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Did Pension Reform Improve the Sustainability of Pension Plans? Evidence from a Counterfactual Analysis of Michigan and Alaska

by Anthony Randazzo and Truong Bui



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Executive Summary

A fierce national debate is raging over whether closing public sector defined benefit plans to replace them with defined contribution plans improves the sustainability of retirement systems or creates further problems. We know what has actually transpired in states like Michigan and Alaska since their pension reform projects began, but until now there has been little robust forecasting of alternate scenarios against which to compare actual experience.

In this policy study we develop a model of what would happen if a state didn't close its defined benefit plan, and apply this to the cases of Michigan's 1996 reform and Alaska's 2005 reform.

We find that both states are better off specifically because they closed defined benefit plans compared to if they had made no changes. Unfunded liabilities have increased in both states since their reforms, but for reasons unrelated to the actual reforms: both states had underperforming investment returns, and both states failed to make 100% of their required employer contributions. Had Michigan and Alaska not closed their pension plans, unfunded liabilities would be even higher today than under actual experience. And had the states properly managed their pension reform projects they would be billions better off today.

Policymakers considering similar reforms to Michigan and Alaska should understand that closing a defined benefit plan and replacing it with a defined contribution plan *can improve sustainability*. They should also heed the warnings that Michigan and Alaska present in recognizing that responsibly managing plans after reform is just as important as getting the initial terms of the reform right.

Table of Contents

Introduction: Pension Reform and Sustainable Retirement Plans	1
A. Analytical Framework Part One: Historical Analysis	2
B. Analytical Framework Part Two: Counterfactual Model.....	4
Michigan: Properly Managed Reform Would Have Saved the State More than \$7 Billion; Without Pension Reform, Unfunded Liabilities Would Be About \$450 Million Greater	10
A. The Story of Reform	10
B. MSERS Actuarial Experience During Pension Reform	11
C. Counterfactual Scenarios	16
D. Conclusion: Pension Reform Improved the Sustainability of Michigan’s Public Sector Pension System.....	23
Alaska: Properly Managed Reform Would Have Saved the State More than \$4 Billion; Without Pension Reform, Unfunded Liabilities Would Be About \$40 Million Greater.....	24
A. The Story of Reform	24
B. Alaska’s Actuarial Experience During Pension Reform	25
C. Counterfactual Scenarios	29
D. Conclusion: Pension Reform Improved the Sustainability of Alaska’s Public Sector Pension System	39
Conclusion: Closing Defined Benefit Plans Did Not Cause An Increase in Unfunded Liabilities in Michigan or Alaska.....	40
About the Authors	42
Related Studies	43
Methodology.....	44

Part 1

Introduction: Pension Reform and Sustainable Retirement Plans

Has pension reform in Michigan and Alaska improved the sustainability of their retirement systems? This question sparks debate whenever a U.S. state or municipality considers pension reform similar to what was implemented in Michigan in 1997 and Alaska in 2007. Both states chose to close one or more defined benefit plans to new members and create defined contribution plans for new public sector employees. Defined benefit plans offer specified retirement benefits that are guaranteed by the taxpayer. Defined contribution plans offer individual retirement accounts that receive specified annual contributions, with flexibility in how those accounts are used by the employee during retirement.

Supporters of the shift from defined benefit to defined contribution plans in Michigan and Alaska make two overarching claims. First, closing the defined benefit plan has prevented problems within the plans—whether due to overly optimistic actuarial assumptions, underperforming investment returns, underfunded employer contributions, and/or mismanaged assets—from getting worse. Closing a defined benefit plan to new hires means that benefits for new employees are provided via a different retirement plan, and not via the existing defined benefit plan. The only obligations remaining or that continue to grow in the existing plan are for active employees who are already members of the plan before the changes.¹ This is the equivalent of shrinking a hole in a sinking ship: water is still on board (the existing unfunded liability) and more could leak in (potential unfunded liabilities on future obligations to members already in the defined benefit plan), but there is dramatically less water streaming on board (no defined benefit liabilities for future hires) than if no repair had taken place.

Second, there is growing evidence that 401(k)-style personal retirement accounts (as offered by defined contribution plans) are preferred by 21st century employees, as they are portable, allow employees to tailor their retirement planning to their personal goals, and allow individuals to bequeath the full value of their retirement benefits.²

¹ This reform step doesn't eliminate the existing unfunded liabilities. Moreover, active employees will add additional liabilities to the system over time until their retirement. Further, underperforming investment returns or inaccurate actuarial assumptions mean that unfunded liabilities could grow based on just the liabilities already in the system. So pension reform must include more than merely shrinking a hole in the sinking ship. However, by preventing new employees from joining the plan, the problem is contained and additional steps can be taken later to bail out the water already in the ship. Once all defined benefit pensions are paid out, the hole is gone.

² For more information about the benefits of defined contribution accounts, see: Zvi Bodie, Alan J. Marcus and Robert C. Merton (1988), "Defined Benefit versus Defined Contribution Pension Plans: What are the Real Trade-offs?," National Bureau of Economic Research, <http://www.nber.org/chapters/c6047.pdf>; John Broadbent and Michael Palumbo (2006), "The Shift from Defined Benefit to Defined Contribution Pension

Defined contribution plans are not without their detractors, though. In particular, critics of the Michigan and Alaska pension reforms argue that closing the defined benefit plans has increased costs, destabilized recruitment, and made pension plans *less* sustainable.³ Critics of the shift to defined contribution plans also point to the fact that both Michigan and Alaska have higher unfunded liabilities today than when the plans were closed as evidence that pension reform has failed.

However, there is an unanswered question at the heart of the debate about Michigan's and Alaska's pension reforms: Does the closing of defined benefit pension plans *cause* the growth in unfunded liabilities? Or were unfunded liabilities bound to grow anyway, but have grown less than they would have *because of* reform?

This study seeks quantitative evidence to elucidate the key points in this debate. Specifically, we consider whether the pension reforms in Michigan and Alaska *improved* the sustainability of their pension plans, or *caused* an increase in unfunded liabilities.

We first lay out an analytical framework for how we plan to consider whether pension reform caused an increase in unfunded liabilities or instead improved sustainability, beginning with a basic breakdown of how defined benefit and defined contribution plans are funded and a list of terms and definitions. Next, we present two case studies, using our analytical framework to assess changes to the Michigan State Employees' Retirement System (MSERS) in the wake of the 1996 legislation to create a new defined contribution tier for all new members, and the changes to the Alaska Public Employees' Retirement System (APERS) and the Alaska Teachers Retirement System (ATRS) following the passage of similar reform legislation in 2005.

In each case study we look at counterfactual scenarios to determine what plan finances would have looked like without reform, or with different plan experience during reform. Finally, we offer some concluding thoughts on how our findings fit with the existing studies of closing defined benefit pension plans in favor of defined contribution plans.

A. Analytical Framework Part One: Historical Analysis

To assess whether pension reform has improved the sustainability of a plan, the actual experience over time should be compared to what would have happened without reform over time. Our analytical framework for interpreting the Michigan and Alaska pension finance data starts by looking at six actuarial events that can lead to an actuarial loss or gain, increase or decrease pension obligations in general, or be a direct cause for a increase in recognized unfunded liabilities:

Plans—Implications for Asset Allocation and Risk Management,” Bank for International Settlements, <http://bit.ly/1RpzLOX>; Lance Christensen, Truong Bui and Leonard Gilroy (2014), “Addressing Common Objections to Shifting from Defined-Benefit Pensions to Defined-Contribution Retirement Plans,” Reason Foundation, <http://bit.ly/1lyU1c>.

³ National Institute on Retirement Security, “Case Studies of State Pension Plans that Switched to Defined Contribution Plans,” February 2015, p. 10, <http://bit.ly/1cy9HQI>; Teresa Ghilarducci (2015), “Nevada Pension Reform: First, Do No Harm,” Oral testimony to the Nevada State Legislature, <http://bit.ly/1VuthhW>.

1. The state legislature not paying the full actuarially determined employer contribution (ADEC) each year—a failure at least a third of the states make each year;⁴
2. A funding policy that is designed to underfund the plan, such as a legislatively defined contribution rate that is lower than the actuarially determined contribution, or an amortization method that pays less than the interest accrued on pension debt, leading to perpetual growth in unfunded liabilities;
3. The use of actuarial assumptions that undervalue liabilities, leading to actuarially determined rates that structurally underfund the plan even if the full actuarially determined rate is paid;
4. The use of pension assets for purposes other than paying promised annual retirement benefits, such as to provide public guarantees on economic stimulus-oriented bond issuances;⁵
5. A change in the pension plan design, such as lengthening the amortization schedule on unfunded liabilities or adopting a new discount rate; if liabilities are being measured differently today than pre-reform then a simple comparison of unfunded liability levels before and after reform might not be a true apples-to-apples comparison;
6. Plan experience turning out differently than actuarial assumptions, such as actual returns being lower than the assumed rate of return, inflation being lower than anticipated, or people living longer than predicted.

Examining actuarial valuations and comprehensive annual financial reports before and after a pension reform effort to look for these kind of events allows us to understand the proximate causes for an increase in unfunded liabilities, beyond simple correlation.

A cursory review of the valuation data for Michigan and Alaska finds that unfunded liabilities have increased in both states between the time when they closed a defined benefit plan and 2014. However, this level of analysis gives us a *correlation* between the closing of a defined benefit plan and an increase in unfunded liabilities. Just looking at the funded ratio or total dollar amount of unfunded liabilities across two points in time does not give any indication as to whether pension reform—specifically, the closing of defined benefit plans—is the proximate *cause* of the increase in unfunded liabilities or if another event during the pension reform process is to blame.

⁴ Until recently, the Government Accounting Standards Board (GASB) issued guidelines for reporting an “annual required contribution,” commonly referred to as the ARC. New GASB statements that have been adopted over the past year have eliminated the ARC, and instead provided guidelines for an “actuarially determined employer contribution” or ADEC. There are important differences between the GASB definition of the ARC and ADEC, but for the purposes of reflecting whether an employer has paid the full contribution dictated by normal cost and its amortization payment, we will use the terms interchangeably.

⁵ Michigan has used pension funds to incentivize movie production in the Wolverine State by promising to pay movie studio bonds in the event of unpaid loans. See Part 2, Section B4 of this study for more details.

IMPORTANT ANALYTICAL CONSIDERATIONS FOR PENSION REFORM ANALYSIS

Correlation is not causation. There are many factors that could be the *cause* of the growth or decline in unfunded liabilities. It is wrong to simply assume that if a closed, defined benefit plan is taking on losses, those losses were caused by its closure; the context of a reform and a closed plan's subsequent experience matters.

Long-term costs are not short-term expenses. The term “cost” is used a lot in pension finance, and can refer to both a short-term expense (or outlay), such as the “normal cost” in a plan fiscal year, or the total annual “employer cost.” In the short-term context, the word *cost* simply means what needs to be paid out of revenues or assets in a given year, i.e. “expenses.” By contrast, in a long-term context the word *cost* is the sum total of what taxpayers ultimately pay to provide retirement benefits, i.e., what is the total dollar amount that taxpayers have had to spend in order to provide monthly pension checks? Factors for long-term cost include not just annual contributions, but also interest paid as a part of amortizing unfunded liabilities.

All else equal, the longer an amortization schedule, the more taxpayers wind up paying on the whole to get rid of that pension debt. Thus, it is important to keep the time horizon in mind when discussing whether a change to a pension plan increases or decreases *costs*.

B. Analytical Framework Part Two: Counterfactual Model

Next, we develop counterfactual models for what the plan experience of MSERS, APERS and ATRS would have been if the defined benefit portions of the plans had not been closed. The counterfactual models also allow us to test what the current financial state of the plans would be if no actuarially determined employer contributions were skipped and if a plan had achieved its assumed rate of return. Further, we use the models to analyze what the experience of the plans would have been with better post-reform plan management. The key components of the counterfactual models are as follows:

- **Time Horizon:** We analyze data from the fiscal year end before reform was adopted (i.e. the data points being considered by policymakers at the time pension reform was being debated) up to fiscal year end 2014 (the most recent year for which complete data exist). For Michigan, this translates to fiscal year end (FYE) 1996 to 2014. For Alaska, this translates to FYE 2005 to 2014.
- **Actual Rate of Return:** With or without reform, a plan would have seen the same rates of return over time.⁶ Thus, our model assumes there would be no difference in the investment strategy of a plan if it had remained open to new members versus the actual experience of being closed.⁷ Thus, for

⁶ This assumes that investment strategy that plans followed in the years after defined benefit plans were closed would have been the same without reform, and that without reform there wouldn't have been any separate changes to investment policy. Given that there is no legal or fiscal reason to change the distribution of assets in a plan's portfolio simply because a plan is closed, we consider this a reasonable assumption.

⁷ The only investment return difference is that losses or gains would have been a magnitude greater if the plans had remained open, because there would have been more contributions flowing into the plan assets.

forecasts of a counterfactual scenario where reform didn't happen, we apply the same rates of return as during actual experience.

- **Benefit Outflows:** We can reasonably assume that benefit outflows would have been similar to the actual experience if reform had not happened. Most changes to the plans we looked at were only for new hires, not existing members. Thus, retirement patterns have not been substantially influenced. For the new hires, there has not been enough time for their cohorts to start retiring in large amounts as no scenario we test involves 20 years or more of actual experience.⁸
- **Contribution Rates:** We can reasonably assume that states would have maintained a similar contribution policy with or without reform. Normal costs would have been the same in the absence of the reform or some other change to benefits; however, amortization payments would have been different. The most straightforward way to determine contributions to plan assets under a no-reform counterfactual scenario is to take the actual contributions and then add to them additional normal cost contributions, which is the primary approach we take for calculating the numbers we report in this study (See the Methodology section for more details).⁹
- **Payroll:** We use actual defined benefit payroll and defined contribution payroll figures in our model. We assume the same hiring patterns would have occurred with or without a defined benefit plan or tier closing. Thus, for each year of a counterfactual scenario with no defined benefit plan closure, we add the payroll from the same fiscal year for members of the defined contribution plan.

