non-legislative changes to ASRS since 2004 will reduce the contribution rate by 4.01% over the next 30 years. These changes included moving from a 36-month to a 60-month basis for determining retirement salary payment for new employees hired since July 1, 2011, which will reduce contribution rates by 0.25%. Repealing the Deferred Retirement Option Program (DROP) in 2006 will reduce the rate by 0.5%.[13]

[13] Buck Consultants for Arizona State Retirement System "ASRS Cost Savings Initiatives, Estimated as of June 30, 2013," provided courtesy of ASRS.

When ASRS was overfunded in the 1990s and early 2000s, a portion of the funds were rebated back, lowering contributions for employer and employee to about 4% of payroll each instead of the roughly 6% then needed to cover normal costs (the cost of additional benefits earned that year by active employees). Cumulatively, from 1997-2005, because contributions slipped below normal costs 10% of the value of ASRS assets was not collected. When the lost investment interest is included, the total loss to ASRS represented 24% of the 2005 actuarial valuation of total plan assets, which would have provided significant protection against the subsequent financial market collapse.[14]

A similar process occurred with PSPRS. Contributions in the 1990s dropped well below normal costs. Instead of paying about 10% to 11% for the employer share of normal costs, employers only paid about 6%. From 1997 to 2005, an additional 6.6% of fund assets was not collected when PSPRS was overfunded and annual employer plus employee contributions (set equal to the ARC) slipped below normal cost. When investment returns on those lost contributions are included, 15% of fund assets relative to the 2005 actuarial value was lost due to lowering the employer's ARC below normal costs – additional assets that would have significantly bolstered PSPRS today. The additional assets that PSPRS would have amassed is less than ASRS because PSPRS had a separate reserve fund to pay for benefit increases that received half of any annual investment returns above 9%.

Table 3. Investment Performance of Arizona Pension Plans Net of Fees

	ASRS [1]	PSPRS [2]	Survey of Pensions[3]
	6/30/2013		6/30/2013
5 year	5.9%	3.75%	5.3%
10 year	7.4%	5.89%	7.1%
20 year	8.1%	6.60%	7.9%
38 years (1976-2013)	9.8%	9.20%[15]	

Sources.

[1] ASRS, *CAFR 2013*, p. 74. Earlier periods pulled from prior *CAFR*s

[2] PSPRS, CAFR 2013, p. 53 for 5 and 10-year return; CAFR 2012, p. 51 for 20-year and 37 year from historic net of fees returns provided by PSPRS

[3] See National Association of State Retirement Administrators (NASRA), *NASRA Issue Brief: Public Pension Plan Investment Return Assumptions,* December 2013, Figure 1, online at : http://www.nasra.org/files/Issue%20Briefs/NASRAInvReturnAssumptBrief.pdf

As well as sharing financial market risk, ASRS member employees contribute nearly twice as much relative to employers as typical for state pension plans. In the 2001-2011 period, according to U.S. Census Bureau data, employer contributions to state pension plans averaged 1.84 times employee contributions, compared to the 1:1 ratio within ASRS.[16]

[14] ASRS dipped below 100% funding in 2003 and continued to decline. However, contribution rates were set for 2003-2005 in 2002 when ASRS was fully funded, resulting in the 2005 contribution rate falling below normal costs even though ASRS had unfunded accumulated actuarial liability.

[15] PSPRS began in 1968, but fund managers have concerns about the reliability of the 1968-1974 returns data relative to later returns data. ASRS began in 1976, so 1976 is used as the starting point for both in the long-term comparison. In 1975 PSPRS reports a 21.8% return (net of fees).

[16] Authors' analysis of Census Annual Survey of Public Pensions data, online at http://www.census.gov/govs/retire/

ASRS does have one feature that contributed to the steady decline, over a decade, in its funded ratio to the current level: the system averages ("smooths") over 10 years the value of assets and liabilities in its annual actuarial analysis. ASRS used a 5-year smoothing through 2002, but after the dotcom market collapse moved to a 10-year smoothing. This means that the system will continue to recognize the declines of 2008 and 2009 over the next five years. (This feature also means the system only slowly recognizes high investment returns.) Ten-year smoothing holds down the ARC in the first years after low investment returns, slowing the increase in contributions and the recovery of funded ratios. The double financial market dip of the 2000s exacerbated the tendency of asset smoothing to lead to underfunding. Over several decades, nonetheless, making ARC payments every year, splitting them between employees and employers and keeping a reasonable expected rate of return will lead ASRS back to full funding.

PSPRS Since 2000. PSPRS has experienced a sharper and deeper erosion in its funded ratio since the year 2000, from nearly 130% in 2000-01 to the current 58.7%, despite the fact that PSPRS also made ARC payments every year. Several factors explain this. First, PSPRS assumed a 9% rate of return on investments until 2003 (versus 8% for ASRS). The PSPRS ratio has now been lowered (to 8.75% in 2004, 8.5% in 2005, 8.25% in 2011, 8% in 2012, and 7.85% in 2013). While a lower and more easily attained rate of return reduces the risk of future fund underperformance, the transition to lower assumed returns also increased the systems' reported unfunded liabilities -- because lower assumed rates of returns mean that more assets are needed to meet pension obligations -- and lowered its reported funded ratio.[17] This transition also meant that more needs to be collected today to meet future obligations, so the ("normal") cost of future benefits rises. (Box 1 discusses how Arizona's assumed returns compare to the norms for public pension plans.)

Second, PSPRS has had lower returns since 2001 (-1% from 2001-09 versus +1% for ASRS; 9.7% for 2010-12 versus 13.2% from 2010-12), a result of more negative returns when the dot com bubble burst and ongoing drag from greater exposure than ASRS to Western real estate investments that plunged in 2008-2009. Since then, PSPRS has overhauled and diversified its portfolio, as well as run scenario tests to evaluate the risk level of its current portfolio. For instance in the 2008-2009 credit crisis, the current portfolio would have suffered only two-fifths of the losses of the portfolio at the time. Compared to 50 public pension funds when measured in terms of the Sharpe ratio, which indicates whether a portfolio's returns are due to smart investment decisions or a result of excess risk, PSPRS has moved from being well average to the 90th percentile of top performers.[18]

Compared to 50 public pension funds measured on whether returns are due to smart investment decisions or excess risk, PSPRS has moved from being well below average to the 90th percentile of top performers.

[17] In effect, by using a 9% discount rate, PSRS was undervaluing liabilities by approximately 15% compared to ASRS. The 15% estimate is based on Figure 4 "Aggregate State and Local Pension Liability under Alternative Discount Rate Assumptions, 2009" in Alicia H. Munnell, Richard W. Kopcke, Jean-Pierre Aubry, and Laura Quinby, *Valuing Liabilities in State and Local Plans*, Center for Retirement Research, June 2010.
"Robert Novy-Marx and Joshua Rauh. "The Liabilities and Risks of State-Sponsored Pension Plans." *Journal of Economic Perspectives* 23(4), Fall 2009.

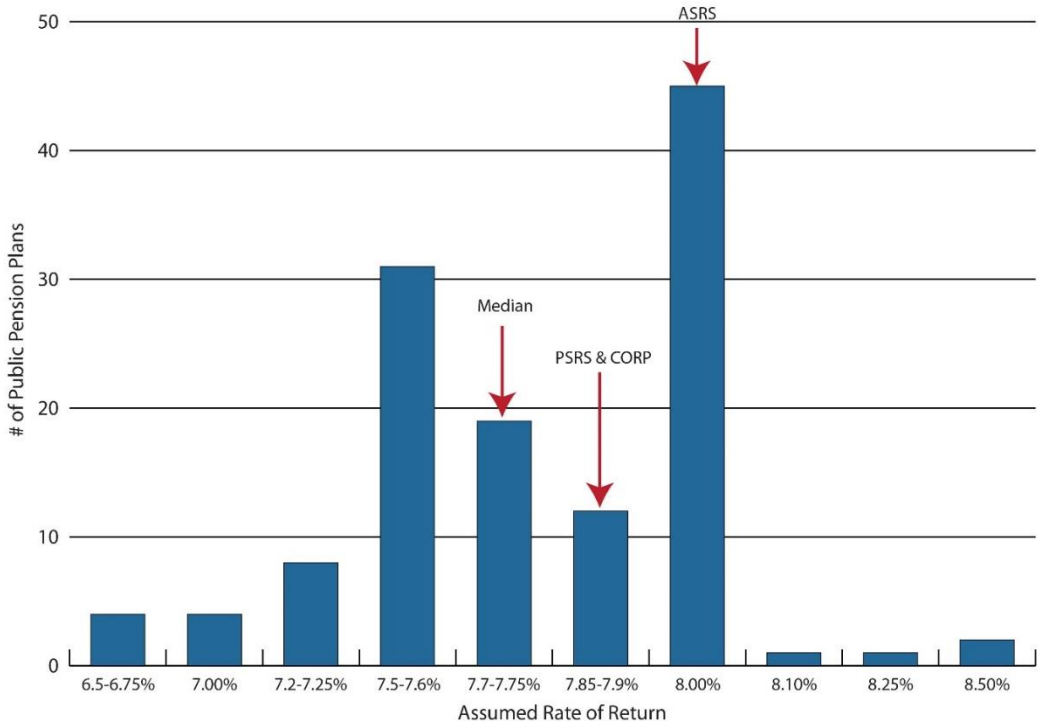
[18] Mark Lundin, PSPRS Deputy Chief Investment Officer, "Portfolio Risk as of December 11, 2013," Presentation to Board of Trustees Investment Committee December 18, 2013, slides 15 and 16.

Box 1. The Assumed Returns of Arizona Pension Plans Move Towards National Norms

Figure 3 shows that the investment returns assumed by Arizona's pensions are now in the middle of the range for public pension plans nationally. Pension plans' assumed returns reflect their expectations about investments over a long-term horizon of about 30 years. Consistent with national best practices (see Table 4 below), it is important that Arizona pension funds make realistic investment return assumptions. One way to operationalize "realistic" would be for Arizona to keep its investment return assumptions within 0.25 percentage points (25 "basis points") of the median of the norm for public pension plans, as measured by the Annual Survey of Public Pension Funds. For most of the last decade, the ASRS rate of 8% matched the median for all public pension plans in the United States. In recent years, the median for all public pension plans shifted downward somewhat, partly in response to lower inflation.[19] So ASRS is now about a quarter point about the median.