For all other elements of the counterfactual model see the “Methodology” section at the end of the study.

⁸ See “Methodology” section for more details on how we forecast benefits. The biggest possible exception to our assumption is that Michigan offered an early retirement option to members who remained in their defined benefit plan as a means of turning over the payroll to defined contribution members faster.

⁹ See “Methodology” section for alternate approaches we considered.

HOW DEFINED BENEFIT PENSION PLANS ARE FUNDED

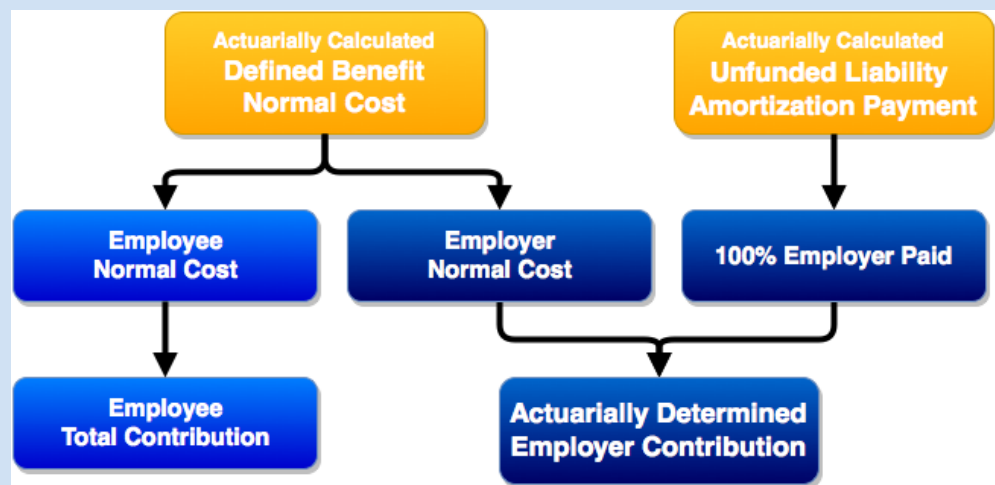
Defined benefit pension plans are supposed to be *pre-funded*. This means that the plan should receive enough contributions during the years an employee is earning benefits to pay out all future benefits promised (taking into account the plan's assumed rate of return on saved assets) for after that member retires. This is structurally different than Social Security, where current workers are taxed to pay the benefits of current retirees.¹⁰

Two primary components determine how much employers and employees should contribute in a given year to fund the payment of future benefits: first, the annual cost to pre-fund pension liabilities, known as “normal cost”; and second, the cost to pay off unfunded pension debt, known as “unfunded liability amortization payments” if normal cost is miscalculated, employers don't make their required contributions, or investment returns underperform.¹¹

Normal cost is determined by an actuary, who estimates how much will be needed in the future to provide the benefits promised to existing workers, in part using actuarial assumptions about salary changes, turnover rates, disability costs, and life expectancy. Contributions for projected obligations are then reduced using an assumed rate of return on assets to figure out how much should be paid into the system's coffers in a given year to ensure long-term solvency of the system. The annual normal cost payment is divided between contributions from the employer and the employees.

The exact percentage of normal cost that employees pay varies from plan to plan, however, in a typical defined benefit plan, employees contribute only to the normal cost. Unlike a ponzi scheme where the people paying into the plan are covering the costs of those drawing benefits from the plan (the way Social Security works), employee contributions to a pension plan are only for the benefits that they have earned.¹²

Unfunded liability amortization payments are the annual contributions that an employer needs to make to pay down pension debt. The unfunded liability is the difference between the value of assets in a plan, and the net present value of accrued liabilities.



¹⁰ The contribution rates to defined benefit plans are actuarially determined based on the demographics and trends of the members of the plan and the particular assumptions adopted by the plan's directors. The normal cost rate for any given employee theoretically should be the contributions necessary in order for the plan to honor the promised stream of payments in retirement to that employee. By contrast, Social Security explicitly draws on the revenue from taxing active employees to pay benefits for retirees, and the contribution rates are determined through a political process that is disconnected from any actuarial analysis of the program's members.

¹¹ For more details read a longer discussion of the pension funding equation in “The ‘Transition Costs’ Myth,” Reason Foundation, October 2014, available at <http://bit.ly/1yDqb0a>.

¹² In principle, employee contributions to a pension plan should be only for the benefits that they have earned. Some plans, such as the city of Phoenix, have adopted policies that dedicate active employee contributions to provide past employee benefits. This is outside the theoretical design for how pension plans should be funded.

Importantly, employee contributions are never supposed to subsidize amortization payments made to support the pensions of other employees. Defined benefit plans can be designed so that active members pay a share of any unfunded liability payments that arise for their own benefits, but current employees' contributions are not supposed to fund the retirement benefits of others, including current retirees. This is a critical difference between the intended design of a defined benefit pension plan and Social Security (which is not a pre-funded plan). Legally, employees in defined benefit pension plans have a right to withdraw from a plan at any time and receive back at least the full value of their own contributions (oftentimes with interest), so if employee contributions were regularly put toward general unfunded liabilities, it would mean employees simply quitting their jobs would increase the contributions required by remaining members, hurting retention and undermining the solvency of a plan.

HOW DEFINED CONTRIBUTION PENSION PLANS ARE FUNDED

Defined contribution plans provide retirement benefits by establishing personal accounts for each employee. These accounts are similar to 401k accounts that form the basis of retirement savings for most employees in the private sector.

Employers and employees jointly fund defined contribution accounts by making regular contributions over time. The rates paid are generally a percentage of salary and vary widely depending on the particular plan.

In contrast to defined benefit plans, which promise monthly retirement benefit checks, defined contribution plans promise an upfront amount that is paid into the employees' accounts only during their working years—the balance of which provides resources for retirement.

There are no accrued liabilities with defined contribution accounts, nor any need to actuarially determine what their contribution rate should be. The rate that employers pay is “defined” ahead of time, and once a payment is made (i.e. a monthly contribution to an employee's DC account) the employer is not on the hook for any promised pension in the future.

Defined contribution plans are therefore inherently 100% funded at all times.

Instead, employees invest the balance of their defined contribution account in varying ways depending on their retirement goals and risk tolerance.

Most defined contribution plans have a third party financial advisor service that offers investment portfolio options that employees can choose from, including annuities that function similarly to a guaranteed pension once they are purchased. An annuity is a promised stream of payments from a private sector financial firm in exchange for a lump-sum payment, such as the balance of an employee's defined contribution account upon his or her desired retirement date.

In some cases, employers offer to match contributions above a minimum employee contribution. Depending on the kind of defined contribution account style (i.e. 401a, 403b, 457) employees make a minimum pre-tax contribution each pay cycle, with the option to make additional contributions up to the annual IRS limit.

Employers and employees make regular contributions to the retirement accounts, the total of which is invested over time.

TERMS AND DEFINITIONS

Defined Benefit Plan (or Tier): A plan that provides specified retirement benefits that are guaranteed by their employer. The monthly retirement benefit is typically based on the employee's salary, years of work, and age. They are designed to be pre-funded such that when an employee retires, the employer has reserved enough money to pay for all promised retirement benefits (i.e. pension checks).

Defined Contribution Plan (or Tier): A plan that provides retirement benefits for employees via regular deposits into a personal retirement account. The accumulated savings and investment income are used to fund the employee's retirement. The liability of employers is only to make the regular contributions to these accounts, which for public sector employees are similar to a 401k.

Payroll: The total amount of salary paid to all active employees of a pension plan. The costs and contribution rates of a pension plan are often expressed as a percentage of the total plan payroll.

Discount Rate: A rate used to determine the net present value of promised pension benefits, also known as the liabilities of the plan. Discount rates are supposed to reflect the risks of the liabilities— i.e. the risk that the plan sponsor will not be able to pay the promised pensions. As such, a discount rate represents the combination of a so-called “risk-free interest rate” plus a risk premium associated with the particular plan's employers. Theoretically the higher the discount rate, the higher the implicit risk associated with the plan. In practice, the discount rate is often selected in a political context with an eye on minimizing near-term contributions.

Expected Rate of Return: A rate of return that a pension plan expects to earn on average over a particular period of time from its investments. The expectation is derived from a historic analysis of the plan's investments and based on its forward-looking investment strategy for the plan's assets. Generally, pension boards adopt the “expected rate of return” on their assets as the “assumed rate of return” used for determining contribution rates; the terms “expected rate of return” and “assumed rate of return” are technically different, though often used interchangeably.

Assumed Rate of Return: The rate of return adopted by the board as its assumption of what the plan will return on average in the long run. Actuaries use the assumed rate of return to determine how much should be contributed to the plan each year to ensure there is enough saved to pay out pension benefits to each employee upon retirement. This rate is typically determined based on the expected rate of return, and in practice the technically different terms are used interchangeably.

Market Value of Assets (MVA): The real value of the plan's total assets, measured by the price that would be received to sell an asset in an orderly transaction between market participants at that date.

Actuarial Value of Assets (AVA): The value of a plan's total assets that accounts for investment gains and losses on a smoothed basis, as used by the actuary for the purpose of an actuarial valuation. For example, a plan using a five-year smoothing period will only recognize 20% of investment losses or gains for a given year's returns when calculating the value of assets. Each year thereafter the plan will recognize another 20% of losses or gains until they are fully recognized in the actuarial value of the assets. Thus, at any given time, there are investment gains or losses up to four years in the past that are not accounted for when citing the actuarial value of assets.

Actuarial Accrued Liability (AAL): The value of the pension benefits promised to date. Pension benefits are also known as pension obligations, or liabilities. In any given year, the plan's actuary calculates the total value of liabilities that have accrued, and this figure is used to determine the plan's unfunded liability. At any given time the recognized value of accrued liabilities on the pension plan's books is dependent on the rate used to discount the promised benefits to their net present value. Ultimately, the value of the obligations will be based on how long retirees live; the actuarial value is based on the discount rate used to estimate those benefits. If a plan increases or decreases the discount rate, leading to a decrease or increase in the reported AAL, this does not mean the actual promised benefits have changed, only the accounting value of them has changed.

Funded Ratio: The ratio of the plan's assets to its liabilities. This could be measured on a market value or actuarial value of assets. It is simply the MVA or AVA divided by the AAL. A funded ratio above 100% means the plan has more assets than liabilities; a funded ratio below 100% means the plan has not saved enough relative to the estimated value of the benefits it has promised.

Unfunded Actuarially Accrued Liability (UAL): The amount of actuarially accrued liabilities (AAL) greater than the actuarially valued assets (AVA) of a plan. This difference is simply the AAL minus the AVA. Colloquially, the phrase “unfunded liabilities” is interchangeable with “unfunded actuarially accrued liabilities” or “unfunded actuarial liability.”

If a plan’s assets were to be greater than the liabilities of the fund, the plan would be considered “overfunded” and in some cases the plan’s actuary would report a “negative” unfunded liability.

Unfunded liabilities can also be reported as the difference between actuarially accrued liabilities and the market value of assets (MVA). Again, this is calculated as AAL minus MVA. Since unfunded liability typically refers to the measurement on an AVA basis, reporting unfunded liabilities on a market basis should always be clearly stated.

Unfunded Liability Amortization Payments: Pension plans are required to make regular payments to reduce any actuarially accrued unfunded liability, which is effectively pension debt. Amortization payments are regular contributions to reduce the unfunded liability and are on a set schedule, similar to paying off a student loan, or a mortgage that allows for negative amortization payments. The pension plan’s board determines how many years it wants to take to pay off the pension debt, and then directs the plan actuary to use a particular method for determining what should be paid each year of the amortization schedule in order to eliminate unfunded liabilities.

Open Amortization Method: If an amortization schedule is “open” that means the amortization payments are reset each year, like refinancing a mortgage each year. This approach guarantees the pension debt will never be paid off and often can mean contributions toward unfunded liabilities each year don’t even cover the interest on the debt.

Closed Amortization Method: If an amortization schedule is “closed” that means the plan has a particular date it is targeting to eliminate unfunded liabilities. Each year the plan pays off a portion of the unfunded liabilities the schedule moves one year closer to its end date. If the plan experiences additional actuarial losses during the schedule that add to the unfunded liabilities that need to be paid down, then the amounts owed in each year of the schedule increase, rather than the number of years in the schedule increasing.

Level-Dollar Amortization Method: Unfunded liabilities can be amortized over a fixed (closed) or open number of years such that the plan expects to pay the same dollar amount each year of the schedule.

Level-Percent Amortization Method: Unfunded liabilities can be amortized over a fixed (closed) or open number of years such that the plan expects to pay the same percentage of payroll each year of the schedule.

Normal Cost: Employees earn new benefits each year. The annual actuarially calculated contribution necessary to provide these benefits, assuming a rate of return on the contributed assets, is known as the normal cost.

Actuarially Determined Employer Contribution (ADEC): The actuarially calculated amount that is required to be paid each year to keep a pension plan fully funded. The contribution rate can be reported either in dollars or a percent of salary. Actuaries annually determine how much should be paid by employers in a given year in order to properly fund a pension plan. This amount is a combination of the employer’s share of normal cost plus the unfunded liability amortization payment. The actuarially determined amount is the “required” contribution, but employers are not necessarily legally bound to actually contribute this amount. The ability for employers to not pay 100% of their pension bill is one of the reasons unfunded liabilities can increase.

Prior to 2014, annual contributions to a plan were known as the ARC, or “annual required contribution.” The Government Accounting Standards Board changed its guidance for actuaries on calculating the ARC and moved to clarify the difference between its guidance for pension plan financial reporting and the funding policies determined by a pension board. For most purposes, the terminology of “ARC” and “ADEC” is similar.

Asset Smoothing: The process of recognizing only part of an actuarial gain or loss to plan assets in any given year. For example, if a plan were to have a loss of 10% on its investment returns in a given year, it might only recognize 2% of the losses in the first year after the loss, and then adjust its assets to recognize 2% more of the losses each year for five years total. This “smooths” out the 10% actuarial loss over five years and reduces the volatility of how the plan’s actuarially valued assets are reported. A plan might want to do this because amortization payments are based on the amount of unfunded liabilities, and smoothing in gains or losses to the plan’s assets means the recognized value of unfunded liabilities is unlikely to make a big jump from one year to the next.

Part 2

Michigan: Properly Managed Reform Would Have Saved the State More than \$7 Billion; Without Pension Reform, Unfunded Liabilities Would Be About \$450 Million Greater

The Year Reform Passed (Adopted): 1996 (1997)

The Plan: Michigan State Employees' Retirement System

The Financials (combined, as of FYE1996):

- Market Value of Assets: \$8.798 billion
- Actuarial Accrued Liability: \$8.374 billion
- Unfunded Liability (Market Value): -\$424 million
- Funded Ratio (Market Value): 105%
- Payroll: \$2.5 billion

Actuarially Determined Employer Contribution as % of Payroll: 10.4%

The Legislation: Michigan Public Act 487 of 1996

Historic figures are not inflation adjusted to current dollars.

A. The Story of Reform

By the end of fiscal year 1996, Michigan's second largest pension plan—the Michigan State Employees' Retirement System (MSERS)—was over funded on a market valued basis at \$424 million.¹³ The plan appeared relatively healthy, but the state's governor was concerned about the long-term sustainability of the defined benefit plan. MSERS's funded ratio had fluctuated between 100% and 80% during the preceding decade, largely because of inconsistent investment returns, and the state governor wanted to ensure there was no future downgrade in the state's debt rating.¹⁴

The plan's reported funding health also was based in part on favorable actuarial assumptions, including an 8% discount rate and assumed rate of return.¹⁵ Accrued liabilities would have measured higher if the plan

¹³ On an actuarial value of assets (AVA) basis—i.e. based on a five-year smoothed value of returns on assets—the plan's assets were \$7.905 billion, thus the unfunded liability on AVA basis was \$469 million and the funded ratio on an AVA basis 94.3%.

¹⁴ At the end of 1996, the governor proposed that both of the state's major pension plans be closed, but the vote to close the teachers' plan—the Michigan Public School Retirement System—failed in the legislature shortly after a companion bill to close the state employee system passed.

¹⁵ The plan assumed 3% inflation rate for 1997 and 1998, and then a 5% inflation rate for 1999. But during that time the discount rate didn't change. This implies the plan was assuming the risk associated with the plan's liabilities was going to decrease between 1997 and 1999, but it isn't clear what could drive

used a lower (more appropriate) discount rate or a lower inflation rate. Adopting more accurate discount rates would have also meant a higher reported unfunded liability, which would increase amortization payments and reduce the funded ratio (whether on a market value or actuarial value basis).

Michigan's governor worried that the plan's health was overstated. On an actuarial valued basis, MSERS and the state's teachers pension plan (Michigan Public School Employees' Retirement System) had nearly \$7 billion in combined unfunded liabilities. These concerns were also shared by bond rating agencies, which were threatening a downgrade of the state's debt—thus the governor's concerns.¹⁶

To address the inconsistency in solvency and threats to the state's credit rating, legislation was proposed to close the defined benefit portion of MSERS to new members, and introduce a new tier within MSERS providing defined contribution benefits. The reform legislation, known as Public Act 487, created 401(k)-style, personal retirement accounts for all new employees (those hired on or after March 31, 1997). It directed the state to contribute 4% of payroll into personal retirement accounts, with an additional matching 3% of pay if employees voluntarily chipped in extra to their defined contribution plan. All current employees remained in the MSERS defined benefit plan (with a few exemptions), with the state promising to continue operating them with the goal of paying out all promised benefits.¹⁷

The bill was developed and negotiated behind closed doors throughout 1996 and then introduced during a lame duck session after elections in November 1996. The proposal was passed and signed into law by the end of the year; the defined benefit tier of MSERS was closed to new members, and the 40-year process of payroll shifting over to a new defined contribution tier within MSERS began.

B. MSERS Actuarial Experience During Pension Reform

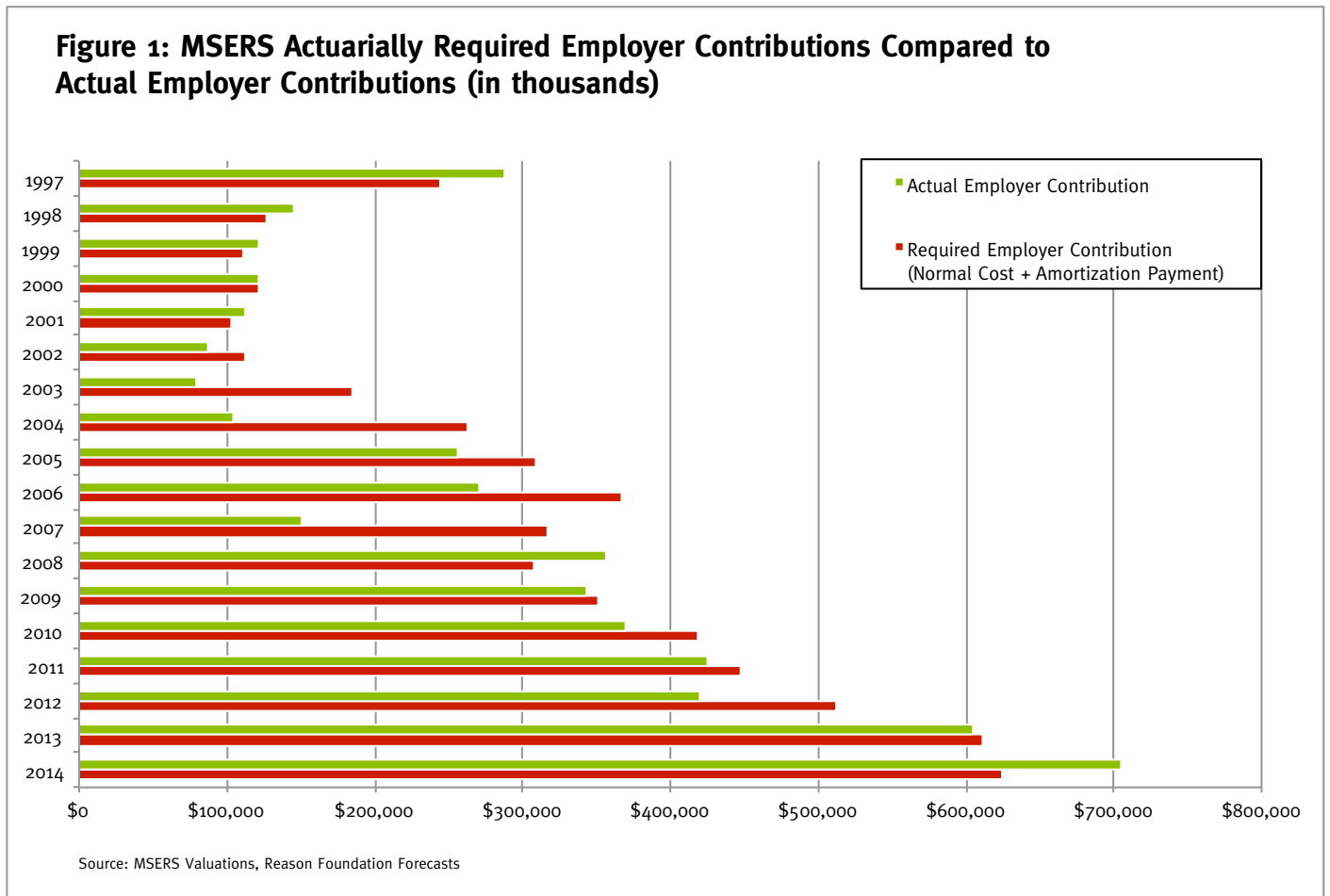
1. Michigan Systematically Underfunded the Closed Plan

For the first few years after reform began, the state paid the full actuarially determined employer contribution to the plan. Even if a plan is closed to new members, obligations are still being added to the plan that require the employer to pay normal cost for members still under the defined benefit plan. And unfunded liability amortization payments are still necessary during the closing of a plan. However, since 2002 Michigan has systematically failed to pay the actuarially determined rates, shown in Figure 1:

such an assumption about the state's ability pay obligations. This has the effect of reducing normal cost and thus contributions to plan assets relative to a lower inflation rate.

¹⁶ Anthony Randazzo, *Pension Reform Case Study: Michigan*, Reason Foundation, Policy Study 434, March 2014, <http://bit.ly/1FbXWas>.

¹⁷ All employees already in the defined benefit plan were given the option to switch to the defined contribution plans. For more details see page 16 of *Pension Reform Case Study: Michigan*, http://reason.org/files/pension_reform_michigan.pdf.



The underperformance clearly starts in the sixth year of reform, with only 78% of the employer contribution requirement paid in 2002, 43% paid in 2003, and a historic low of 40% paid in 2004. In 2007 the state legislature decided to only pay the interest portion of the amortization payment, leading to just a 48% contribution relative to what actuaries determined was necessary. This was well before the financial crisis.

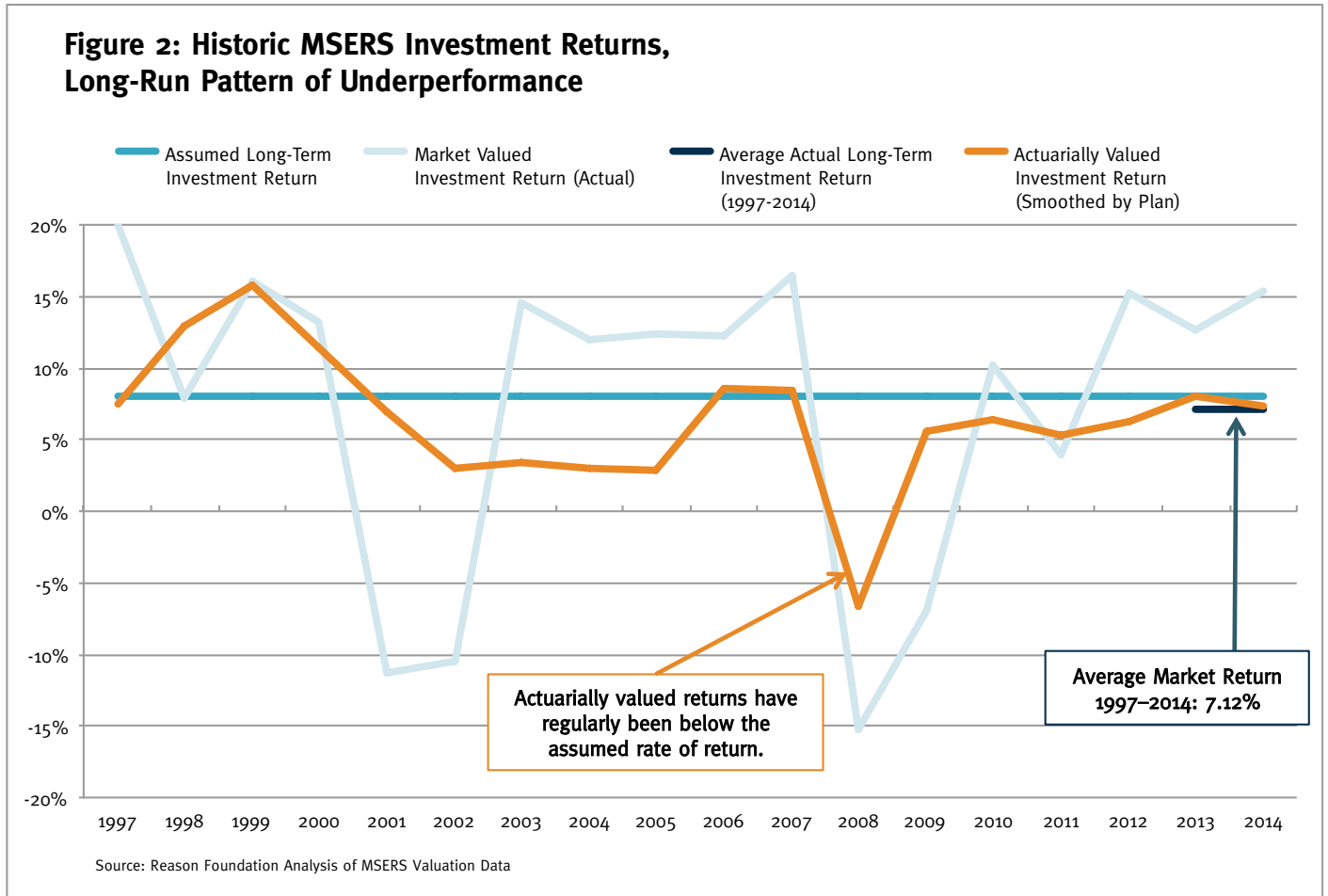
Overall, Michigan officials have contributed less than 88% of the annual required employer contributions during the years since MSERS closed its defined benefit tier. The lower-than-required contributions made budgeting easier for lawmakers, but at the long-term expense of the plan, with the missed payments simply being added to unfunded liabilities.

2. Investment Return Underperformance

Since 1997, MSERS has seen its assets underperform the long-standing 8% assumed rate of return. Between 1997 and 2014, MSERS has averaged a return of only 7.1%. Figure 2 shows the variation in the returns, along with the average assumed rate and the average actual return rate.

The assumed rate of return being used by the plan is clearly disconnected from the actual experience of the plan—i.e. it is unrealistic. The average market return on assets (7.1%) has been below the assumed return

(8.0%) for nearly the last two decades. Similarly, the actuarially valued returns (smoothed on a five-year basis) have almost always been below the assumed rate of return since 2001.



One reason the state hasn't changed the rate, though, is because MSERS uses the assumed return as the discount rate as well—a common practice for public sector plans, though not a good practice.¹⁸ If the assumed return were lowered then the discount rate would come down too. And reducing the discount rate would result in an increase in the net present value of accrued liabilities, which in turn would increase the reported unfunded liabilities.