PSPRS during most of the past decade was as much as a percentage point above the median for all public plans. The transition to lower assumed investment returns was difficult because it lowered the PSPRS funded ratio and raised the (normal) cost of pensions going forward. Now that the transition is complete, however, it provides more attainable investment return assumptions for PSPRS for the future.

Figure 3. Distribution of Public Pensions Assumed Return on Investments



Source. Public Pension Survey, November 2013; online at http://www.publicfundsurvey.org/publicfundsurvey/summaryoffindings.html, Figure N.

[19] See Keith Brainard, *Public Fund Survey Summary of Findings for FY2005* (September 2006) and *Public Fund Survey Summary of Findings for FY2009* (November 2010), National Association of State Retirement Administrators, on line at http://www.pebc.ca.gov/images/files/5a_Public_Fund_Survey_Summary_FY_2005.pdf and http://www.publicfundsurvey.org/publicfundsurvey/pdfs/Summary%20of%20Findings%20FY09.pdf.

Third, until the passage of SB 1609 in 2011, PSPRS by statute allocated half of any investment earnings above 9% to a "Permanent Benefit Increase" reserve fund. Until 2012, when the reserve fund was depleted, PSPRS provided 4% annual PBIs, even though the funding status of the pension had dropped significantly.

A fourth factor that helps explain why PSPRS became substantially underfunded in the last decade despite making its ARC payments – necessitating an increase in employer contributions to the current 25.7% – is the relatively long seven-year "smoothing" period for valuing plan assets in PSPRS. Through 2003, PSPRS had used a four-year smoothing. (See the discussion above of the impact of ASRS's even longer 10-year smoothing period.) Two final factors are that PSPRS (and ASRS) are relatively young pension system in a fast-growing state: both these characteristics make the low-return 2000s more influential in the current financial status of PSPRS (and ASRS).[20]

PSPRS now has a version of the ASRS risk-sharing plan that ensures that employees as well as employers (and taxpayers) share financial market risk going forward.

Via SB 1609, enacted in 2011, Arizona lawmakers addressed several of the features of PSPRS that made it more vulnerable to deep and sustained financial market instability. SB 1609 phased-in increases in employee contributions to PSPRS from 7.65% to (by 2015-16) 11.65% or one third of the total Annual Required Contribution, whichever is less.[21] (For employees who become pension plan members after January 1, 2012, the maximum contribution is 13.65% or one third of the ARC, whichever is lower.) Thus, PSPRS now has a version of the ASRS risk-sharing plan that ensures that employees as well as employers (and taxpayers) share financial market risk going forward. (CORP has implemented the same 50-50 split of the ARC going forward.[22]

Had that new Permanent Benefit Increases formula been in place since 1997, PSPRS would have $1.07 billion more in assets, equivalent to 17.3% of its 2013 assets.

Senate Bill 1609 also made future PSPRS inflation adjustments (known as "Permanent Benefit Increases" or PBIs) conditional on higher investment earnings (above 10.5%) and on PSPRS's funded ratio (with no increase if the fund is less than 60% funded and smaller increases with the ratio between 60% and 80%).[23] Had that new PBI formula been in place since 1997, PSPRS would have $1.07 billion more in assets, equivalent to 17.3% of its 2013 assets.

Senate Bill 1609 made additional modifications to lower benefits and make pension benefits less costly in the future. It required all three systems to compute the final average salary used to set benefits over a

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[20] Since PSPRS and ASRS are younger pension systems than those in some other states, the period of lower investment returns in the 2000s represents a bigger portion of their history and accounts for a bigger portion of their accrued pension obligations. This increases the impact of the 2000s on the PSPRS and ASRS funded ratios. Arizona is also one of the nation's fastest growing states, which also increases the portion of pension liabilities accrued in the 2000s. If not for these structural handicaps, the solid financial performance of the Arizona pension plans would stand out more clearly.

[21] Final version of SB 1609, online at http://www.azleg.gov//FormatDocument.asp?inDoc=/legtext/50leg/1r/laws/0357.htm&Session_ID=102, p. 25.

[22] See SB1609 legislative Summary (2011), 50th Legislature, First Regular Session

[23] These changes to PSPRS are under litigation based on the provision added by voters to the state constitution in 1998 that says "public retirement system benefits shall not be diminished or impaired." If that litigation goes against the state, it will substantially impact PSPRS, raising costs to the pension fund and diminishing employee contributions.

five-year period (instead of three) for new employees (hired after July 1, 2011). SB 1609 also increased retirement ages and years of service requirements for new employees.[24]

The financial sustainability of Arizona's pension plans is acknowledged by pension experts within Arizona and beyond. Arizona State Treasurer Doug Ducey has noted, Arizona is "fortunate that our pensions are in far better shape than many other states."[25] The Ducey report notes that "Outside experts that have reviewed Arizona's plans have concluded that a credible plan exists to pay down the existing liabilities has been adopted…"[26]

In its 2010 report on public pension plans, The Pew Center on the States, a division of the nonprofit Pew Charitable Trusts, ranked Arizona as one of 16 states achieving a rating of "solid performer" for its state pensions.[27] To be sure, two more recent Pew reports lowered Arizona's rating based on two additional years of data.[28] But the changes in the Arizona plans' performance in those two years were incremental and the legislative changes since the 2010 Pew report further improve the Arizona's plans long-term financial sustainability. The bottom line is that Arizona's plans, taken as a group, are solid performers and in a stronger position than ever to retain that status.

[24] SB1609 Legislative Summary as Transmitted to the Governor, 50th Legislature, 1st Regular Session, March 10, 2011, http://www.azleg.gov//FormatDocument.asp?inDoc=/legtext/50leg/1r/summary/h.sb1609_04-14-2011_astransmittedtogovernor.doc.htm&Session_ID=102 (accessed December 3, 2013). The change in current employee contributions is being litigated due to a provision added to the state Constitution by voters in 1998 that says "public retirement system benefits shall not be diminished or impaired."

[25] Doug Ducey, (2013), "Inside the Vault: The Arizona State Treasurer's Quarterly Update," Quarter 1 http://www.aztreasury.gov/wp-content/uploads/2012/02/Inside-the-Vault-Q1-20131.pdf (accessed November 29, 2013)

[26] *Senate Bill 1609 Defined Contribution and Retirement Study Committee Final Report*, December 21, 2012, p. 9. In the Ducey report, the sentence quoted includes a reference to *Arizona's Pension Challenges,* Pew Center and the Arnold Foundation, November 2012.

[27] The Pew Center on the States, *The Trillion Dollar Gap: Underfunded State Pension Systems and the Roads to Reform*, February 2010, p. 12.

[28] See Pew Center on the States, *The Widening Gap: The Great Recession's Impact on State Pension and Retiree Health Care Costs*, April 2011, online at http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/State_policy/State_Pensions_Health_Care_Retiree_Benefits.pdf; and Pew Center on the States, *The Widening Gap Update*, June 2012, online at http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/Pew_Pensions_Update.pdf.

Box 2. Pension Plan Funding Levels and Long-Term Sustainability

Much of the debate about Arizona pensions focuses on the "funding level" of the plans and the "unfunded liabilities" of the plans – the $14.5 billion in additional funds that Table 1 projects the plans need to cover their existing pension benefit obligations to retirees and current workers. Sometimes lost in these discussions is that these obligations will be paid over a very long period of time, as much as 50 or 60 years into the future given that some obligations are owed to employees in their thirties. Thus, just as a home-owner does not need assets in liquid form today to pay off a 30-year home mortgage, pension systems do not need on hand today 100% of the assets needed to pay all existing pension obligations.

Exactly what fraction of assets on hand today are considered necessary for pensions to be financially sustainable is a function of conventions developed by pension fund financial experts known as "actuaries." Actuaries generally agree that 80% funded is financially healthy, a standard that Arizona's plans currently fall eight percentage points below (see Table 1). Nonetheless, even if pensions have funded ratios somewhat below 80%, the sky will not fall: pension funds (including Arizona's today) still have assets in place adequate to pay pension obligations many years into the future. Setting aside actuarial convention what ultimately matters is that pension plans maintain credible plans to sustain contributions adequate to meet their obligations in perpetuity.[29]

The body of this report suggests that Arizona's pension plans do have credible plans to sustain contributions adequate to meet their obligations long term.

Arizona's Pension Funds – Financially Sustainable for the Long Term

With recent reforms, all of Arizona's pension plans now exhibit six characteristics of well-funded pension plans identified by the National Institute on Retirement Security (NIRS).[30] NIRS derived these characteristics by examining the common features of six state pension plans that remained at least 80% funded during the financial market turmoil since 2000. Table 4 lists each best-practice characteristic and how it compares with the current practices of Arizona's pension systems.

[29] Social Security, which operates on a "pay as you go" model, illustrates that pension plans can be sustainable with low levels of pre-funding and that what ultimately matters is political commitment to sufficient ongoing employee and employer contributions to pay benefits.

[30] Jun Peng and Ilana Bolvie, *Lessons from Well-Funded Public Pensions: An Analysis of Six Plans that Weathered the Financial Storm*, National Institute on Retirement Security, Washington, D.C., June 2011, online at http://www.nirsonline.org/index.php?option=com_content&task=view&id=613&Itemid=48.

Table 4. Arizona Pension Plans Now Mirror National Best Practices	
Characteristics of Well-Funded Public Pensions	**Arizona Consistency With Each Best Practice**
1. Pension contributions pay the full annual required contribution (ARC), and maintain stability in contribution rates over time	Arizona has consistently made 100% of the annual required contribution for its pensions, even during economically challenging times. Since 1998 this has been an Arizona constitutional requirement. Making the ARC is easier because the unique cost sharing built into ASRS maintains stability in employer contribution rates. Cost sharing now applies to CORP and PSPRS as well.
2. Employee contributions share in the cost of the plan	Arizona ASRS employees contribute half the cost of their own pensions, a much higher share than public employees in most other states. The same cost-share now applies to CORP, and PSPRS employees will soon bear one-third of the cost of their own pensions.
3. Benefit improvements actuarially valued before adoption, and funded upon adoption	The sharing of ARC payments means that – across all three plans – employees pay nearly half the cost of any benefit improvements. Before benefit improvements (or cuts) are made, pension plans present to the Arizona legislature actuarial analysis of the impact of changes on annual pension costs.
4. Cost of living adjustments (COLAs) that are granted responsibly	ASRS requires that the 10-year return exceeds 8%, and then only the excess returns above that amount are used in a formula for Permanent Benefit Increases (PBIs) of up to 4%. The last time ASRS provided a PBI was 2005.[31] Under SB1609, PSPRS and CORP require a 10.5% return in the prior fiscal year before granting a PBI and, above that level, the PBI is tiered based on the fund status (starting at 2% if the funded ratio is at least 60% and reaching a cap of 4% the funded ratio is 80% or higher).
5. Anti-spiking measures that ensure actuarial integrity and transparency in pension benefit determination	All three state retirement systems now rely on a highest 60-consecutive-month period for determining employee pension benefits. Lengthening the time assures pensions are based on more representative salaries. In addition, termination pay including sick or vacation time are excluded from pension benefit calculations
6. Economic actuarial assumptions, including discount and inflation rates which can reasonably be expected to be achieved long term.	Arizona's pension systems now assume investment returns within the actuarial standard range of 7.5% to 8.0%. While the plans' returns fell below that range in the last 10 years, over long time horizons – and since their inception – they have exceeded it. PSPRS as recently as 2003 assumed a long-run return of 9%, but the Board of Directors for PSPRS has adjusted this downward appropriately.
Note. The left-hand column is based on Jun Peng and Ilana Bolvie, *Lessons from Well-Funded Public Pensions: An Analysis of Six Plans that Weathered the Financial Storm*, National Institute on Retirement Security, Washington, D.C., June 2011.	

A second gauge of the financial sustainability – and cost-effectiveness – of Arizona's pension plans is their long-run investment performance. Table 3 indicates that both ASRS and PSPRS have delivered returns of over 9% annually over the very long term.

[31] Arizona State Retirement System (2012), *Retirement Handbook*, "p. 19, https://www.azasrs.gov/content/pdf/Retirement_Handbook.pdf (accessed September 28, 2013). In 2013, the legislature went a step further, making new employees ineligible to receive PBIs at all. In our view, this goes too far and is arguably unfair to new employees. See SB1107, 2013 First Regular Session, Arizona State Legislature, access at http://www.azleg.gov/DocumentsForBill.asp?Bill_Number=sb1170&Session_Id=110&image.x=-1322&image.y=-34.

401(k)-Type Individual Accounts: Inefficient Retirement Plans and More Pension Debt

The prior sections focus on Arizona's current pension plans. The next several sections consider alternative pension plans. Two main alternatives to existing pensions are currently being promoted in states across the country. The most prominent proposed replacements for traditional defined benefit pensions are 401(k)-style individual accounts, also known as "defined contribution" (DC) plans. From the perspective of taxpayers – leaving aside the impact on public employees – the defined contribution approach to retirement savings has two fundamental flaws, each one independently fatal and sufficient to warrant policymakers retaining the state's current defined benefit pensions.

Less Cost-Effective Pensions. Research and actual experience show that, for several reasons, defined contribution pensions are much less "efficient" or cost-effective than defined benefit pensions.[32]

- Defined contribution pensions deliver lower investment returns, partly because individuals making investment choices do not match the returns of investment experts who manage defined benefit pooled funds and partly because individuals need to invest more conservatively as they approach retirement. By contrast, pension plans that retain a mix of young, mid-career, and older workers and retirees can maintain a diversified portfolio and invest for the long term
- They have higher administrative costs because of the need to manage individual accounts and higher marketing (or educational) costs incurred to educate plan participants about their investment options.
- They have higher financial management and trading fees.
- They do not pool "longevity risk." When individuals convert their accumulated savings into an "annuity" – a fixed payment until they die – their annuity payment is lower because the provider of the annuity knows there is a reasonable chance that the individual may live much longer than average.[33] Since defined benefit plans do pool longevity risk – across tens of thousands of plan members – they know that plan participants, *on average*, will live exactly the expected number of years. Thus, annual benefit payments don't need to be pared back to insure against a longer drawdown of benefits.

A large body of evidence exists on the higher investment returns of DB compared to DC retirement plans. That National Institute on Retirement Security (NIRS) cites three sources that put the DB investment return advantage over DC accounts between 0.8 and 1.8 percentage points annually.[34] The human resources firm Towers Watson has been analyzing asset-weighted performance differences

[32] Beth Almeida and William B. Fornia, *A Better Bang for the Buck*, National Institute on Retirement Security, August 2008, online at http://www.nirsonline.org/index.php?option=com_content&task=view&id=121&Itemid=48. William B. Fornia, *Better Bang for NYC's Buck: An Efficiency Comparison of Defined Benefit and Defined Contribution Retirement Savings Plans*, New York City Comptroller's Office, Budget & Policy Bureau, October 2011, Table 6, p. 23. See also Mark Olleman, "Public Plan DB/DC Choices," *PERiSCOPE,* January 2009, Milliman, online at http://publications.milliman.com/periodicals/peri/pdfs/PERi-01-01-09.pdf; and Robert Hiltonsmith, *The Retirement Savings Drain: The Hidden and Excessive Costs of 401(k)*, Demos, New York, New York; online at http://www.demos.org/sites/default/files/publications/TheRetirementSavingsDrain-Final.pdf.

[33] Instead of buying an annuity, holders of individual accounts may prefer to retain a savings account and spend it down during retirement. When they choose this option, however, holders of individual accounts need to save for beyond the median life expectancy or run a 50% chance of running out of funds before they die.

[34] Almeida and Fornia, *A Better Bang for the Buck*, p. 12.

between DB and DC plans since 1995. In a May 2013 brief, the firm reported that DB pension plans outperformed DC plans by 0.76% per year from 1995 to 2011, 8.01% versus 7.25%.[35] Among the largest one-sixth of plans, the group into which Arizona's pension plans fall, DB pensions outperformed DC plans by 0.99%.

The Center for Retirement Research at Boston College compared returns from 1988 to 2004 and found weighted by size, the average return for defined benefit plans was one percentage point greater than defined contribution, 401(k) plans, 10.7% to 9.7%. [36]

A "natural experiment" exists in a small number of states in which the state manages both DC and DB plans. How do investment returns compare when the same state retirement agency oversees both DB and DC options? In Florida, Keystone Research Center found that the investment returns of the Florida DB pension have been 0.76 percentage points higher than returns of the aggregated individual accounts since the DC option was established in the early 2000s. A 0.76 percentage point annual difference may not sound like much, but it compounds. A typical worker might withdraw monies 30 years later. After 30 years the higher DB returns yield about 25 percent greater retirement benefits dollar for dollar. If the difference is 1 percentage point, then the DB plan means more than 30 percent greater retirement benefits per dollar.

The two studies conclude that defined contribution retirement plans cost 45% to 85% more in employee plus taxpayer contributions to deliver the same level of retirement security as defined benefit retirement plans.

Two recent NIRS studies seek to gauge the combined impact of all of the DC plan inefficiencies summarized in the bullets above.[37] These studies make assumptions about each cost factor and then run simulations to project the overall DB cost advantage. Based on the assumptions made, the two studies conclude that defined contribution retirement plans cost 45% to 85% more in employee plus taxpayer contributions to deliver the same level of retirement security. The NIRS August 2008 study notes a 26% gap due to better DC earnings, a 5% gap due to the greater liquidity needs and consequently lower returns of people on DC plans after retirement, and a 15% gap due to a need to plan for greater longevity with a DC plan since you can outlive your savings. If just the first two gaps are included a DC plan to provide equivalent retirement security would require contributions equal to 145% of those to a DB plan. If all three are included, then the DC plan costs 185% of a DB plan. This is a BIG difference. (Box 3 shows that the inadequacy of 401(k)s for achieving retirement security has become widely recognized in the media recently.)

[35] See Brendon McFarland (2013), "DB Versus DC Investment Returns: the 2009-2011 Update," *The Insider*, May 2013, online at http://www.towerswatson.com/en/Insights/Newsletters/Americas/insider/2013/DB-Versus-DC-Investment-Returns-the-2009-2011-Update.

[36] Alicia H. Munnell, Mauricio Soto, Jerilyn Libby, and John Prinzivalli, Investment Returns: Defined Benefit v. 401(k) Plans, Center for Retirement Research, September 2006, on line at http://crr.bc.edu/wp-content/uploads/2006/09/ib_52.pdf

[37] Almeida and Fornia, *A Better Bang for the Buck*, August 2008; *and* Fornia, *Better Bang for NYC's Buck*, October 2011, Table 6, p. 23.

Box 3. Recent Media Reports on 401(k) Retirement Savings Plans

Just how good are 401(k) retirement plans? A number of recent news and magazine articles recognize that they are a bad deal for workers, providing less retirement security than defined benefit pension plans. Here are some recent quotes from business magazines and other media sources that highlight how 401(k) plans are less cost effective than pension plans and produce less retirement security for working Americans.

Pension Plans Beat 401(k) Savers Silly -- Here's Why

Forbes, June 4, 2013 (online at http://www.forbes.com/sites/mitchelltuchman/2013/06/04/pension-plans-beat-401k-savers-silly-heres-why/)

> "Towers Watson, the global human resources consultant, found that pension-style plans beat 401(k)-style offerings by nearly 3 percentage points in 2011, the latest study year. Pensions made investment returns of 2.74% while defined contribution plans lost money, banking -0.22%.
>
> It's no fluke. [Defined benefit] [p]ension plans often beat 401(k) plans. … Part of the reason is mutual fund fees. Mutual funds in the plans studied had weighted average expenses of 65 basis points [0.65%] in 2011… "

Why Your 401(k) Retirement Plan is Failing You

PBS.org, April 23, 2013 (online at http://www.pbs.org/wgbh/pages/frontline/business-economy-financial-crisis/retirement-gamble/helaine-olen-why-your-401k-retirement-plan-is-failing-you/)

> "Q: Some people do hit it big (in the stock market) right?
>
> A. That's mostly a myth. We know from the studies of people who look at this data, roughly 1%, maybe a little less, have the ability to beat the markets year in and year out. That's very unusual. So it's sort of like saying anybody can be Albert Einstein if only they went to the right high school."

Retirement Gamble: Frontline's Powerful Case for Taking Control of your Financial Future

Time Magazine, April 23, 2013 (online at http://business.time.com/2013/04/23/retirement-gamble-how-fees-and-poor-results-destroyed-your-401k/#ixzz2Ws85q2E6)

> "Traditional pensions have been supplanted by 401(k) plans, which have proved to be massively ineffective as a primary source of retirement security. Billions of dollars in savings have leaked out of these plans over the years and trillions were wiped away in the market collapses of 2000 and 2008."