The arguments for a lower discount rate and lower assumed return rate are different, but lead to the same result. A discount rate that reflected the risk of the liabilities would be much lower than the status quo, given the state of Michigan's constitutional provisions protecting retiree benefits. Using MSERS's historic investment return experience as a guide, plus the fiduciary principle of minimizing taxpayer risks, a more responsibly set assumed rate of return would at least be lower than the status quo. Combined, the use of a

¹⁸ In a separate paper, we argue that the discount rate used to value pension liabilities should reflect the risk inherent in the obligations, not the risk of the assets. This is not standard practice among actuaries, but we argue that it should be. For more, see Truong Bui and Anthony Randazzo, *Why Discount Rates Should Reflect Liabilities: Best Practices for Setting Public Sector Pension Fund Discount Rates*, Reason Foundation, Policy Brief 130.

lower discount rate and assumed return would mean that the actual unfunded liabilities of the plan are *higher* than actually being reported as of 2014.¹⁹

3. Irresponsible Policy for Amortizing Pension Debt

One reason MSERS has struggled with its unfunded liability in recent years is because of the long-term amortization schedule MSERS has used. In 1997, MSERS had 39 years remaining on its amortization schedule, a very large number of years relative to most pension plans (which are typically on 15-year to 30-year schedules).

All else equal, the longer an amortization schedule for paying down unfunded liabilities, the more total taxpayer dollars will be required to pay off the pension debt. Just as taking 30 years to pay off student loans will result in a larger total amount paid for those loans relative to paying them off in 10 years (due to compounding interest), so too are long amortization schedules more expensive in the long run for taxpayers. We argue the amortization approach taken by the MSERS board violated the fiduciary responsibility it had to protect taxpayers from excessive risk. The long amortization period also violates a principle of intergenerational equity by pushing payments on pension debt for today's employees off onto future taxpayers.

In 2005, the state made the reasonable choice to switch the calculation of unfunded liability payments to a level-dollar method—i.e. amortizing the pension debt such that the same dollar amount is paid each year of the schedule. From a near-term budgeting perspective, the downside of adopting the level-dollar method means that in the first years of the schedule, payments will be higher than sticking with the level, percent of payroll method.²⁰ From one perspective this may appear as if pension reform has increased costs. However, only *payments in the short-term* have gone up, not the *long-term actual cost* of pension benefits. By paying more toward the debt earlier on, fewer total taxpayer dollars will be spent on pensions overall, much like paying off a student loan early. The change has thus increased the actuarially determined employer contribution rates, and thus meant that unfunded liabilities are *lower* today than without the change (assuming the contribution rates were fully paid, which in many years after 2005 they were not).

In short, MSERS unfunded liabilities are higher today than they otherwise would be, in part because the amortization schedule in place two decades ago meant a very slow pace of paying off the pension debt. By contrast, unfunded liabilities are lower today than they would have been if Michigan lawmakers had not adopted a more responsible policy for amortizing the existing unfunded liabilities in 2005. Neither one of these policy choices was necessarily related to the concurrent closure of the defined benefit tier and its phase out over time.

¹⁹ It is important to note again that changes to actuarial assumptions can mean a plan has more debt, but the changes themselves don't generate the debt. Lowering the discount rate to reflect a more accurate net present value of accrued liabilities wouldn't actually cause an increase in the amount owed to pensioners (liabilities), but would instead result in a more accurate reflection of the true long-term value of promised pensions. By contrast, Michigan's failure to pay 100% of its annual required contributions did actively *cause* an increase in unfunded liabilities greater than would have happened otherwise. Similarly, the plan's underperforming investments have contributed substantially and directly to a growth in pension debt.

²⁰ See Figures 1 and 2 in Josh McGee (2013), "The Transition Cost Mirage—False Arguments Distract from Real Pension Reform Debates," LJAF Policy Perspective, <http://bit.ly/1V4Qelw>.

4. Other Elements of Actual Experience

(a) *Misuse of Funds:* Another factor influencing the funded ratio of MSERS has been the use of pension assets for non-pension-related expenses. In 2010, Michigan agreed to provide a public backstop for an \$18 billion bond issuance to Michigan Motion Picture Studios (MMPS), and put up the state’s retirement funds as the collateral. The intention was to attract the film industry to Michigan in order to boost the economy. However, by 2013 MMPS was not doing well and had missed \$1.7 million in bond payments, which were paid instead from the asset pool of Michigan’s four major pension funds, including MSERS.²¹

(b) *Employee Contribution Rates:* For most of the existence of MSERS, the plan has not required contributions from its members.²² When the defined benefit plan closed, current members continued to have zero contribution requirements. However, in 2011 the Michigan Legislature passed a law requiring remaining defined benefit pension employees to start paying 4% of salary as contributions into the defined benefit plan’s assets (active members were also given a choice again to opt out of the defined benefit plan and join the defined contribution plan). The law was challenged in the courts, but in the summer of 2015 the Michigan Supreme Court upheld the addition of employee contributions.²³

(c) *Early Retirement Incentive:* In 2010, the state offered to let some employees retire early to speed up the process of shifting payroll over to the defined contribution of MSERS. The state offered a modest benefit increase to employees who selected this option (a 0.1 percentage point increase in the multiplier), which had a small but meaningful influence on the unfunded liability, as previous contribution rates had not accounted for a retroactive increase in benefits.

MSERS Defined Benefit Tier Actual Financials as of 2014:

- Market Value of Assets: \$10.97 billion
- Actuarial Accrued Liabilities: \$16.12 billion
- Unfunded Liability (Market Value): \$5.15 billion
- Funded Ratio (Market Value): 68.1%

MSERS Defined Contribution Tier Actual Financials as of 2014:

- Market Value of Assets: \$2.7 billion
- Accrued Liabilities: \$0
- Funded Ratio: 100%

Figures are not inflation-adjusted.

²¹ For more see: “Public Employee Pension Systems Raided To Pay Film Studio Bills,” *Michigan Capitol Confidential*, <http://bit.ly/1TCrLj>.

²² An often-stated critique of Michigan’s pension reform is that by closing it to new members, the plan lost out on contributions relative to those new members, and that is why unfunded liabilities are higher. Not only does this critique gloss over the many factors that have contributed to MSERS’s unfunded liability, it also ignores the fact that there never were employee contributions to the plan in the first place. There are fewer employer contributions to the plan than if new members were being added, but there are also fewer liabilities. We discuss this misinformed complaint more in Part 4 of this study.

²³ Christine Williamson, “Michigan Supreme Court upholds pension reforms,” *PIONline.com*, July 30, 2015, <http://bit.ly/1MSXft3>.

C. Counterfactual Scenarios

1. What If Reform Never Happened?

Counterfactual Scenario 1:

No changes to the plan are made in 1996; all future members are hired into MSERS's defined benefit tier. Michigan's funding policy is the same as actual experience.

There is no doubt that MSERS has more reported unfunded liabilities today than it did in the year before pension reform was adopted (even accounting for inflation). But did pension reform *cause* the increase in pension debt?

Consider a counterfactual scenario in which the vote to close MSERS failed in the state legislature and no reform was adopted. The plan would have continued bringing in new members, but it still would have experienced the same underperforming investment returns. The additional unfunded liabilities would have resulted in actuarially determined employer contribution rates *higher* than actual experience, so we can assume that the state would have likely become a serial under-contributor even without the passage of reform.²⁴

Table 1 provides a financial comparison of this counterfactual scenario to MSERS's actual experience. (See the Methodology section for details on our forecasting method for counterfactual scenarios.)

	Counterfactual 1: No Pension Reform	Actual Experience: Pension Reform	Difference	Percentage Change
Market Asset Value, DB Plan	\$12.73 billion	\$10.97 billion	-\$1.76 billion	-13.8%
Accrued Liabilities	\$18.32 billion	\$16.12 billion	-\$2.20 billion	-12.0%
Unfunded Liabilities	\$5.59 billion	\$5.15 billion	-\$440 million	-7.9%
Funded Ratio: DB Plan	69.5%	68.1%	-1.4%	-2.0%
Funded Ratio: Full System	69.5%	87.9%	+18.4%	20.9%
DB Plan Contributions, 1997 to 2014	\$6.7 billion	\$5.5 billion		
DC Plan Contributions, 1997 to 2014	\$0	\$2 billion		

Source: MSERS valuations, Reason Foundation forecast.

Notes: (1) Forecast uses a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) The "Full System" references the funded ratio for both the DB tier and the DC tier of MSERS. We weight the funded status of each tier by the percentage of total payroll that tier represents. (3) "Plan Contributions" represent both employer and employee contributions. The MSERS DC tier comprises 62% of the total MSERS payroll. Contributions paid do not necessarily equal contributions actuarially required.

There are several important findings from this table. First, while we estimate the value of assets would be higher today without pension reform, so too would accrued liabilities. So much so that unfunded liabilities would be roughly \$440 million larger today. At a minimum, the actual experience of the plan would be preferred to no reform because today's unfunded liability is lower than it otherwise would have been. Second, notice that the funded ratio for MSERS as a whole is better today (88%) under actual experience than it would have been without pension reform (70%). As of 2014, roughly two-thirds of MSERS payroll

²⁴ There are some obvious limitations to this forecast: we have to assume normal cost as a percent of payroll would remain the same (the actual rate would have likely varied slightly), and we have to assume the defined contribution tier's payroll would have been the same if new hires went into the DB tier instead of the DC tier.

was in the DC tier, and member benefits for that tier are inherently 100% funded (for more on why, see Part 1 “How Defined Contribution Pension Plans Are Funded”).

The funded ratio of the DB tier alone is forecast to be slightly better under the no-reform scenario, but this is not necessarily a sign of greater health. Funded ratios should always be considered in connection to the associated unfunded liabilities (and vice versa). In this instance, we noted that the unfunded liability was higher in the no-reform scenario, which suggests the slightly better funded ratio is a function of the greater magnitude of liabilities and assets. (For example, a plan with \$8 in assets and \$10 in liabilities—80% funded with \$2 in unfunded liabilities—is actually better off than a plan with \$17 in assets and \$20 in liabilities—85% funded with \$3 in unfunded liabilities.²⁵) The funded ratio is important for understanding the relative strength of a plan, but the absolute unfunded liability is important for understanding the net effect on state budgets and taxpayers.

Finally, the table shows the cumulative contributions to retirement benefits under each scenario. The contributions to a DC plan are technically not relevant to the solvency or sustainability of a DB plan. However, it is analytically helpful to compare the total amounts paid under both scenarios when considering what the net results have been.

Under the no-reform scenario we forecast, \$6.7 billion would have been paid into the plan during the last two decades without reform and assuming the same funding policy.²⁶ The result would have been a pension system roughly 70% funded with \$5.6 billion in unfunded liabilities.

By contrast, under actual experience of the plan, contributions were about \$700 million higher, with \$5.5 billion going toward DB obligations plus about \$2 billion in contributions to defined contribution accounts, for a total of \$7.5 billion.²⁷ The result has been a pension system roughly 88% funded with \$5.2 billion in unfunded liabilities.

The logic of how underperforming investments and underfunding policies negatively influences the solvency of pension plans suggests MSERS would have seen its funded ratio fall, irrespective of whether the plan was closed to new members. And, based on our forecast, we find the MSERS plan was headed toward substantial growth in unfunded liabilities with or without reform. Given the lower unfunded liability of the reform scenario versus the no-reform scenario, combined with the significantly larger funded ratio of the reform scenario (88%) versus the no-reform scenario (70%), we find Michigan’s pension reform and closing the defined benefit tier to new members made MSERS more sustainable.

²⁵ This is particularly true for states or municipalities with smaller overall budgets, where the difference between \$2 and \$3 in unfunded liabilities could be a large percentage of general revenues, making it hard to pay the additional debt.

²⁶ These contributions were forecast using the same assumptions as the plan. However, we have previously argued that the discount rate history for MSERS has not been an accurate reflection of the risk of pension liabilities. In effect this means that the contributions to defined benefit normal cost are artificially deflated because the recognized net present value of future pension obligations is too low. For example, if there were no changes to the defined benefit plan in 1997 other than adopting a 7% discount rate, contributions over the following 18 years would have been \$7.6 billion.

²⁷ Publicly available data on defined contribution rates only goes back to 2000, therefore we had to estimate the contribution amounts for the few years between implementation of reform and then. However, the amount of the DC payroll was very small in these early years and the contributions to DC accounts during this period would be less than 5% of total DC contributions. Thus, the need to estimate data during this period does not substantially change the nature of our findings.

Michigan: Summary of Reform vs. No Reform

Michigan's actual experience with pension reform has involved taxpayers and employees making contributions of \$7.5 billion since 1997 for DB and DC benefits, and the result so far is \$5.2 billion in unfunded liabilities on \$16.1 billion in pension obligations, but a full system funded ratio of 88%.

By contrast, if there had been no pension reform Michigan taxpayers and employees would have contributed around \$6.8 billion and would be facing \$5.6 billion in unfunded liabilities on \$18.3 billion in pension obligations, and a full system funded ratio of 70%.

2. What If Pension Reform Had Been Better Managed?

Michigan certainly could have done a better job determining its funding policy and plan governance over the last two decades during the plan closure. To start, the state could have made 100% of its

actuarially determined employer contributions.²⁸ Plus, if the plan had achieved the assumed rate of return that was assumed when pension reform was adopted, unfunded liabilities would be much less.²⁹ This provides another benchmark to compare to actual experience: a counterfactual scenario where pension reform was better managed.

Counterfactual Scenario 2:

A defined contribution tier is created in 1996 as actually happened; the state pays 100% of the required contribution; and the defined benefit tier's assets are better managed so as to actually achieve the assumed rate of return.

Table 2 compares MSERS's plan financials of this second counterfactual scenario to the first counterfactual scenario of "no-reform" and to the plan's actual experience. Specifically, we consider what the pension financials would look like if the plan's actual investment returns matched the assumed rates of return, and if Michigan had a responsible funding policy of paying the full bill every year.

Better pension reform management—from the perspective of paying the full employer contribution rate every year—and targeting an achievable rate of return would have only affected the plan's assets. We forecast that these two elements alone would have added roughly \$7 billion to MSERS's assets today. And since the accrued liabilities would not have been changed, this would have meant a \$2.1 billion surplus for MSERS by the end of 2014.³⁰

²⁸ This would have necessitated cuts in other programs or an increase in taxes, which are considerable policy considerations for a government as a whole. However, to the degree that under-contributing to a plan increases pension debt, the additional payments that will need to be made on that debt in the future are never attributed as costs of the programs (though, arguably, they should be). It is worthwhile to consider what fiscal policies are necessary to fund a pension plan on its own terms, separate from other policy considerations.