Abolish the 401(k): The real crisis facing America's aging society is not Social Security, but private retirement plans

Salon.com, April 4, 2013 (online at http://www.salon.com/2013/04/04/abolish_the_401k/)

> "But the risks, including risks from poor investments and the chance that you will retire during a stock market downturn, fall entirely on the individual. Even worse, many working-class and middle-class Americans with 401Ks are stealthily fleeced by money managers, who charge high and often difficult-to-find fees for allocating retirement money among stocks, bonds and other assets."

The Greatest Retirement Crisis In American History
Forbes, March 20, 2013 (online at http://www.salon.com/2013/04/04/abolish_the_401k/)

> "Americans also know the great 401k experiment of the past 30 years has been a disaster. It is now apparent that 401ks will not provide the retirement security promised to workers. As a former mutual fund legal counsel, when I recall some of the outrageous sales materials the industry came up with to peddle funds to workers, particularly in the 1980s, it's almost laughable—if the results weren't so tragic."

What Will Replace the 401(k)?
Time Magazine, March 21, 2012 (online at http://business.time.com/2012/03/21/what-will-replace-the-401k/#ixzz2Ws9a3Kir)

> "With little or no return for more than a decade—and just as baby boomers begin to retire—the savings crisis has pushed us to new levels of despair. More than half the population has less than $25,000 saved for retirement, according to the Employee Benefits Research Institute."

Retirement overhaul: 401(k)s may not be the answer now
USA Today, October 23, 2009 (online at http://usatoday30.usatoday.com/money/perfi/retirement/2009-10-19-401k-savings-retirement_N.htm)

> "Now, we're in a different world," says Ted Benna, a retirement consultant who created the first 401(k) plan in 1980 and is semi-retired. "How are we going to move forward from here? It will be interesting to see. And I am not going to lose any sleep if 401(k) doesn't survive."

A Higher Unfunded Liability – Digging a Deeper Pension Hole. A switch to defined contribution plans for new employees would close the existing pension plans to new members. The actuarial research literature suggests that this would lower investment returns on the current pension plans' assets, increasing unfunded liabilities and adding billions of dollars in costs to Arizona taxpayers.

Investment returns are the most important source of revenues for pension benefits, typically paying for two thirds of benefits, twice as much as employer and employee contributions combined. By reducing the investment returns on Arizona's defined benefit pension assets, closing the existing defined benefit pensions would drive up the amount that public employers – hence taxpayers – must pay to cover current pension commitments.

Closing existing pensions and switching to defined contribution savings plans would, actuarial studies show, lower investment return and add billions of dollars in costs to Arizona tax payers.

Many policymakers recognize that switching to a defined contribution plan for all future employees will not make Arizona's unfunded pension liabilities vanish: the state and other public employers will still be responsible for the pension benefits of current and retired employees. Few policymakers recognize, however, that transitioning new employees into defined contribution plans will increase costs for taxpayers by reducing investment earnings on defined benefit plan assets. Here are the main reasons why. (Box 4 explains that it will also be difficult for a 401(k)-type savings plan to save money on pension benefits for new employees).

A shorter investment horizon.[38] A defined benefit plan that continues to take in new employees has a balanced mix of young, middle-age, and retired members. This balance gives such plans the ability to diversify their portfolios over a long investment horizon, including large amounts of high-risk, high-return investments (such as stocks or private equities), as well as some low-risk investments (such as bonds) that have lower returns. In defined benefit plans that no longer take in new employees, remaining plan participants gradually age and the plans' investment horizons shorten. As a result, investment managers must shift plan assets from higher-return to safer assets – just as individual investors approaching retirement shift savings away from risky assets to protect themselves against sudden market drops shortly before withdrawal of the money. The shift of pension funds to lower-return assets reduces investment earnings. In Arizona, lower investment earnings will force the state and other public employers to make additional contributions to cover defined pension benefits already promised to retiring employees.

A need for more liquid assets. If they are closed to new employees, an increasing share of remaining participants in the Arizona defined benefit pension plans will gradually age and retire. As this happens, remaining funds in the plans must be removed from illiquid assets, such as private equities, and invested in more liquid assets which are easy to convert into pension checks for retirees. This shift to more liquid assets will also lower the rate of return, increasing the taxpayer contributions needed to honor existing defined pension obligations.

Given the importance of investment earnings to growing pension assets over time, even a modest decline in investment earnings – e.g., 1% – can result in a large increase in the cost to taxpayers of meeting existing pension commitments. Studies in 13 states that have considered a switch to defined contribution plans have reached an actuarial consensus that closing a defined benefit plan lowers investment returns and thus *increases* unfunded liabilities (see Appendix A for more detail and complete references). These studies indicate that modifying defined benefit pension plans to lower long-term costs and increase employee contributions – as Arizona did beginning in 2011 – is a more cost-efficient way to reduce taxpayer costs and any unfunded liabilities.[39] Some highlights from the research on the transition costs of closing defined benefit pensions.[40]

- In Pennsylvania, three different actuaries concluded that closing the state's defined benefit pensions to new employees would gradually erode investment returns leading to a $40 billion increase in unfunded liabilities.
- In California, the state Legislative Analyst's Office acknowledged that closing defined benefit plans to new employees would require changes in investment asset mix, increasing expenses in the short and medium term. A study for the California Public Employees' Retirement System also concluded that closing the defined benefit plan to new employees would lower investment

[38] For the arguments in this and the next paragraph, see, for example, California Public Employees Retirement System, *The Impact of Closing the Defined Benefit Plan at CalPERS*, March 2011, online at http://www.calpers.ca.gov/eip-docs/closing-impact.pdf.

[39] Nari Rhee and Diane Oakley, *Issue Brief: On the Right Track? Public Pension Reforms in the Wake of the Financial Crisis,* National Institute on Retirement Security, p. 12; online at http://www.nirsonline.org/index.php?option=com_content&task=view&id=734&Itemid=49

[40] For an annotated bibliography that summarizes many of the recent studies (and contains complete source notes), see Stephen Herzenberg, *Digging a Deeper Pension Hole: Transitioning to Defined Contribution Plan Brings Higher Pension Debt and Taxpayer Costs*, Keystone Research Center, February 26, 2013, Appendix B, online at http://keystoneresearch.org/sites/default/files/KRC-Pension-Primer-Cost-of-Switching-to-DC.pdf.

returns of plan assets due to a shrinking investment time horizon and the need for more liquid assets.

- In Kansas, an actuarial study concluded that closing the defined benefit plan would lead to a change in asset mix to "produce a greater degree of liquidity, reflect a shorter time horizon for investment, and the resulting lower risk tolerance level…The System's need to hold more cash equivalents to meet outgoing cash flows would also reduce the total return of the investment portfolio…The lower investment return would result in higher contributions needed to provide the same benefits."
- In Minnesota, a 2011 study estimated a transition to a defined contribution plan would cost the state $2.8 billion.
- The New Hampshire Retirement System in 2012 found that closing its defined benefit plan to new hires would likely lead to more conservative investments and lower returns, and would increase the unfunded liability by an additional $1.2 billion.
- In New Mexico, an analysis for the state legislature found that, when a defined benefit plan is closed to new hires, "…a growing portion of assets will likely be held in short-term securities, thereby reducing investment returns."
- In Texas, the Employee Retirement System of Texas (ERS) in 2012 concluded that it made sense to "modify the existing plan design instead of switching all employees to an alternative plan structure." A study by the Texas Teacher Retirement System (TRS) concluded that freezing the defined benefit pension could cause the liability to grow by an estimated $11.7 billion – 49% higher than the current liability – due to lower investment returns from shifting to more liquid assets.

The idea that switching to a defined contribution plan will increase costs to taxpayers is not just theory. It is the experience of the three states that have closed off their defined benefit plans and put all new hires in 401(k)-type plans: West Virginia (1991), Michigan for its state employees (1997), and Alaska (2006).[41]

West Virginia adopted a 401(k)-type plan in 1991, but reversed course in 2006, reopening its defined benefit plan to all new hires in 2005 and allowing the members of the 401(k)-type plan to switch into the defined benefit plan. There were several reasons cited for the switch back, including a study done by West Virginia's Consolidated Public Retirement Board. The study found that the average investment return for employees with individual accounts equaled 3.39% from 2001 to 2006, compared to 6.13% from the teachers' defined benefit retirement system. In addition, for five out of six members over age 60 with individual accounts, the average account equaled $23,193. With many individual accounts not on track to generate adequate retirement income, the defined contribution plan was perceived to be driving up taxpayer costs for means-tested public programs.[42]

[41] For details and references on the Alaska and Michigan examples, see Herzenberg, *Digging a Deeper Pension Hole*, pp. 5-6.

[42] West Virginia Consolidated Public Retirement Board, "TDC Membership, Balance and Return Analysis For Experience July 1, 2005 thru June 30, 2006, " presented to the Joint Standing Committee on Pensions and Retirement, July 28, 2007

Box 4. Defined Contribution Plans Not Likely to Save Money on Future Retirement Plan Costs

While defined-contribution pensions will not wipe away existing pension fund debt – and, in fact, would likely increase it – many policymakers assume that 401(k)-type savings plans would at least lower employer (hence taxpayer) costs for retirement benefits going forward. In part as a result of recent cost-saving reforms, it will be difficult for any new pension plan to beat the low "employer normal cost" of Arizona's three pension plans. As Table 4 shows, the "employer normal cost" is the total normal cost minus the contributions that employees make each year for their own DB pension. Arizona's three pension plans now have a combined employer normal cost of about 3.5%, which means that most employer contributions pay down the unfunded liability. Moreover, this 3.5% blends a higher rate for employees hired before the 2011 reforms and a lower rate for employees hired since then (and a still lower one for employees subject to additional benefit cuts in 2013). Thus as the share of new employees in the Arizona plans grow relative to the pre-2011 hires, the employer normal cost will decline further.

The modest cost to employers of Arizona's defined benefit pensions going forward will make it more difficult for any alternative pension design to save additional money for employers – or taxpayers. For a DC plan, any employer match that exceeds 3.5% on average – or 2.5% (and falling) for ASRS alone – will have a higher employer cost for retirement security than the current plans.

Table 5. The Modest Cost of Arizona Pension Benefits Going Forward

	Arizona State Retirement System (ASRS) [1]	Public Safety Personnel Retirement System (PSPRS) [2]	Corrections Officers Retirement Plan (CORS) [3]	Weighted Average [4]
(a) Active Members	207,572	18,436	14,580	240,588
(b) Total Normal Cost (% of payroll)	13.64%	20.2%	15.18%	14.2%
(c) Employee Contribution	11.14%	11.05%	8.4%	11.0%
(d) Less Portion of Employee Contribution Not Used to Lower Employer Normal Cost		3.4%		0.3%
(e) Employer Normal Cost (b - c + d)	**2.50%**	**12.55%[5]**	**6.78%**	**3.5%**
(f) Amortization of Unfunded Liability	8.41%	18.48%	6.45%	9.1%
(g) Total Employer Contribution	10.91%	31.03%	13.23%	12.6%

[1] ASRS, *CAFR for the Year Ending June 30, 2013*, contribution for period ending June 30, 2013 (valuation 2011), p. 48. The costs for shown for ASRS include costs for long-term disability and retiree health care. Excluding contributions for long-term disability and health care lower total normal cost by 1.13% and employer normal cost by the same amount.

[2] Gabriel, Roeder, Smith & Company, Arizona Corrections Officer Retirement Plan Consolidated Report, June 30, 2013, contribution for valuation date June 30, 2013 and for Fiscal Year 2015, p. A-2; online at http://www.psprs.com/Admin_Investments_and_Finance/2013%20Actuarial%20Reports%20by%20System/

PSPRS%20Annual%20Valuation%202013.pdf. Note: it is not clear that the 3.4% employee contribution made to PSPRS currently, but not, on paper, used to lower employer normal cost, would still be made by new employees in a new DC plan. In that event, the effective employer normal cost that is relevant to a new defined-contribution plan would be 9.15%,
[3] Gabriel, Roeder, Smith & Company, *Arizona Corrections Officer Retirement Plan Consolidated Report*, June 30, 2013, contribution for valuation date June 30, 2013 and for Fiscal Year 2015, p. A-2; online at http://www.psprs.com/Admin_Investments_and_Finance/2013%20Actuarial%20Reports%20by%20System/CORP%20Annual%20Valuation%202013.pdf.
[4] Weighted by the number of members in each plan.
[5] A majority of PSPRS members do not participate in Social Security. For these members, employers avoid the 6.2% employer social security tax and the normal cost of PSPRS pensions over and above Social Security is 6.35% (or 2.95% if we also subtract the additional 3.4% employee contribution – see the end of note 2 above.)

Cash Balance: Less Retirement Security, High Turnover, Potentially Higher Costs

A new pension favorite, now being promoted by the Pew Trust and the Arnold Foundation, is a "cash balance" pension. Unlike traditional defined benefit pensions, but similar to defined contribution plans, cash balance pensions do not guarantee a specific benefit tied to years of service.[43] Instead they guarantee contributions from employees and employers each year (as with a DC plan) plus a minimum annual return (or "interest crediting rate") on benefits. This guaranteed return could be a fixed amount (such as 4%) or a fixed minimum plus some fraction of investment returns above the minimum.

Cash balance plans do have some advantages over 401(k)-type individual accounts. In particular, funds are still pooled and professionally managed, potentially eliminating the inefficiencies of defined contribution plans relative to traditional pensions. In addition, funds for new employee cash balance accounts can be pooled with existing pension plans, with the cash balance plan becoming a new "tier" within the existing pension plans. This should eliminate the mechanisms by which closing defined benefit plans leads to lower investment returns and high transition costs. Cash balance plans can also be designed in a way that increases pension portability (although that advantage depends on plan design). A last benefit of some cash balance plans is that they tend to increase benefits for employees in government service early in their career and then employed in the private sector for 20 years.

Unfortunately, however, cash balance plans have important disadvantages. To start with, they are much less "transparent" than traditional pensions, so workers do not really know what their retirement benefits will be. They are also virtually untested in the public sector. Third, they transfer significant financial market risk to employees, although not as much as defined contribution plans. Additional downsides to cash balance plans are that they could (1) substantially erode retirement security for long-term career employees, (2) lead to much higher turnover among mid-career professionals (eroding the quality of public service and potentially requiring offsetting wage increases), and (3) lower investment returns, leading to higher costs to taxpayers.

(1) Although the impact of cash balance plans depends on their specific features, these plans would likely reduce benefits on average as well as deeply slash benefits for career employees who retire from public service. For example, actuarial studies of two Pennsylvania cash balance proposals introduced in

[43] Legally, cash balance plans are considered defined benefit plans.

the 2011-12 legislative session found that average pension benefits across a sample of typical employee careers would be 40% lower than with the existing Pennsylvania defined benefit pensions.[44] As the size of this average cut makes clear, this particular Pennsylvania proposal was not generous to employees – providing them with only a fixed 4% return on their cash balance accounts annually, with no sharing of investment returns above 4%. The apparent aim of this Pennsylvania proposal was to eliminate employer costs for new employee pensions. Indeed, one of the Pennsylvania actuarial studies found that employees' own contributions more than covered the full cost of cash balance benefits, so that new employees would have paid for their own benefits themselves and paid an estimated 1.25% of their salaries to help pay off an unfunded liability accrued prior to their hire.

The Pennsylvania actuarial studies – and other research – indicate that career public employees who retire from government service can suffer benefit cuts relative to existing defined benefit plans of two-thirds or more.

The intuition behind why many cash balance proposals would cut benefits is implicit in the discussion of the Pennsylvania flat 4% interest (crediting) rate proposal discussed above: cash balance plans are often advanced by proponents that want to limit the risk to the public sector of future unfunded liabilities and also want to pay down an existing pension debt. These goals can be accomplished by lowering the interest rate guaranteed workers on their cash balance account and by giving workers a low or no share of investment earnings above the guaranteed level. But if the interest rates employees are given on their individual cash balance accounts are low, then benefits will be eroded. Of course, if employees receive higher interest rates on their accounts, cash balance plans can provide better benefits. Based on analysis of alternative Pennsylvania and Kentucky proposals, if employees receive 4% plus three-quarters of the investment returns above 4%, benefits on average may be in the neighborhood of what they would be with a traditional defined benefit plan.

In the private sector, where actual experience with cash balance plans is vastly greater than in the public sector, conversions in the 1990s from traditional defined benefit pension plans to cash balance plans usually reduced the pension benefits of workers, regardless of age. Older workers whose pensions were converted experienced a greater loss of expected benefits than younger workers.[45]

As noted, cash balance plans could provide better benefits for employees who work for the public sector when young but then leave government service mid-career. For example, if someone works for the public sector for 20 years until age 45 and then works in the private sector for 20 years, their defined benefit will not grow – in fact it might shrink by nearly half because of inflation. By contrast, a cash balance account would continue to grow and would increase in real ("inflation-adjusted") terms as long as the interest crediting rate exceeds inflation.

(2) Cash balance plans could sharply increase turnover among teachers, nurses, and other public servants because they reduce the pension incentive to stay in public service while increasing pensions for those who leave mid-career. Higher turnover that results from deep benefit cuts for career

[44] For details and references to the actuarial studies, see Stephen Herzenberg, *Cash Balance Plans Could Hurt Public Employees and Taxpayers*, Keystone Research Center, online at http://keystoneresearch.org/publications/research/cash-balance-pension-plan-could-hurt-public-employees-and-taxpayers.

[45] United States Government Accountability Office, *Private Pensions: Information on Cash Balance Pension Plans*, online at http://www.gpo.gov/fdsys/pkg/GAOREPORTS-GAO-06-42/pdf/GAOREPORTS-GAO-06-42.pdf.

employees could erode the quality of education and other public services, while potentially requiring compensating wage increases to increase retention. One of the actuarial studies of a Pennsylvania cash balance proposal noted the potential negative impact on retention: "One unintended effect of the bill may be to decrease the attractiveness of public school employment. The General Assembly and the Governor must determine whether the benefit provisions of the bill are consistent with the long-term personnel management goals of school and Commonwealth employers."[46] The Pennsylvania Public Employee Retirement Commission (PERC) also noted about this cash balance proposal that "…if the pension benefits are reduced, there may be pressure to increase other compensation to provide for the same total compensation as before." [47]

(3) Cash balance plans risk lower investment returns because plan managers may choose to target only the interest rate guaranteed employees (e.g., 4% instead of the up to 8% currently projected for Arizona's pensions). Consistent with this concern, a Pennsylvania actuary analyzing a cash balance proposal that would have provided a fixed 4% rate of return (i.e., with no sharing of returns above 4%) recommended that pension fund managers consider investing more conservatively once most employees participate in the cash balance plan: "Lastly, once active membership in PSERS [the Pennsylvania State Education Retirement System] has significantly become cash balance members with a guaranteed investment return and PSERS continues to have a sizable population of retired members, the System should consider revising their [sic] investment policy. The System may be inclined to invest assets in a more conservative manner…"[48] In a similar vein, one of the few longstanding public sector cash balance plans, the Texas Municipal Retirement System plan (in place since 1948), has an investment target of 7%, which is lower than most defined benefit plans. Moreover, the systems 2012 financial report (p. 9) notes that the establishment of a 7% target "…allows for a more conservative investment allocation, reflected in a lower equity allocation than the median plan sponsor in a peer universe of large public pension plans."[49]

Even if cash balance plans could earn high rates of return on a consistent basis, they may face pressure after implementation to lower their target return and invest conservatively. This pressure is likely from advocates who favor more conservative investment approaches to reduce the chance of future unfunded liabilities with cash balance plans and who do not mind that lower returns will also reduce retirement benefits for employees (in any cash balance plan that shares returns above the minimum with employees).

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[46] Nugent and Warren, letter to PERC Executive Director James McAneny containing Milliman (PERC actuary) actuarial note on House Bill 1677, p. 7.

[47] PERC Actuarial Note Transmittal on HB 1677, August 4, 2011, p. 13, online at https://ctcoas02.state.pa.us/pls/public/rlws.download?p_file=F12034/House%20Bill%201677,%20PN%202124.pdf

[48] Timothy J. Nugent and Katherine A. Warren letter to PERC Executive Director James McAneny containing Milliman (PERC actuary) actuarial note on House Bill 1677, p. 7, attached to PERC Actuarial Note Transmittal on HB 1677, August 4, 2011, online at https://ctcoas02.state.pa.us/pls/public/rlws.download?p_file=F12034/House%20Bill%201677,%20PN%202124.pdf

[49] In response to a request from the authors for information on annual investment returns going back to 1948, the Texas Municipal Retirement System provided data for 1989 to 2012. These data indicate healthy (geometric) average returns of 8.9% over the period. Along with this date, TMRS noted that "Although TMRS's investment objective was income-based rather than total-return based until 2009, TMRS began producing total return calculations beginning in 1989 for reporting purposes. As such, TMRS can only provide the full extent of our total return history since 1989."