²⁹ We mean "better management" in the context of the assumed rate of return in two respects. First, the plan could have hired a different asset manager or better redistributed its assets so as to actually get the average return. This is, naturally, a critique that is only possible in retrospect, after seeing how average returns play out over a number of years. Presumably, the MSERS board did everything it could to manage the plan's assets well. However, this leads us to the second way we mean "better manage"—the board should have lowered the assumed return to something manageable. This would have necessitated higher required contributions, but if they had been paid in full and the more achievable rate successfully attained, then the plan would be more solvent today. There are certainly policy trade-offs that come with increasing the contribution rates for a plan, but that does not negate the simple reality that if the plan had either done a better job of managing its assets, or better positioned itself for success (i.e. targeted a lower assumed return rate), it would be better off today.

³⁰ It is probable that well before a \$2 billion surplus was reached, that funding policy would have changed to reduce contributions into the plan. However, a large surplus would have been beneficial to build because it would serve as a cushion against future potential underperforming markets.

Table 2: MSERS 2014 Financials, Actual and Projected, Counterfactuals 1 & 2

	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Actual Experience: Pension Reform
Market Value of Assets, DB Plan	\$12.73 billion	\$18.26 billion	\$10.97 billion
Accrued Liabilities	\$18.32 billion	\$16.12 billion	\$16.12 billion
Unfunded Liabilities	\$5.59 billion	(\$2.14 billion)	\$5.15 billion
Funded Ratio: DB Plan	70%	113%	68.1%
Funded Ratio: Full System	70%	105%	87.9%
DB Plan Contributions, 1997 to 2014	\$6.7 billion	\$6.2 billion	\$5.5 billion
DC Plan Contributions, 1997 to 2014	\$0	\$2.0 billion	\$2.0 billion

Source: MSERS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plan’s assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) The “Full System” references the funded ratio for both the DB tier and the DC tier of MSERS. We weight the funded status of each tier by the percentage of total payroll that tier represents. (3) “Plan Contributions” represent both employer and employee contributions. The MSERS DC tier comprises 62% of the total MSERS payroll. Contributions paid do not necessarily equal contributions actuarially required. (4) Assumes legislators paid 100% of the annual required employer contribution rate, and that the plan’s investments actually achieved their assumed rate of return.

Notice further that contribution requirements would not have been much higher than the actual experience—assuming the plan also achieved its assumed rate of return, it would have taken just \$700 million more over the past two decades to have completely avoided the plan’s current billions in unfunded liabilities.³¹ To be sure, assuming the plans’ investments actually returned the assumed rate is a major factor in halving the unfunded liability, and not an easy requirement. The majority of public sector pension plans struggled to achieve their assumed rate of return over the past decade, and it is only clear in retrospect how Michigan could have better managed its pension assets. Better asset management would have also helped the plan in the absence of reform, but keeping the DB plans open would not have provided greater insight to the asset managers for MSERS.

Given that the central research question for this study is focused on whether closing a defined benefit plan to new hires *caused* the increase in unfunded liabilities, this scenario helps to provide a baseline for what would have been the assumed future for MSERS when the reform was adopted. In this case we find that if all of the defined benefit plan’s assumptions at the time of pension reform had been accurate, then the plan would be in a better fiscal position today than both actual experience and if there was no reform.

The most sustainable scenario is adopting the pension reform of closing the defined benefit tier of MSERS and opening a defined contribution tier for new members, *plus* prudent funding policy and investment strategy. By contrast, in looking at the unfunded liability figures on an annual basis, it is clear that the no-reform counterfactual is the worst-case scenario.

In Table 3 we show a projection of MSERS’s unfunded liability under the same three scenarios as in Table 2.

³¹ Our forecast above assumes the plan had achieved its 8% assumed rate of return on average over the past two decades—theoretically possible using a different investment strategy. If the state’s approach had been to target a lower and more manageable rate of return, then employer contribution rates would have been higher, but the net asset outcome would have been the same. In such a scenario it is also likely that the funding policy would have changed after the plan reached 100% funded, but reporting on all such iterations isn’t necessary to understand that better financial management would have improved the plan’s actual experience and the net outcome of the pension reform project as a whole.

**Table 3: MSERS Annualized Unfunded Liability, Comparing Scenarios (in millions)
No Pension Reform vs. Better Post-Reform Management vs. Actual Experience**

MSERS	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Actual Experience: Pension Reform
1997	-\$424	-\$424	-\$424
1998	-\$588	-\$573	-\$587
1999	-\$1,199	-\$438	-\$1,196
2000	-\$1,778	-\$416	-\$1,774
2001	\$268	-\$431	\$261
2002	\$2,520	-\$75	\$2,479
2003	\$2,908	\$521	\$2,837
2004	\$2,688	\$272	\$2,576
2005	\$2,391	\$138	\$2,267
2006	\$2,051	-\$54	\$1,909
2007	\$1,223	-\$301	\$1,059
2008	\$4,273	-\$255	\$3,984
2009	\$6,052	-\$402	\$5,651
2010	\$6,358	-\$473	\$5,920
2011	\$7,452	-\$347	\$6,942
2012	\$6,898	-\$955	\$6,382
2013	\$6,236	-\$1,766	\$5,725
2014	\$5,585	-\$2,140	\$5,150

Source: MSERS valuations, Reason Foundation forecast.

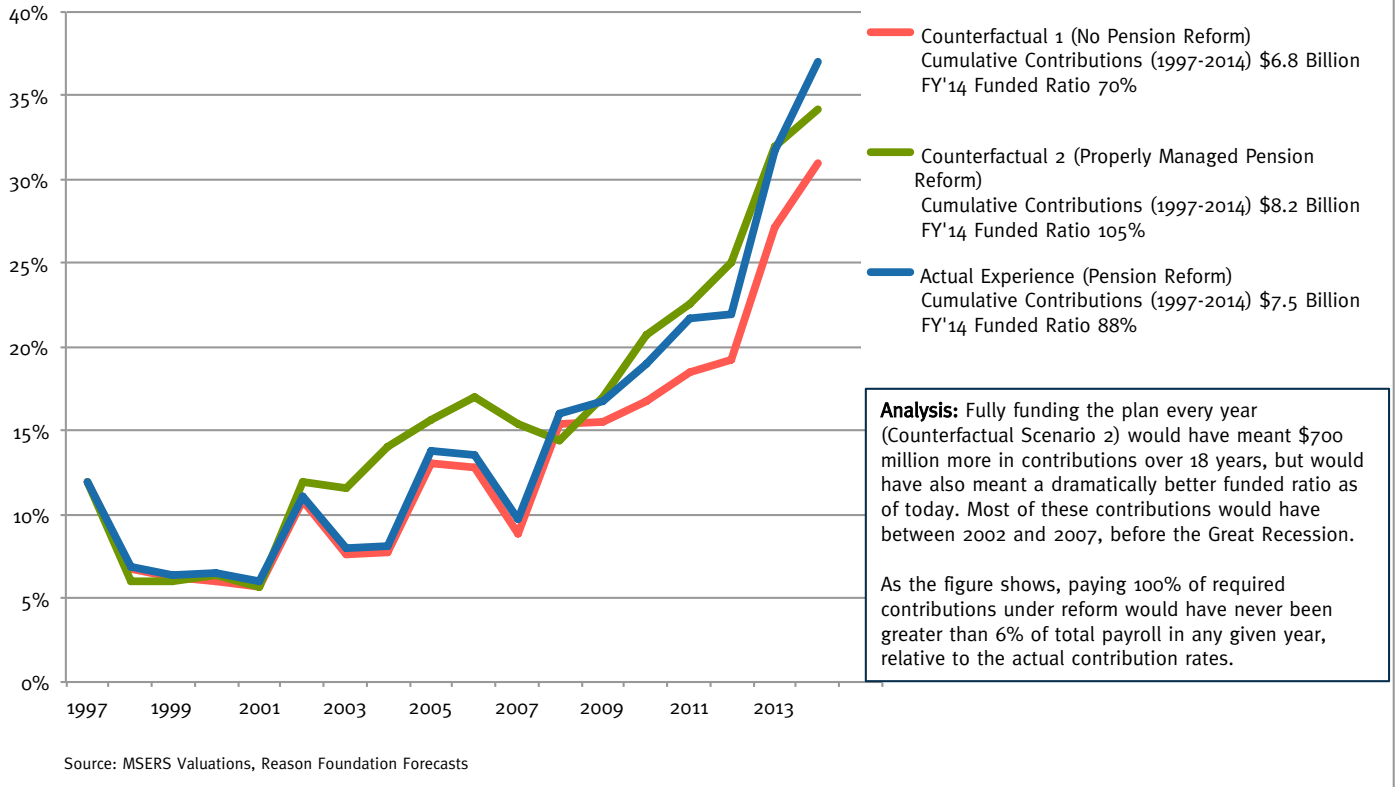
Notes: (1) Forecasts use a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More fiscally conservative actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) Assumes legislators paid 100% of the annual required employer contribution rate, and that the plan's investments actually achieved their assumed rate of return.

Of course, making additional contributions above what was actually paid would have meant policy trade-offs elsewhere in state government, such as less spending on public goods or increases in taxes to cover the full actuarially determined employer contribution. In the moment, legislators might have considered the trade-offs of underfunding the pension plan to be more worthwhile than changing the code making cuts to separate spending. However, in retrospect, the cumulative contribution requirements of Counterfactual Scenario 2, “Properly Managed Pension Reform” would not have been dramatically larger than actual experience.

Figure 3 shows contributions (DB and DC) as a percentage of total MSERS payroll (DB and DC members) for Counterfactual Scenarios 1 and 2, along with actual experience.

Contribution requirements for properly managed pension reform (Counterfactual 2) are not substantially more demanding on an annual basis than the actual experience, on average less than 4% of payroll higher, and never more than 6% of payroll higher. This plan does not “cost” more, as the additional contributions are only additional relative to the underfunding history of actual experience. Near-term contributions would have been higher, but the funded status and unfunded liability level would have improved. The no-reform experience (Counterfactual 1) has the lowest contributions in our forecast, but also has the lowest funded ratio.

Figure 3: MSERS Employer Contribution Rates, as a % of Payroll Actual Experience Compared to Counterfactual Scenarios: “No Pension Reform” and “Properly Managed Pension Reform”



3. What If MSERS Adopted a More Accurate Discount Rate?

Michigan’s pension reform effort primarily focused on closing its existing defined benefit plan for state employees, and creating a defined contribution plan for new hires. However, the legislature could have also directed the MSERS board to use actuarial assumptions for the closed plan that better reflected the value of liabilities and reduced the investment return risks to taxpayers. This would have meant larger employer contribution rates, but it would have also more accurately reported the net present value of accrued liabilities and resulted in a better funded plan.

We reforecast accrued liabilities and contribution rates under an assumption that MSERS had adopted an alternate discount rate, specifically a discount rate linked to a high-grade, long-term corporate bond index (which provides a decent proxy for a risk-free rate

Counterfactual Scenario 3:

Actual experience, except in 1996 the state adopts a lower discount rate for a more accurate accounting of the net present value of liabilities along with creating the defined contribution tier.

Counterfactual Scenario 4:

A defined contribution tier is created in 1996 as actually happened and the state adopts a lower discount rate, then the state pays 100% of the required contribution, and the defined benefit tier’s assets are better managed so as to actually achieve the assumed rate of return.

Counterfactual Scenario 5:

Actual experience, except the plan revalues accrued liabilities as of FYE 2014 using a lower discount rate.

plus risk premium that should guide setting a discount rate).³² This approach provides a more accurate reflection of the risk of the liabilities, and thus is a more accurate discount rate. Table 4 reports the projected financials from this better discount rate forecast (Counterfactual 3), along with the results of a separate forecast that assumes a discount rate change and proper pension reform management (Counterfactual 4), and a statement of today’s actual experience pension finances, but with liabilities revalued using the more accurate discount rate (Counterfactual 5).

**Table 4: MSERS Actual Experience v. Counterfactual Experience:
FY2014 Pension Financials with Revalued Liabilities (Using Alternate Discount Rate)**

	Counterfactual 3: Adopt Alternate Discount Rate with Pension Reform	Counterfactual 4: Adopt Alternate Discount Rate with Pension Reform <i>and</i> Proper Management	Counterfactual 5: Revaluation of Actual Experience Liabilities
Market Value of Assets	\$13.90 billion	\$20.12 billion	\$10.97 billion
Accrued Liabilities	\$19.77 billion	\$19.77 billion	\$20.30 billion
Unfunded Liabilities	\$5.87 billion	(\$348 million)	\$9.33 billion
Funded Ratio: DB Plan	70%	102%	54%
DB Plan Contributions, 1997 to 2014	\$7.4 billion	\$7.4 billion	\$5.5 billion

Source: MSERS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plan’s assumptions for apples-to-apples comparisons. More fiscally conservative actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) “Plan Contributions” represent both employer and employee contributions. The MSERS DC tier comprises 62% of the total MSERS payroll. Contributions paid do not necessarily equal contributions actuarially required. (3) “Proper Management” refers both to better management of assets, so as to actually achieve the assumed rate of return, as well as to paying 100% of the required contribution rate. Simply managing the assets differently would have been a significant challenge, as nearly all states failed to meet their assumed rates of return over the past decade, but that difficulty highlights how the additional unfunded liabilities experienced by the plan were not *caused* by closing the defined benefit tier, but were going to happen anyway. Alternate discount rate used in all scenarios is linked to a high-grade, long-term corporate bond index.

We find that with the more accurate discount rate approach, total contributions would have been \$2 billion higher than actual experience (assuming employers made 100% of their required contributions). Those contributions—accounting for the higher valued cost of liabilities—would have been added to the asset pool and invested along the way. By the end of 2014, there would have been roughly \$5.9 billion in unfunded liabilities, but much of this would be due to the revaluation of liabilities.