Whatever the mechanism, lower investment returns with cash balance plans would increase any unfunded liability left over from the current pensions. Lower returns would also translate into less efficient – and more expensive – retirement benefits, with more contributions from taxpayers and employees required to achieve any given benefit.

Arizona Public Sector Wages plus Compensation Trail Those for Comparable Private Employees

Earlier in this report (see Table 1 and the accompanying text), we noted how modest are Arizona pension benefits, paying an average of $22,000 in annual benefits. We also summarized research showing that Arizona public sector workers earn less in salaries plus benefits than private sector workers with comparable education, experience, and other attributes that impact wages. Public sector salaries trail private ones even more for employees with a four-year college degree or higher levels of education.

For example, public sector salaries are especially low in Arizona for teachers – the largest single membership group in all of Arizona's pensions. (Teachers' and other school employees typically account for two thirds of all public sector employees in a state's public sector retirement plans.).

Given that public sector salaries are considerably lower than private, today's modest Arizona pensions are a critical offset against low earnings during a working career, especially for the K-12 teachers that hold Arizona schools together and for other college-educated employees. If public pensions are further eroded, what incentive do teachers have to give their lives to educating Arizona's children or other public employees to devote themselves to a career in public service?[50]

America's Coming Retirement Crisis

Arizona debates about retirement security have focused heavily on public sector pensions in recent years. Arizona's – an America's – real retirement security crises, however, are not the unfunded liabilities of public sector pensions but the lack of retirement security for today's – and tomorrow's – seniors, a problem with roots in the erosion of middle-class pensions in the private sector.

Even today, with many seniors still benefiting from a period when middle-class defined benefit pensions were common in the private sector, close to half (43%) of the elderly population in Arizona is "economically vulnerable." (Economically vulnerable is defined as having an income that is less than two times the "supplemental poverty threshold," a poverty measure more comprehensive than the traditional federal poverty line.[51])

[50] Teacher experience correlates with higher student achievement, and lower pay for teachers increases turnover of teachers, depressing student achievement. See Hendricks, Matthew (2014), "Does it pay to pay teachers more? Evidence from Texas," *Journal of Public Economics*, 109: 50-63.

[51] Elise Gould and David Cooper, *Financial Security of Elderly Americans at Risk*, Economic Policy institute, Washington D.C., Jun 6, 2013; online at http://s2.epi.org/files/2013/financial-security-elderly-americans-risk.pdf. Arizona's 43% below the 48% of U.S. elderly that are economically vulnerable, possibly because significant numbers of middle-class and affluent seniors move to Arizona.

If someone retiring today wished to purchase an annuity to provide $30,000 income for the remainder of their life, that person would need to have accumulated approximately $500,000 or more.[52]

The inadequate savings of older working-age Americans indicate that economic vulnerability could grow in the future. For example, a Harris Interactive Survey commissioned and released by Wells Fargo found that most "middle-class Americans" between 40 and 59 think they'll need $200,000 for their retirement, but these Americans reported median savings of only about $34,000.[53] The New School for Social Research estimates the mean retirement savings for 50-64 only $26,000 including zero for half this population.[54]

Using data on household finances collected by the Federal Reserve, the Center for Retirement Research estimates that 53% of American workers 30 and older are on a path that will leave them unprepared for retirement, a sharp deterioration from 38% in 2001 and 30-31% in the 1980s.[55] The Center found that of those 55-64, the median set aside was $120,000, enough to purchase an annuity of almost $600 a month, yielding an annual income of $7,000.[56]
One contributor to the coming retirement security crisis is the switch in the private sector away from middle-class defined-benefit pensions. Since 1989, the share of private workers with defined benefit pensions has dropped by half, from 42% to 22%.[57] Since 1981 it has likely dropped by even more (from 57% to 22%).[58] Since 1989, the share of private-sector employees with 401(k)-type savings accounts has

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[52] For further discussion see Steve Vernon, "How Much Retirement Savings Do You Need?," CBS News MoneyWatch, February 3, 2010, access on line http://www.cbsnews.com/news/how-much-retirement-savings-do-you-need/.

[53] Wells Fargo (2013), News Release, **"**Middle Class Americans Face a Retirement Shutdown; 37% Say 'I'll Never Retire, But Work Until I'm Too Sick or Die,' a Wells Fargo Study Finds, October 23**,** https://www.wellsfargo.com/press/2013/20131023_middleclasssurvey.

[54] Link: https://docs.google.com/a/azgci.org/file/d/0B35b9afh6ZgZeVJES08wNXFxVVk/edit?pli=1

[55] Alicia H. Munnell, Anthony Webb, and Francesca Golub-Sass, *The National Retirement Risk Index*, Center for Retirement Research at Boston College, October 2012, Number 12-20; online at http://crr.bc.edu/wp-content/uploads/2012/11/IB_12-20-508.pdf. Cited in Fletcher, Michael A. (2013), "Fiscal Trouble Ahead for Most Future Retirees," Washington Post, February 16, http://articles.washingtonpost.com/2013-02-16/business/37130450_1_retirement-benefits-center-for-retirement-research-social-security (accessed February 16, 2013).

[56] Michael A. Fletcher (2013), "Fiscal Trouble Ahead for Most Future Retirees," Washington Post, February 16, http://articles.washingtonpost.com/2013-02-16/business/37130450_1_retirement-benefits-center-for-retirement-research-social-security (accessed February 16, 2013).

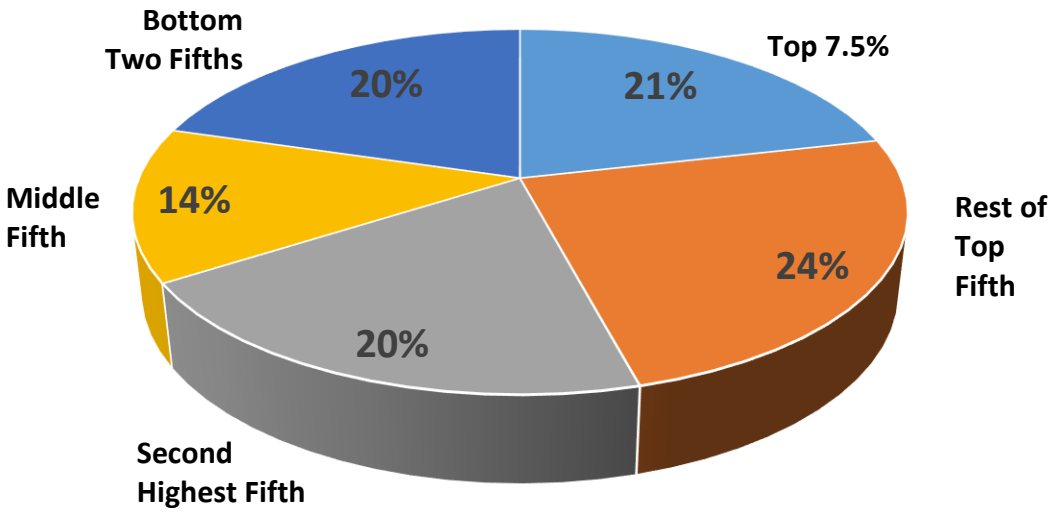
[57] For a wealth of detail on this topic, see Monique Morissey and Natalie Sabadish, *Retirement Inequality Chartbook: How the 401(k) revolution created a few big winners and many losers*, Economic Policy Institute, September 6, 2013, online at http://www.epi.org/publication/retirement-inequality-chartbook/

[58] Prior to 1990, data were maintained only on the share of private, full-time employees in large establishments that had defined-benefit pensions. From 1981 to 1991, this share fell from about 85% to about 60%. Interpolating this suggests about 62.5% in 1990, or a fall of 26% from 1981 to 1990. If the large-establishment decline mirrored the overall decline, given the 42% DB share in 1989 this implies a 57% DB share in 1981.Estimates based on William J. Wiatrowski, "The last private industry pension plans: a visual essay," *Monthly Labor Review*, December 2012, pp. 3-18; online at http://www.bls.gov/opub/mlr/2012/12/art1full.pdf. See especially the first chart on p. 4. See also William J. Wiatrowski 2011. *Changing Landscape of Employment-based Retirement Benefits*. Bureau of Labor Statistics; online at http://www.bls.gov/opub/mlr/cwc/changing-landscape-of-employment-based-retirement-benefits.pdf.

grown to 50% (from 42%). (In 2011, an estimated 41% of private employees had no retirement plan of either kind, DC or DB.) (Figure 5). The problem, implicit in the saving trends among those approaching retirement (and in Figure 1 earlier in the report), is that most private 401(k)-type savings accounts have little money in them (although a few have very large amounts of money)

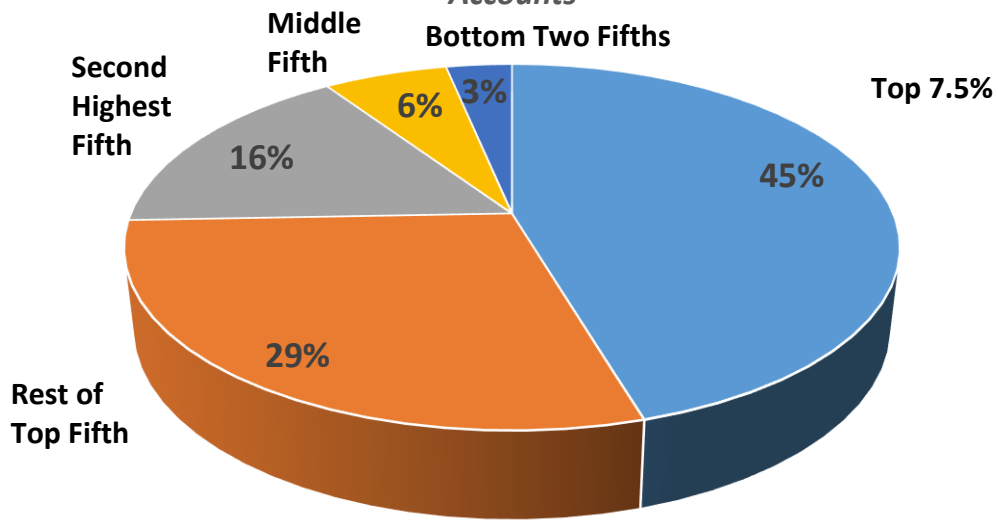
Figures 4 and 5 contrast the equitable distribution of ASRS pension benefits with the inequality distribution of 401(k) savings. (We use national data on 401(k) savings because separate data we do not have data for Arizona alone.) The dramatic differences between the two pie charts illustrates that 401(k) savings are an important part of growing economic inequality among retirees – the "1%" economy among the retired.