If we revalue MSERS liabilities in retrospect using the same alternate discount rate method, then the total unfunded liability would be about \$9 billion.

³² Discount rates should reflect the risk associated with a plan’s liabilities, specifically the employer’s ability to meet its pension obligations (for more, see Truong Bui and Anthony Randazzo, “Why Discount Rates Should Reflect Liabilities: Best Practices for Setting Public Sector Pension Fund Discount Rates,” Reason Foundation, Policy Brief 130). A good proxy for the risk premium that discount rates should reflect would be either a high-grade municipal bond index or a corporate bond index (see Bui and Randazzo, p. 2). For the purposes of our forecast we follow Moody’s Investors Service and discount pension liabilities using a high-grade, long-term corporate bond index.

D. Conclusion: Pension Reform Improved the Sustainability of Michigan’s Public Sector Pension System

The effects of Public Act 487 have meant that unfunded liabilities are lower in Michigan today than they otherwise would have been without reform. While MSERS is certainly facing a substantial unfunded liability, the debt would be higher if not for the closing of the defined benefit tier of the plan to new members.³³ As of the end of fiscal year 2014, MSERS faces \$5.2 billion in unfunded liabilities. But without pension reform, the plan would be facing \$5.6 billion in unfunded liabilities, meaning *the plan is about \$450 million better off with reform*.

MSERS’s solvency would have been even better off if Michigan had properly managed the closed plan. If, following the reform effort, lawmakers had paid 100% of the annual actuarially determined contributions and had investment returns match the assumed rates (perhaps by lowering the assumed return to something more achievable), then MSERS would be over-funded today by about \$2.1 billion. This means that *with proper implementation of reforms Michigan’s retirement systems would be roughly \$7.7 billion better off today than if no reform were ever initiated*.³⁴

³³ Some critics have claimed the additional pension debt is because fewer contributors to the plan have meant fewer assets. However, even before reform the employee contribution rate was zero (the plan’s design was non-contributory by employees), so the unfunded liabilities the plan faces today aren’t related to reduced contributions. As noted in the outline of how pension financing is supposed to work, employee contributions are not required to fund benefits for any workers other than the individuals making the contributions. MSERS never relied on employee contributions from active employees to pay the benefits of retired employees. Additional employees do mean additional contributions, but they mean additional liabilities—liabilities that can translate into unfunded liabilities if returns underperform or an employer underpays its required contribution, as happened in Michigan.

³⁴ This is taking the difference between the unfunded liabilities of Counterfactual Scenario 1 (\$5.6 billion) with no reform to the system and Counterfactual Scenario 2 (-\$2.1 billion) with properly managed reform to the system.

Part 3

Alaska: Properly Managed Reform Would Have Saved the State More than \$4 Billion; Without Pension Reform, Unfunded Liabilities Would Be About \$40 Million Greater

The Year Reform Passed (Adopted): 2005 (2007)

The Plans:

- Alaska Public Employees' Retirement System (APERS); and
- Alaska Teachers Retirement System (ATRS)

The Financials (combined, as of FYE2004):

- Market Value of Assets: \$9.0 billion
- Actuarial Accrued Liability: \$10.9 billion
- Unfunded Liability (Market Value): \$1.9 billion
- Funded Ratio (Market Value): 82.8%
- Payroll: \$1.7 billion
- Actuarially Determined Employer Contribution as % of Payroll: 30.8%

The Legislation: Alaska Retirement Security Act, SB141

Historic figures are not inflation adjusted to current dollars.

A. The Story of Reform

By the end of fiscal year 2004, Alaska's two public sector pension plans were facing a combined \$1.9 billion unfunded liability, on a market value basis.³⁵ This pension debt was putting pressure on the state's operating budget, threatening its credit rating, and reducing the viability of the plans to actually pay out all of the future pension benefits promised.

To address the insolvency challenge, state lawmakers proposed closing the troubled defined benefit plans to new members, and introducing a new defined contribution plan within each existing retirement system. The reform legislation, known as SB 141, created 401(k)-style, personal retirement accounts for all new employees (those hired during or after fiscal year 2007).

³⁵ Unfunded liability using market valued assets. Using actuarially valued assets, the combined unfunded liability was measured at \$2 billion (because there were some decreases from market losses during the dot-com bubble that hadn't been recognized yet). The plans' combined unfunded liability would have actually been reported as even higher if less favorable actuarial assumptions had been used—the assumed rate of return and discount rate were set at 8.25% for both plans.

SB 141 directed employers in the Alaska Public Employees' Retirement System (APERS) to contribute 5% of payroll to the personal retirement accounts of employees in the newly created defined contribution plan, and Alaska Teachers Retirement System (ATRS) employers to contribute 7% of payroll. Employee contributions to the retirement funds were set at a minimum of 8% of their salaries, with the ability to put more into the funds up to IRS limits.³⁶ All current employees remained in the defined benefit plans (with a few exemptions), with the state promising to continue operating them with the goal of paying out all promised benefits.³⁷

The proposed legislation faced a fierce public debate, but was passed out of both legislative chambers and sent to the governor at the end of May 2005. While the plan has continued to be assailed during implementation, the process of phasing out APERS and ATRS has slowly begun.

B. Alaska's Actuarial Experience During Pension Reform

1. Alaska Inconsistently Funded the Closed Plan

Alaska was erratic with its contributions to the pension plans during the decade from 2005 to 2014.³⁸ In only three years during this period did the state's employers pay at least the actuarially determined employer contribution, as shown in Figure 4 (for both plans combined).

In 2014 the state legislature decided to move \$3 billion from the Alaska Constitutional Reserve Budget into the pension plans' asset pools in order to reduce the unfunded liability. APERS received \$1 billion, and \$2 billion was transferred into ATRS. From the perspective of the funds, this was a positive development, as the additional contributions will make up for some of the missed previous contributions.

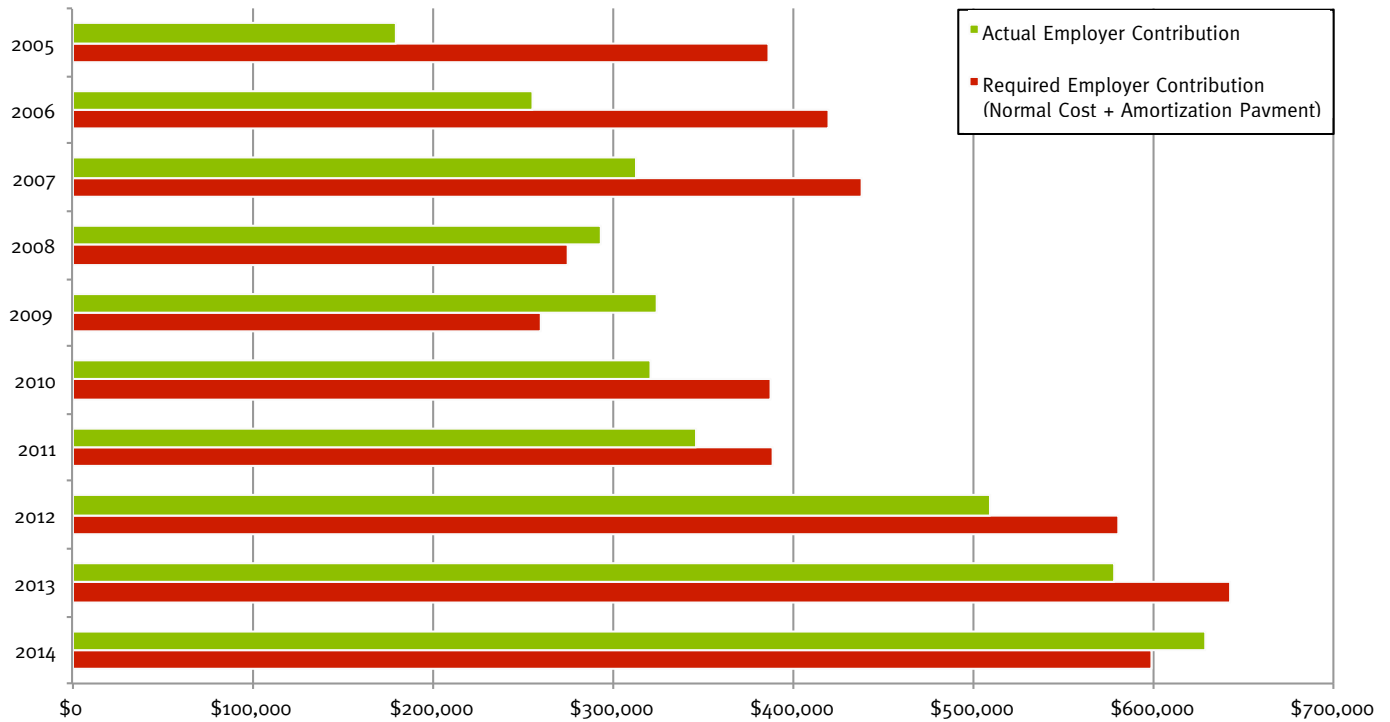
Overall, Alaska officials have contributed just 88.4% of the annual required employer contributions during the 10 years since APERS and ATRS closed their defined benefit plans. The lower-than-required contributions made budgeting easier for lawmakers, but at the long-term expense of the plan, with the missed payments simply being added to unfunded liabilities.

³⁶ For complete details about SB 141, see this overview: http://www.akrepublicans.org/senfin/24/pdfs/senfin_sb141_16.pdf.

³⁷ Non-vested Tier III APERS members with less than five years of service, and Tier II ATRS members with less than eight years of service, were given the option to switch into the defined contribution plan.

³⁸ Even if a plan, or tier of a plan, is closed to new members, the employees already in the plan will continue working and continue accruing promised pension benefits until they retire, and these obligations still being added to the plan require normal cost payments and, if the returns underperform, additional unfunded liability payments. Plus, unfunded liability amortization payments on the debt that was already in the plan when it was closed to new members are still necessary even as the plan is in the process of closing.

Figure 4: APERS & ATRS Actuarially Required Employer Contributions Compared to Actual Employer Contributions (in thousands, combined)



Source: APERS and ATRS Valuations, Reason Foundation Forecasts

2. Investment Return Underperformance and Changes to the Discount Rate

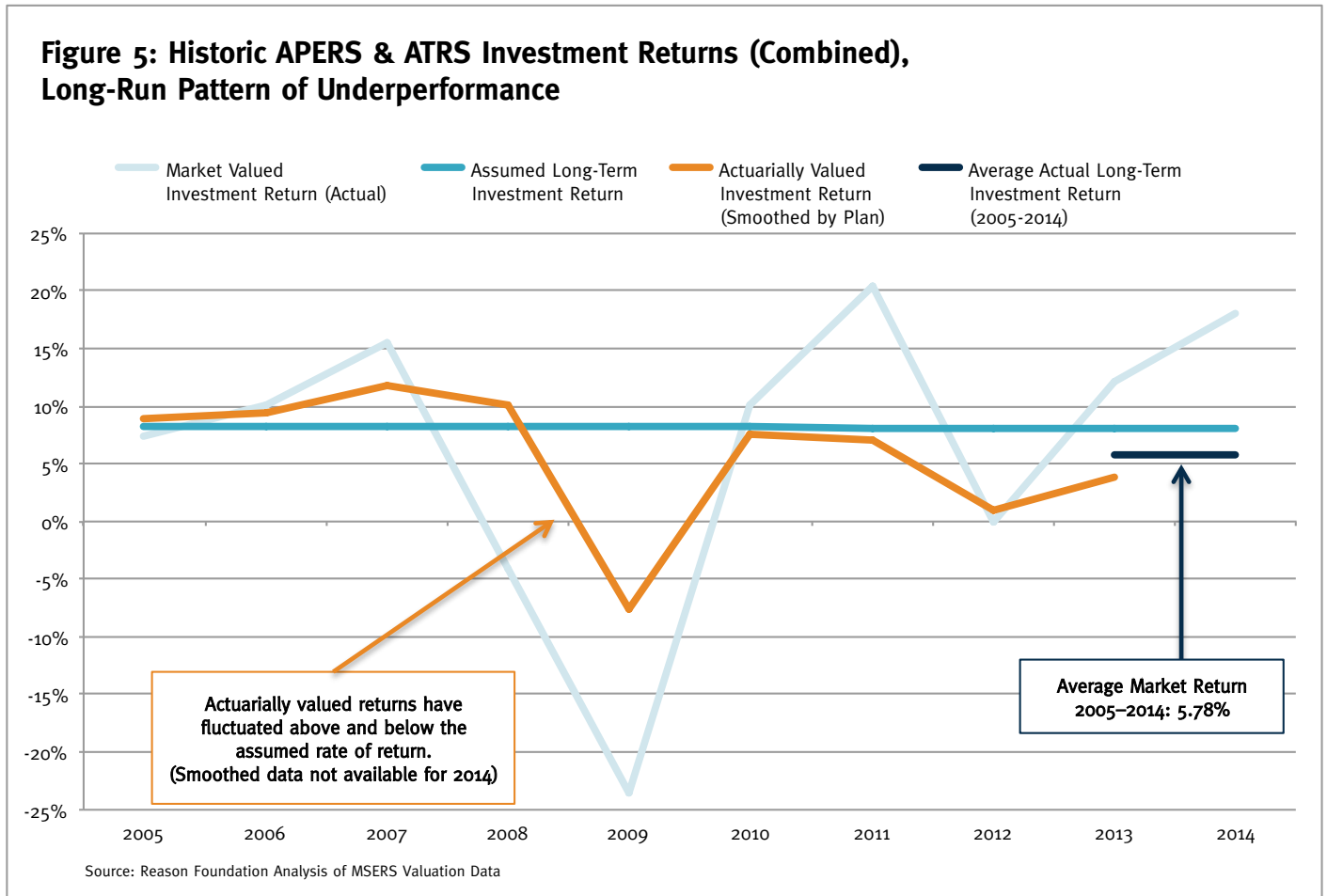
Over the decade after reform was adopted, APERS and ATRS have seen their assets underperform the assumed rate of return. In 2005 when pension reform was passed, the plans were expecting an average 8.25% return. By 2010, that actuarial assumption was lowered to 8%. However, between 2005 and 2014 APERS averaged a return of 5.56% while ATRS averaged 6.08%.³⁹

Figure 5 shows the variation in the returns for the plans combined, along with the assumed average rate and the actual average rate.⁴⁰ Even declining slightly over time, the assumed rate of return has not been particularly realistic. Over the last decade the average rate of return (5.78%) has been well below what was expected to flow into the fund. The average return following the financial crisis has been particularly troublesome, with a combined averaged return of 5.0% between 2009 and 2014. (That short-term average falls to 4.7% if we include 2015, for which there is investment return data available, but not full actuarial data).