Figure 4. The Distribution of Arizona Pension Benefits:
Share (%) of ASRS + PSPRS Pension Benefits Going to Each Group



Source. Authors' estimates based on ASRS and PSPRS data

Figure 5. The Distribution of 401(k) Retirement Savings
Share (%) of Retirement Savings Going to Each Group of Accounts



Source. Authors' estimates based on EBRI/ICI Participant-Directed Retirement Plan

Conclusion and Recommendations

The body of this report makes four main points. First, Arizona's public sector pension plans, despite the financial market difficulties of the last decade, are in reasonable financial shape. Changes over the past decade should ensure that they remain financially sustainable for the long term.

Second, the most widely discussed alternative pension proposals are not needed – given the sustainability of the current plans – and risk hurting both taxpayers by increasing costs, and public employees and the quality of public services by eroding public sector pensions and destabilizing public-sector employment.

Third, Arizona does have an emerging retirement security crisis, as does the rest of the country. This crisis, however, is not that public middle-class pensions are too generous, or unsustainably expensive, both claims being false as documented here. The real retirement security crisis is the erosion of retirement security in the private sector, a trend that results in part from the atrophy of defined benefit pensions in the private sector and the demonstrable failure of traditional 401(k) plans to plug the gap. The decline of private defined benefit pensions and the growth of 401(k) defined contribution accounts has brought the stark income inequalities observed widely among working-age families into the retirement sphere – in spades.

Fourth, to safeguard taxpayers and further guard against future underfunding, Arizona could take some more modest steps. The state could adopt a rule to always pay the larger of the ARC or the full normal cost. Then pension funds would be likely to develop a reserve in good times that lowers the cost of

pensions in lean times. If this policy had been in effect from 1997-2005, the state could have accrued an additional 24 percent of plan assets in ASRS and 15 percent of plan assets in PSPRS, meaning Arizona would have significantly better funded pensions and lower employer costs today.

Based on the evidence in this report, it is time for Arizona state policymakers to take a new tack on retirement security issues. The new focus should not be on the unfunded liabilities of Arizona's state pension plans but on the more serious issue of retirement security for all. Arizona should take a two-pronged approach to achieving retirement security for all. It should maintain the existing modest but middle-class pension benefits provided to members of Arizona's state pension plans. The state should also explore options for improving the retirement security of private sector workers. In neighboring California, retirement stakeholders and policymakers are designing a state-managed retirement savings plan in which private-sector employees who have no employment-related retirement savings could participate.[59] As well as employees, this could benefit small businesses that would like to provide employees with retirement benefits but struggle to independently administer a good plan. Plugging the retirement security hole in the private sector, not creating a new hole in the public sector, is the way forward for Arizona.

[59] Ross Eisenbrey and Monique Morrissey, *California Retirement Plan Could Serve As a National Model*, Economic Policy Institute, Washington D.C., September 13, 2012, online at http://www.epi.org/publication/pm193-california-retirement-plan-national-model/

Appendix A.

The High Cost of Transition from Defined Benefit to Define Contribution Retirement Plans

Public officials who are considering moving from a defined benefit pension plan to a defined contribution plan should be aware of the potential effects. Actuaries and benefit experts who have analyzed proposed changes in other states have found that closing a defined benefit plan and transitioning to a defined contribution plan can result in significant additional costs to the state (and to schools), hence to taxpayers. Aside from transition costs and the impact on unfunded liabilities, most of the studies in other states also find that new defined contribution plans are substantially less cost-effective in the long term—i.e., they deliver less retirement security for any given level of employee plus employer (or taxpayer) contributions than defined benefit plans. In this annotated bibliography, we highlight primarily findings that relate to the fall of investment returns in defined benefit plans closed to new entrants, as under the Florida House plan.

Arizona

An analysis of the defined benefit and defined contribution plans conducted by the Arizona Retirement System in 2006 concluded: "If the goal of a retirement plan is to provide the least expensive method of providing a basic guaranteed replacement income to the members, then the defined benefit plan appears to provide a significant advantage for the majority of participants if the plan choices are mutually exclusive."[60]

California

A 2011 study for the California Public Employees' Retirement System concluded that closing the defined benefit plan would lower investment returns of plan assets due to a shrinking investment time horizon and the need for more liquid assets.[61] The study also concluded that freezing the defined benefit plan would incur the increased administrative costs of a defined contribution plan and the costs associated with having two systems concurrently.

In 2005, Milliman, serving as actuary for the Los Angeles County Boards of Retirement, studied the fiscal impact of placing Los Angeles County employees hired after July 1, 2007 into a new defined contribution retirement plan instead of the current defined benefit pension. Milliman estimated that the county's defined benefit plan contribution rate would increase by 3.66%, increasing county contributions to the closed defined benefit plan by $206 million in 2008. While the contributions would gradually decline over time, the county would have to wait until 2018 to see any savings in defined plan costs as a result of the change. The actuary found that investments of assets may need to be more conservative because no new members will be added after July 1, 2007, reducing investment returns and requiring the employer to pay more to fund retirement benefits.

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[60] Paul Matson and Suzanne Dobel, *A Comparative Analysis of Defined Benefit and Defined Contribution Retirement Plans*, Arizona Retirement System, 2006, online at http://www.nasra.org/resources/ASRS%20DBDC%20White%20Paper.pdf.

[61] California Public Employees Retirement System, *The Impact of Closing the Defined Benefit Plan at CalPERS*, March 2011, online at http://www.calpers.ca.gov/eip-docs/closing-impact.pdf.

Colorado
A study by Buck Consultants under contract to the State Auditor in 2001 concluded that "…it is more expensive for a defined contribution plan to provide a career employee with the same level of retirement benefits as a defined benefit plan..."[62]

Kansas
An actuarial study examined questions related to closing the defined benefit plan (with no new hires becoming members of the defined benefit plan).[63] The study concluded, "The System's current asset mix reflects its position as an institutional investor with a very long time horizon. In anticipation of the closed plan moving into a negative cash flow situation, the target asset mix would be rebalanced to produce a greater degree of liquidity, reflect a shorter time horizon for investment, and the resulting lower risk tolerance level. The System's ability to invest in illiquid asset classes, such as private equity and real estate, would be reduced. The System's shorter time horizon for investment would dictate a reduction in the higher return producing asset classes, which produces more volatility of returns. The System's need to hold more cash equivalents to meet outgoing cash flows would also reduce the total return of the investment portfolio. As a result, the return on the portfolio would be expected to be lower than the investment return assumption on an ongoing basis. The lower investment return would result in higher contributions needed to provide the same benefits."

Kentucky
An actuarial analysis in Kentucky done by the actuarial firm Cavanaugh Macdonald in 2011 found that a conversion to a defined contribution plan would increase the state's costs for nearly two decades.[64]

Minnesota
A 2011 study for the Minnesota State Legislature found that the transition costs of switching new hires from defined benefit pensions to defined contribution plans "…would be approximately $2.76 billion over the next decade for all three systems."[65] The analysis explained that costs increase during a transition period because once a plan is closed to new members any unfunded liabilities remaining in the existing defined benefit plan must be paid off over a shorter timeframe.

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[62] Buck Consultants, Incorporated, Study of Retirement Plan Designs for the State of Colorado Pursuant to Senate Bill 01-049, online at http://www.leg.state.co.us/OSA/coauditor1.nsf/All/5F3AC8C645174C5087256E30007BC1D8/$FILE/1409%20PERA%20Fin%20FY%2002.pdf

[63] Kansas Public Employees Retirement System (KPERS or the System) and Cavanaugh Macdonald Consulting LLC (Cavanaugh Macdonald), *Fiscal Impact Report: Senate Substitute for HB 2194 and House Substitute for HB 2333 Conference Committee on Senate Substitute for HB 219*, online at http://www.kpers.org/legislation_fiscalimpactreport.pdf

[64] Kentucky Retirement Systems, *Actuarial Analysis of Senate Bill 2 GA*, online at http://www.google.com/url?sa=t&rct=j&q=actuarial%20analysis%20of%20senate%20bill%202%20ga%2C%20letter%20to%20mr.%20william%20a.%20thielen%2C%20coo%20kentucky%20retirement%20systems%2Cfebruary%2025%2C%202011&source=web&cd=6&ved=0CDwQFjAF&url=http%3A%2F%2Fwww.lrc.ky.gov%2Frecord%2F11rs%2FHB480%2FSCS1AA.doc&ei=QLUNT-TrKsbw0gGZqu3dBQ&usg=AFQjCNE9PiL-TMquoWWT-1Qrt7gb6nh7VA&cad=rja

[65] Retirement Systems of Minnesota, *Retirement Plan Design Study*, June 1, 2011, online at http://www.msrs.state.mn.us/pdf/Study6-1-2011web.pdf

Nevada
A 2010 Segal Company study of Nevada's proposal to put new hires in a defined contribution plan found that the state's total pension costs would increase.[66]

New Hampshire
The New Hampshire Retirement System performed an analysis on proposed 2012 defined contribution legislation related to the benefit plan design and funding.[67] The report found that closing the defined benefit plan to new hires would increase the unfunded liability by an additional $1.2 billion, and closing the defined benefit plan to new workers will likely lead to changes in investment allocations, including an increase in more conservative investments with lower returns, because over time it will become a retiree-only system.

New Mexico
The New Mexico legislature requested analysis on the implications of moving from a defined benefit program to a defined contribution program for all new education employees in 2005.[68] The analysis was conducted by Gabriel, Roeder, Smith & Company, and as the report explained, when a defined benefit plan is closed to new hires, "…since a growing portion of plan assets must be used to pay benefits, a growing portion of assets will likely be held in short-term securities, thereby reducing investment returns."