³⁹ Geometric average rates of return, net of fees, market valuation.

⁴⁰ The Alaska Retirement Management Board manages the investments for both plans, and reports the returns for the plans independently. Most years there are slight differences in the returns. However, these differences are typically less than 100 basis points, as the returns tend to follow a similar trajectory.

The adjustment to 8% was a positive step, but is clearly still too high in retrospect. A more responsible assumed rate of return would be lower—with responsibility being defined in context of the historic investment return experience and a principle of minimizing taxpayer risks.



3. Changes to Discount Rate and Assumed Rate of Return

APERS and ATRS, like most other public sector defined benefit plans, use their assumed rate of return for setting the discount rate—a common practice for public sector plans, though not a good practice.⁴¹ Thus, the lowering of the assumed rate of return on assets in 2010 was also a resetting of the discount rate used to value liabilities.

Lowering the assumed rate of return was a sensible policy choice, given the underperformance of the asset portfolios of APERS and ATRS (as shown in Figure 5 above). However, lowering the assumed rate of return means the plans expected to earn less on their assets in future years, translating into an increase in annual

⁴¹ In a separate paper, we argue that the discount rate used to value pension liabilities should reflect the risk inherent in the obligations, not the risk of the assets. This is not standard practice among actuaries, but we argue that it should be. For more, see Truong Bui and Anthony Randazzo, *Why Discount Rates Should Reflect Liabilities: Best Practices for Setting Public Sector Pension Fund Discount Rates*, Reason Foundation, Policy Brief 130.

employer contribution rates to ensure benefits are fully funded. The subsequent failure to pay 100% of actuarially determined employer contribution rates in the years after the assumed return was lowered meant that, on an accounting basis, even more dollars were failing to flow into the assets of the plans than if the rate of return had remained higher. The resulting lower value of assets, contributing to a real increase in the unfunded liability of the plans, was therefore unrelated to the closing of a defined benefit plan.

Moreover, as previously discussed, all else equal, lowering the discount rate in a defined benefit plan means the net present value of accrued liabilities will increase. Thus the change to an 8% discount rate meant the reported liabilities of APERS and ATRS are higher today, in part simply because of the corrective actuarial assumption change. In reality, there are not *more liabilities* after a discount rate change—actuarial assumptions do not determine how many pension checks are cut. Over the long-term, the cost of monthly pension checks will be based on the actual longevity of retirees. The increase in the value of accrued liabilities after a discount rate change is just an increase in the *recognition* of the real value of promised pension benefits, in an accounting sense. For the purposes of measuring the unfunded liability, however, lowering the discount rate means that accrued liabilities will be measured as higher without an offset to the assets, therefore the *reported value* of unfunded liabilities will increase.

Again, all else equal, the plans could have performed exactly as expected during the post-reform years, but with the lowering of the discount rate alone there would be higher reported unfunded liabilities in the post-reform years than prior to reform. Such an increase is completely unrelated to the closing of a defined benefit plan.

4. Changes to the Amortization Method

Alaska's pension plans both changed their amortization methods to "level-dollar" (paying an equal dollar amount per year over a fixed number of years) the year the plans were closed.⁴² All else equal, paying a fixed dollar amount over a scheduled number of years will result in fewer total payments by the end of the amortization schedule than using a "level-percent" of payroll method (paying a dollar amount that is consistently the same percentage of payroll over a fixed number of years) to calculate amortization payments.

With a closed, 25-year amortization schedule, Alaska taxpayers were set to pay roughly 20% less in unfunded liability payments using a level-dollar method versus having kept a level-percent of payroll method.⁴³ However, in 2014 the state decided to extend the amortization of APERS and ATRS pension debt

⁴² When closing a defined benefit plan, GASB recommends plans adopt a level-dollar amortization of unfunded liabilities (if the method is not already being used). This is not a legal requirement. For more, see Robert M. Costrell (2012), "'GASB won't let me' — A false objection to public pension reform," *PIONline.com*, <http://bit.ly/1VsYOAT>.

⁴³ Adopting the level-dollar method means that in the first 10 to 12 years of the schedule, payments will be higher than under the level-percent of payroll method—meaning contribution rates are higher in the early post-reform years than they would have been. From one perspective this may appear as if pension reform has increased costs. However, only *payments in the short-term* have gone up, not the *long-term actual cost* of pension benefits. By paying more toward the debt in the early years, fewer total taxpayer dollars will be spent on pensions overall. Plus, in the second half of the amortization schedule, unfunded liability payments will be lower with a level-dollar method than a level-percent of payroll method, so the contribution rates in the last years of closing the plans will be more manageable. For more see Figures 1 and 2 in Josh McGee (2013), "The Transition Cost Mirage – False Arguments Distract from Real Pension Reform Debates," *LJAF Policy Perspective*, <http://bit.ly/1V4QeIw>.

out to a 39-year schedule in order to reduce its annual payments. This method did reduce the year-to-year outlays relative to what they would have been, but it means on the whole employers will wind up paying more (just as paying a student loan off over 30 years would cost more in the long run than over 15 years).

APERS Defined Benefit Plan Actual Financials as of 2014:

- Market Value of Assets: \$7.73 billion
- Accrued Liabilities: \$12.95 billion
- Unfunded Liability (Market Value): \$5.22 billion
- Funded Ratio (Market Value): 59.7%

ATRS Defined Benefit Plan Actual Financials as of 2014:

- Market Value of Assets: \$3.77 billion
- Accrued Liabilities: \$6.92 billion
- Unfunded Liability (Market Value): \$3.15 billion
- Funded Ratio (Market Value): 54.5%

Joint Defined Contribution Tier Actual Financials as of 2014:

- Market Value of Assets: \$709.9 million
- Accrued Liabilities: \$0
- Funded Ratio: 100%

C. Counterfactual Scenarios

1. What If Reform Never Happened?

Counterfactual Scenario 1:

No changes to the plans are made in 2005; all future members are hired into APERS's and ATRS's defined benefit plans. Alaska's funding policy is the same as actual experience.

There is no doubt that APERS and ATRS have more reported unfunded liabilities today than they did in the year before pension reform was adopted (even accounting for inflation). But did pension reform *cause* the increase in pension debt?

Consider a counterfactual scenario where the vote to close APERS and ATRS failed in the state legislature and no reform was adopted. The plans would have continued bringing in new members, but they still would have experienced the same underperforming investment returns. The additional unfunded liabilities would have resulted in actuarially determined employer contribution rates *higher* than actual experience, so we can assume that the state would have likely become a serial under-contributor even without the passage of reform.

Table 5 provides a financial comparison of this counterfactual scenario to APERS and ATRS's actual experience. (See the Methodology section for details on our forecasting method for counterfactual scenarios.)

Table 5: APERS & ATRS 2014 Financials, Actual and Projected, Counterfactual 1

APERS	Counterfactual 1: No Pension Reform	Actual Experience: Pension Reform	Difference	Percentage Change
Market Value of Assets, DB Plan	\$8.19 billion	\$7.73 billion	-\$460 million	-5.6%
Accrued Liabilities	\$13.43 billion	\$12.95 billion	-\$480 million	-3.6%
Unfunded Liabilities	\$5.25 billion	\$5.22 billion	-\$30 million	-0.6%
Funded Ratio: DB Plan Only	61.0%	59.7%	-1.3%	-2.1%
Funded Ratio: Full System	61.0%	72.8%	+11.8%	16.2%
DB Plan Contributions, 2005 to 2014	\$3.63 billion	\$3.28 billion		
DC Plan Contributions, 2005 to 2014	\$0	\$0.43 billion		
ATRS	Counterfactual 1: No Pension Reform	Actual Experience: Pension Reform	Difference	Percentage Change
Market Value of Assets, DB Plan	\$3.94 billion	\$3.77 billion	-\$170 million	-4.3%
Accrued Liabilities	\$7.10 billion	\$6.92 billion	-\$180 million	-2.5%
Unfunded Liabilities	\$3.16 billion	\$3.15 billion	-\$10 million	-0.3%
Funded Ratio: DB Plan Only	55.5%	54.5%	-1.0%	-1.8%
Funded Ratio: Full System	55.5%	68.6%	13.1%	19.1%
DB Plan Contributions, 2005 to 2014	\$2.12 billion	\$1.98 billion		
DC Plan Contributions, 2005 to 2014	\$0	\$0.17 billion		

Source: APERS and ATRS valuations, Reason Foundation forecast.

Notes: (1) Forecast uses a roll-forward model that uses the plans' assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) The "Full System" references the funded ratio for both the DB tier and the DC tiers of APERS/ATRS. We weight the funded status of each tier by the percentage of total payroll that tier represents. (3) "Plan Contributions" represent both employer and employee contributions. The APERS DC plan comprises 31% of the total APERS payroll; the ATRS DC plan comprises 32.6% of the total ATRS payroll. Contributions paid do not necessarily equal contributions actuarially required.

There are several important findings from this table. First, while the unfunded liability and funded ratio figures are similar for the "no-reform" scenario compared to actual experience, the accrued liabilities are sharply higher without pension reform.

Second, notice that the funded ratio for APERS as a whole is better today (72.8%) under actual experience than it would have been without pension reform (61.0%). The same is true for the ATRS system-wide funded ratio today (68.6%) as opposed to what it would be without pension reform (55.5%). As of 2014, one-third of the combined APERS and ATRS payroll is in the DC plan, and member benefits for that plan are inherently 100% funded (for more on why, see Part 1 "How Defined Contribution Pension Plans Are Funded").

The funded ratio of the DB tier alone is forecast to be slightly better under the no-reform scenario, but this is not necessarily a sign of greater health. Funded ratios should always be considered in connection to the associated unfunded liabilities (and vice versa). In this instance, we noted that the unfunded liability was higher in the no-reform scenario, which suggests the slightly better funded ratio is a function of the greater magnitude of liabilities and assets. (For example, a plan with \$8 in assets and \$10 in liabilities—80% funded with \$2 in unfunded liabilities—is actually better off than a plan with \$17 assets and \$20 in liabilities—85% funded with \$3 in unfunded liabilities.⁴⁴) The funded ratio is important for understanding the relative strength

⁴⁴ This is particularly true for states or municipalities with smaller overall budgets, where the difference between \$2 and \$3 in unfunded liabilities could be a large percentage of general revenues, making it hard to pay the additional debt.

of a plan, but the absolute unfunded liability is important for understanding the net effect on state budgets and taxpayers.

Finally, the table shows the cumulative contributions to retirement benefits under each scenario. The contributions to a DC plan are technically not relevant to the solvency or sustainability of a DB plan. However, it is analytically helpful to compare the total amounts paid under both scenarios when considering what the net results have been.

Under the APERS no-reform scenario we forecast \$3.6 billion would have been paid into the plan during the last decade without reform and assuming the same funding policy. The result would have been a pension system roughly 61% funded with \$5.3 billion in unfunded liabilities.

By contrast, under the actual APERS experience of the plan, contributions were about \$100 million higher, with \$3.3 billion going toward DB obligations plus about \$430 million in contributions to defined contribution accounts, for a total of \$3.7 billion.⁴⁵ The result has been a pension system roughly 73% funded with \$5.2 billion in unfunded liabilities.

The pattern is the same for ATRS, where under the no-reform scenario we forecast \$2.12 billion would have been paid into the plan during the last decade without reform and assuming the same funding policy. The result would have been a pension system roughly 56% funded with \$3.16 billion in unfunded liabilities.

By contrast, under the actual ATRS experience of the plan, contributions were about \$30 million higher, with \$1.98 billion going toward DB obligations plus about \$170 million in contributions to defined contribution accounts, for a total of \$2.15 billion.⁴⁶ The result has been a pension system roughly 69% funded with \$3.15 billion in unfunded liabilities.

All of these figures are combined and summarized in Table 6.

⁴⁵ Publicly available data on defined contribution rates only goes back to 2000, therefore we had to estimate the contribution amounts for the few years between implementation of reform and then. However, the amount of the DC payroll was very small in these early years and the contributions to DC accounts during this period would be less than 5% of total DC contributions. Thus, the need to estimate data during this period does not substantially change the nature of our findings.

⁴⁶ Publicly available data on defined contribution rates only goes back to 2000, therefore we had to estimate the contribution amounts for the few years between implementation of reform and then. However, the amount of the DC payroll was very small in these early years and the contributions to DC accounts during this period would be less than 5% of total DC contributions. Thus, the need to estimate data during this period does not substantially change the nature of our findings.

Table 6: APERS & ATRS Combined 2014 DB + DC Financials, Actual and Projected

APERS & ATRS	Counterfactual 1: No Pension Reform	Actual Experience: Pension Reform
Market Value of Assets, DB Plan	\$12.1 billion	\$11.5 billion
Accrued Liabilities	\$20.5 billion	\$19.9 billion
Unfunded Liabilities	\$8.41 billion	\$8.37 billion
Funded Ratio: DB Plan	59%	58%
Funded Ratio: Full System	59%	71%
DB + DC Plans Contributions, 2005 to 2014	\$5.8 billion	\$5.9 billion

Source: APERS and ATRS valuations, Reason Foundation forecast.

It is also important to recognize that at the time of reform, the value of accrued liabilities was being underestimated in both plans because of the high discount rate, which in turn meant unfunded liabilities were actually higher than reported in the plan's valuations. The slight revision downward in the discount rate since reform was implemented (a positive fiduciary step) has resulted in the recognition of more unfunded liabilities on today's books and is reflected in the actual experience unfunded liability figure. However, it is critical to emphasize that *those are not additional* unfunded liabilities caused by closing the plan; they are a more accurate *recognition* of the net present value of liabilities—i.e. the promised pension checks.