New York
In 2011, a study was conducted by the National Institute on Retirement Security and Pension Trustee Advisors on behalf of the Office of New York City Comptroller John C. Liu. The study found that costs associated with traditional pensions range from 36% to 38% less than a defined contribution plan providing equivalent benefits. Longevity risk pooling saves from 10%-13%, maintenance of portfolio diversification saves from 4%-5%, and superior investment returns saves from 21%-22%. http://www.nirsonline.org/storage/nirs/documents/NYC%20BB%20Report/final_nyc_report_oct_2011.pdf

Pennsylvania
Three different actuaries concluded that closing Pennsylvania's defined benefit pensions to new employees would gradually erode investment returns leading to a $40 billion increase in unfunded liabilities.[69]

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[66] Segal Company, *Public Employees' Retirement System of the State of Nevada: Analysis and Comparison of Defined Benefit Contribution Retirement Plans*, online at http://www.nvpers.org/public/executiveOfficer/2010-DB-DC%20Study%20By%20Segal.pdf.

[67] Gabriel, Roeder, Smith, and Company, *New Hampshire Retirement System, Defined Contribution Retirement Plan Study*, January 11, 2012, online at http://www.nhrs.org/documents/GRS_DC_Plan_Study_01_11_11_FINAL.pdf.

[68] Gabriel, Roeder, Smith, and Company, *Defined Contribution Retirement Plan Study* for the New Mexico Educational Retirement Board, October 14, 2005, online at http://www.nasra.org/resources/New%20Mexico%20ERB-DC.pdf

[69] For an actuarial study of the impact of closing the Pennsylvania State Employees' Retirement System (SERS) defined benefit plan, see Hay Group, "Actuarial Cost Note Regarding H.B. 1350, P.N.1760," May 2013. For an actuarial study of the impact of closing the Pennsylvania Public School Employees' Retirement System (PSERS) defined benefit plan see "Letter from Dana Spangher, Consulting Actuary, Buck Consultants, to PSERS Executive Director Jeff Clay, Transmitting an Actuarial Note on HB1350 (Printer's No. 1760)," June 11, 2013. For a summary of the two prior studies, see Public Employee Retirement Commission (PERC) (of Pennsylvania), A*dvisory Note for House Bill Number 1350, Printer's Number 1760*. Public Employee Retirement Commission (PERC), A*dvisory Note*

Texas

The Employee Retirement System of Texas (ERS) in 2012 noted that, in many cases, the increased cost of freezing a defined benefit plan, combined with the inefficiencies of defined contribution plans made it sensible to "modify the existing plan design instead of switching all employees to an alternative plan structure."[70] The Teacher Retirement System of Texas (TRS) concluded that even if contributions remained the same as in the current defined benefit plan, participants in an individually directed defined contribution plan would have only a 50% chance of earning investment returns high enough to get 60% or more of the defined benefit plan benefit.[71] The study found that it would cost 12% to 138% more to fund a target benefit through alternative retirement systems. Individually directed defined contribution accounts were found to be the most costly, and a defined benefit system the least costly. Finally, the study estimated that freezing the defined benefit pension could cause the liability to grow by nearly an estimated $11.7 billion—49% higher than the current liability—due to lower investment returns resulting from a transition to a more liquid asset allocation.

Wisconsin

A 2011 study for the state legislature analyzed the impact of establishing a defined contribution plan as an option, among other potential changes to the Wisconsin Retirement System (WRS). The final report stated: "Actuarial analysis indicates that to provide a benefit equal to the current WRS plan, an optional DC [defined contribution] plan would require higher contributions than employers and employees currently pay." The study recommended: "Given the current financial health and unique risk-sharing features of the WRS, neither an optional DC plan nor an opt-out of employee contributions should be implemented in Wisconsin at this time. Analysis included in this study from actuaries, legal experts, financial experts, and information from similar studies conducted in other states show that there are significant issues for both study items in terms of the actual benefit provided and potential for negative effects on administrative costs, funding, long term investment strategy, contribution rates, and individual benefits."
http://etf.wi.gov/publications/wrs-study.pdf

for House Bill Number 1350, Printer's Number 1760. For a summary of all three of the previous documents, see Stephen Herzenberg, *A $40 Billion Dollar Oversight: Actuarial Studies Document High Cost of Governor Corbett's Pension Plan*

[70] Employee Retirement System of Texas, *Sustainability of the State of Texas Retirement System*, Report to the 82nd Texas Legislature, September 4, 2012.

[71] Teacher Retirement System of Texas, *Pension Benefit Design Study*, online at http://www.trs.state.tx.us/about/documents/pension_study_benefit_design.pdf

Table A1

Table A1. Financial Measures of Arizona Pension Plans Over Time											
	Funded Ratio			Employer Contribution Rate[72]			Employee Contribution Rate			Employer Normal Cost	Employer Contribution to Cover Unfunded Actuarial Accrued Liability
	ASRS	PSPRS	CORP	ASRS	PSPRS	CORP	ASRS	PSPRS	CORP	PSPRS	PSPRS
1968											
1969					10.10			5.00		10.10	.00
1970					10.10			5.00		10.10	.00
1971				5.00	13.23		5.00	5.00		9.21	4.02
1972				5.00	15.58		5.00	8.00		N/A	N/A
1973	79.3			5.00	22.12		5.00	8.00		15.59	6.53
1974				5.00	21.62		5.00	8.00		15.22	6.40
1975	71.1			5.00	20.79		5.00	8.00		15.19	5.60
1976	75.9			7.00	20.24		7.00	8.00		15.17	5.07
1977	76.5	78.5		7.00	16.37		7.00	8.00		12.33	4.04
1978	72.0	83.3		7.00	15.34		7.00	8.00		11.24	4.10
1979	75.6	85.8		7.00	15.38		7.00	8.00		11.37	4.01
1980	78.8	87.1		7.00	13.46		7.00	8.00		10.00	3.46
1981	84.5	93.7		7.00	12.28		7.00	8.00		9.25	3.03
1982	82.7	94		7.00	11.86		7.00	8.00		9.15	2.71
1983	90.2	93.2		7.00	10.61		7.00	8.00		9.16	1.45
1984	92.8	97.2		7.00	10.10			8.00		8.65	1.45
1985	92.4	98.1		6.27	9.16		6.27	8.00		8.38	.78
1986	97.9	101.9		5.67	7.87		5.67	8.00		7.75	.12
1987	110.2	100.5	69	5.53	7.67	6.00	5.53	8.00	6.00	7.67	.00
1988	110.5	101.1	90.8	4.00	6.67	6.00	4.00	8.00	6.00	7.61	-.94
1989	110.6	100.6	90	5.09	7.18	6.00	5.09	8.00	6.00	7.79	-.61
1990	109.8	98.1	88.9	2.00	6.72	6.00	2.00	8.00	6.35	7.60	-.88
1991	110.4	97.4	94.9	3.82	7.01	6.35	3.82	8.00	7.00	7.97	-.96
1992	104.7	99.4	103	3.60	8.1	6.16	3.60	7.65	6.65	8.26	-.16
1993	109.5	100.6	107.8	3.59	8.73	6.22	3.59	7.65	6.65	8.84	-.11
1994	109	100.7	101	3.14	8.16	5.83	3.14	7.65	6.65	8.63	-.47
1995	111.8	103	104.3	3.75	7.66	5.54	3.75	7.65	6.65	8.59	-.93
1996	113.2	106.9	109.9	3.36	7.85	6.66	3.36	7.65	6.65	9.94	-.89

[72] Includes health insurance premium benefit program cost as well as pension cost.

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	Funded Ratio			Employer Contribution Rate[72]			Employee Contribution Rate			Employer Normal Cost	Employer Contribution to Cover Unfunded Actuarial Accrued Liability
	ASRS	PSPRS	CORP	ASRS	PSPRS	CORP	ASRS	PSPRS	CORP	PSPRS	PSPRS
1997	117.1	115.1	110.8	3.20	8.11	6.93	3.20	7.65	6.65	9.96	-1.85
1998	120.7	116.3	118.1	3.05	6.36	6.63	3.05	7.65	8.50	9.94	-3.58
1999	116.6	120.3	133.5	2.85	5.82	5.98	2.85	7.65	8.50	9.92	-4.10
2000*	120.4	124.7	140.6	2.17	5.29	5.14	2.17	7.65	8.50	9.76	-4.47
2001*	115.1	126.9	140	2.17	5.21	1.88	2.17	7.65	8.50	10.89	-5.68
2002*	106.4	113	123.8	2.00	4.21	1.15	2.00	7.65	8.50	10.86	-6.65
2003*	98.4	100.9	114.4	2.00	3.75	1.71	2.00	7.65	8.50	11.21	-7.46
2004*	92.5	92.4	104.8	5.20	7.66	3.95	5.20	7.65	8.50	11.61	-3.95
2005	86.1	81.3	96.4	5.20	10.05	4.07	5.20	7.65	8.50	10.32	-0.27
2006	84.3	76.7	93.7	6.90	12.80	5.47	6.90	7.65	8.50	10.29	2.51
2007	83.3	65.2	88.5	8.60	13.83	4.46	8.60	7.65	7.96	8.64[73]	3.49
2008	82.1	68.8	90.3	9.10	16.52	6.72	9.10	7.65	7.96	9.57	5.44
2009	79	70	86.4	8.95	21.71	8.65	8.95	7.65	8.41	11.75	8.48
2010	76.4	67.7	83.8	9.00	20.77	7.49	9.00	7.65	8.41	11.80	8.08
2011	75.5	63.7	76.6	9.60	20.89	8.57	9.60	7.65	8.41	11.51	8.09
2012	75.3	60.2	70.7	10.50	22.68	9.5	10.50	8.65	8.41	11.60	9.66
2013	75.9	58.7	69.7	10.90	27.18	11.31	10.90	9.55	8.41	12.23	13.47
Average**				5.64	12.20	6.92	5.64	7.88	8.36		

* Computed contribution rates are before application of the 2.00% minimum employer contribution for each participating unit. Minimum rate established by State Legislature in 2000 for fiscal years beginning 2002/2003.

** Arithmetic average of the contribution rates in each year for which they are reported.

Sources. ASRS, PSPRS, and CORP CAFRs and other annual reports, various years.

[73] First year in which health insurance premium benefit costs are excluded. In prior years these costs were bundled with pension cost.