Just as with Michigan, the logic of how underperforming investments and underfunding policies negatively influencing the solvency of pension plans suggests Alaska would have seen the funded ratio of its pension plans fall, irrespective of whether the plans were closed to new members. And based on our forecast, we find APERS and ATRS were headed toward substantial growth in unfunded liabilities with or without reform. Given the lower unfunded liability of the reform scenarios versus the no-reform scenarios, combined with the significantly larger funded ratio of the reform scenarios (71%, combined) versus the no-reform scenario (59%, combined), we find Alaska's pension reform and closing the defined benefit plans to new members made APERS and ATRS more sustainable.

Alaska: Summary of Reform vs. No Reform

Alaska's experience with pension reform has involved taxpayers and employees making combined contributions of \$5.9 billion since 2005 for DB and DC benefits, and the result so far is \$8.37 billion in combined unfunded liabilities on \$19.9 billion in pension obligations, but a full system funded ratio of 71%.

By contrast, if there had been no pension reform Alaska taxpayers and employees would have contributed around \$5.8 billion and would be facing \$8.41 billion in unfunded liabilities on \$20.5 billion in pension obligations, and a full system funded ratio of 58%.

2. What If Pension Reform Had Been Better Managed?

Alaska certainly could have done a better job determining plan funding policy and plan governance over the last decade during the defined benefit plan closure. To start, the state could have made 100% of its actuarially determined employer contributions.⁴⁷ Plus, if the plan had achieved the assumed rate of return that was assumed when pension reform was adopted, unfunded liabilities would be much less.⁴⁸ This provides another benchmark with which to compare actual experience: a counterfactual scenario where pension reform was better managed.

Counterfactual Scenario 2:

Defined contribution plans are created in 2005 as actually happened; the state pays 100% of the required contribution; and the defined benefit plans' assets are better managed so as to actually achieve the assumed rate of return.

Table 7 compares APERS's and ATRS's plan financials for this second counterfactual scenario to the first counterfactual scenario of "no reform" and the plans' actual experience. Specifically, we consider what the pension financials would look like if the plans' actual investment returns matched the assumed rates of return, and if Alaska had a responsible funding policy of paying the full bill every year.

Better pension reform management—from the perspective of paying the full employer contribution rate every year—and targeting an achievable rate of return would have only affected the plan's assets. We forecast these two elements alone would have added more than \$4.3 billion to the combined assets of APERS and ATRS today. And since the accrued liabilities would not have been changed, this would have meant a combined unfunded liability of only \$4 billion instead of \$8.4 billion.

Notice further that contribution requirements would not have been much higher than the actual experience—assuming the plan also achieved its assumed rate of return, it would have taken just \$270 million more over the past decade to have cut the plan's current unfunded liability in half.⁴⁹ To be sure, the former clause—assuming the plans' investments actually returned the assumed rate—is a major factor in halving the unfunded liability, and not an easy requirement. The majority of public sector pension plans struggled to achieve their assumed rate of return over the past decade, and it is only clear in retrospect how Alaska could have better managed its pension assets. Better asset management would have also helped the plan in the

⁴⁷ Our forecast above assumes the plan had achieved its 8% assumed rate of return on average over the past two decades—theoretically possible using a different investment strategy. If the state's approach had been to target a lower and more manageable rate of return, then employer contribution rates would have been higher, but the net asset outcome would have been the same. In such a scenario it is also likely that the funding policy would have changed after the plan reached 100% funded, but reporting on all such iterations isn't necessary to understand that better financial management would have improved the plan's actual experience and the net outcome of the pension reform project as a whole.

⁴⁸ Discount rates should reflect the risk associated with a plan's liabilities, specifically the employer's ability to meet its pension obligations (for more, see Truong Bui and Anthony Randazzo, "Why Discount Rates Should Reflect Liabilities: Best Practices for Setting Public Sector Pension Fund Discount Rates," Reason Foundation, Policy Brief 130). A good proxy for the risk premium that discount rates should reflect would be either a high-grade municipal bond index or a corporate bond index (see Bui and Randazzo, p. 2). For the purposes of our forecast we follow Moody's Investors Service and discount pension liabilities using a high-grade, long-term corporate bond index.

⁴⁹ Our forecast above assumes the plan had achieved its 8.25% and then 8% assumed rate of return on average over the past decade—theoretically possible using a different investment strategy. If the state's approach had been to target a lower, more manageable rate of return, then employer contribution rates would have been higher, but the net asset outcome would have been the same. In such a scenario it is also likely that the funding policy would have changed after the plan reached 100% funded, but reporting on all such iterations isn't necessary to understand that better financial management would have improved the plan's actual experience and the net outcome of the pension reform project as a whole.

absence of reform, but keeping the DB plans open would not have provided greater insight to the asset managers for APERS and ATRS.

APERS	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Actual Experience: Pension Reform
Market Value of Assets, DB Plan	\$8.19 billion	\$10.62 billion	\$7.73 billion
Accrued Liabilities	\$13.43 billion	\$12.95 billion	\$12.95 billion
Unfunded Liabilities	\$5.25 billion	\$2.33 billion	\$5.22 billion
Funded Ratio: DB Plan	61.0%	82.0%	59.7%
Funded Ratio: Full System	61.0%	87.9%	72.8%
DB Plan Contributions, 2005 to 2014	\$3.63 billion	\$3.40 billion	\$3.28 billion
DC Plan Contributions, 2005 to 2014	\$0	\$0.43 billion	\$0.43 billion
ATRS	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Actual Experience: Pension Reform
Market Value of Assets, DB Plan	\$3.94 billion	\$5.20 billion	\$3.77 billion
Accrued Liabilities	\$7.10 billion	\$6.92 billion	\$6.92 billion
Unfunded Liabilities	\$3.16 billion	\$1.72 billion	\$3.15 billion
Funded Ratio: DB Plan	55.5%	75.2%	54.5%
Funded Ratio: Full System	55.5%	82.9%	68.6%
DB Plan Contributions, 2005 to 2014	\$2.12 billion	\$2.13 billion	\$1.98 billion
DC Plan Contributions, 2005 to 2014	\$0	\$0.17 billion	\$0.17 billion

Source: APERS and ATRS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plans' assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) The "Full System" references the funded ratio for both the DB tier and the DC tiers of APERS/ATRS. We weight the funded status of each tier by the percentage of total payroll that tier represents. (3) "Plan Contributions" represent both employer and employee contributions. The APERS DC plan comprises 31% of the total APERS payroll; the ATRS DC plan comprises 32.6% of the total ATRS payroll. Contributions paid do not necessarily equal contributions actuarially required. (4) Assumes legislators paid 100% of the annual required employer contribution rate, and that the plans' investments actually achieved their assumed rate of return.

Given that the central research question for this paper is focused on whether closing a defined benefit plan to new hires *caused* the increase in unfunded liabilities, this scenario helps to provide a baseline for what would have been the expected future for APERS and ATRS when the reform was adopted. In this case we find that if all of the defined benefit plans' assumptions at the time of pension reform had been accurate, then the plans would be in a better fiscal position today than both actual experience and if there was no reform. The most sustainable scenario is adopting the pension reform of closing APERS's and ATRS's defined benefit plans *and* opening defined contribution plans for new members, *plus* prudent funding policy and investment strategy. By contrast, in looking at the unfunded liability figures on an annual basis, it is clear that the no-reform counterfactual is the worst-case scenario.

In Table 8.1 we show a projection of APERS's unfunded liability under the same three scenarios as in Table 7; Table 8.2 shows the same for ATRS. Separate from our own analysis, the FYE2004 valuations for both APERS and ATRS include a 25-year forecast for plan financials by the plan's actuary, Buck Consultants. We add their forecast for if there had been no reform to the below tables as well.

Table 8.1: APERS, Unfunded Liability Comparison (in thousands)**No Pension Reform vs. Better Post-Reform Management vs. Actual Experience**

APERS	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Plan Actuary's 2004 Forecast: Assuming No Reform	Actual Experience: Pension Reform
2005	\$965	\$965	\$n/a	\$965
2006	\$1,526	\$1,526	\$n/a	\$1,526
2007	\$1,227	\$1,632	\$n/a	\$1,223
2008	\$2,224	\$1,736	\$4,345	\$2,218
2009	\$4,625	\$1,866	\$4,438	\$4,612
2010	\$5,004	\$2,057	\$4,509	\$4,980
2011	\$4,671	\$2,140	\$4,564	\$4,651
2012	\$5,358	\$2,054	\$4,600	\$5,311
2013	\$5,305	\$1,937	\$4,612	\$5,251
2014	\$5,245	\$2,325	\$4,600	\$5,216

Source: APERS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) Assumes legislators paid 100% of the annual required employer contribution rate, and that the plan's investments actually achieved their assumed rate of return.

Table 8.2: ATRS, Unfunded Liability Comparison (in millions)**No Pension Reform vs. Better Post-Reform Management vs. Actual Experience**

ATRS	Counterfactual 1: No Pension Reform	Counterfactual 2: Pension Reform Properly Managed	Plan Actuary's 2004 Forecast: Assuming No Reform	Actual Experience: Pension Reform
2005	\$1,095	\$1,095	\$n/a	\$1,095
2006	\$1,436	\$1,436	\$n/a	\$1,436
2007	\$1,239	\$1,426	\$n/a	\$1,237
2008	\$1,683	\$1,438	\$2,962	\$1,681
2009	\$2,870	\$1,532	\$3,092	\$2,868
2010	\$3,296	\$1,859	\$3,193	\$3,290
2011	\$3,080	\$1,839	\$3,261	\$3,073
2012	\$3,411	\$1,777	\$3,287	\$3,393
2013	\$3,331	\$1,669	\$3,297	\$3,310
2014	\$3,162	\$1,719	\$3,288	\$3,150

Source: ATRS valuations, Reason Foundation forecast.

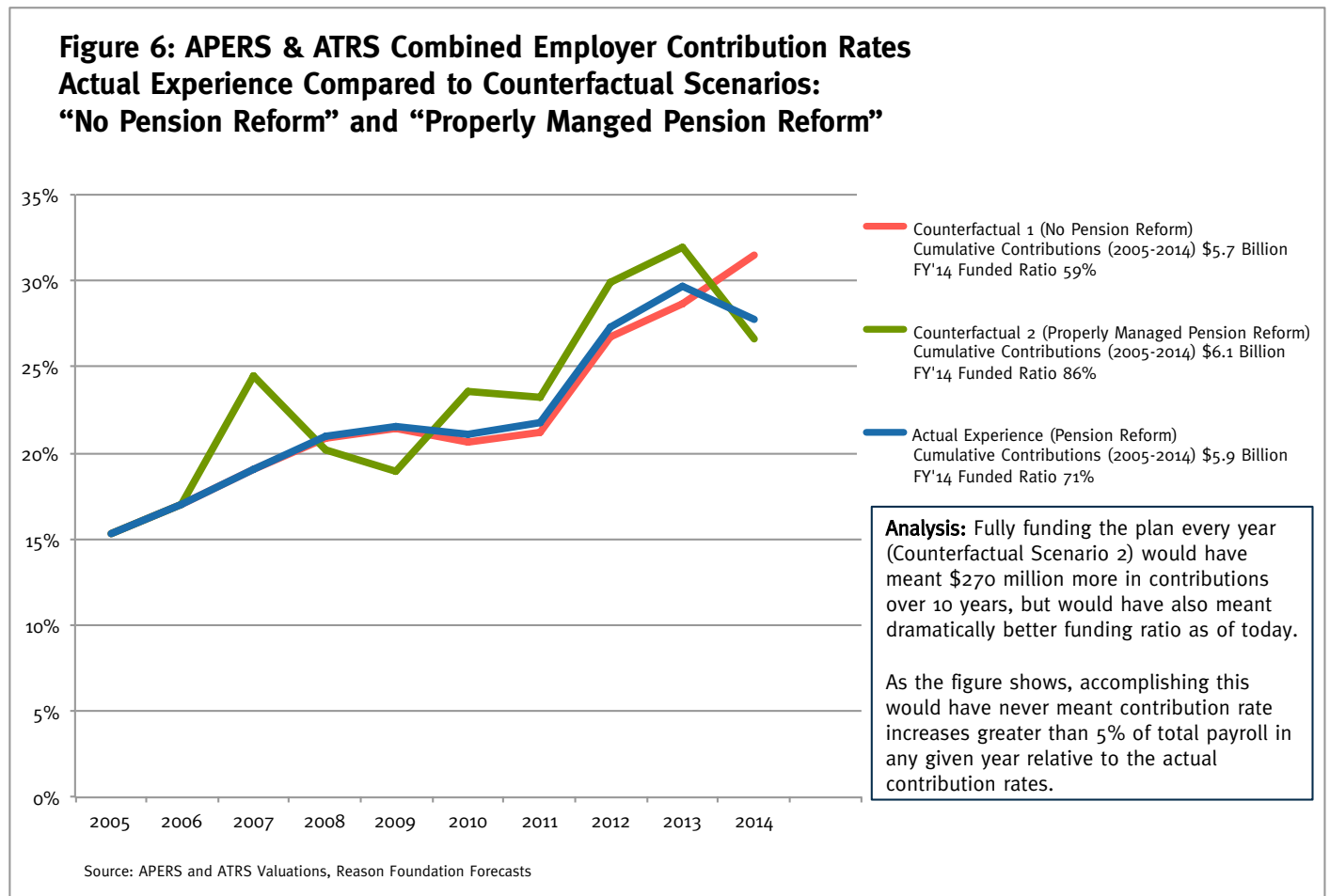
Notes: (1) Forecasts use a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) Assumes legislators paid 100% of the annual required employer contribution rate, and that the plan's investments actually achieved their assumed rate of return.

The lowest unfunded liability scenario is clearly properly managed pension reform. Leaving open the defined benefit plans would not have put the plans in a better financial position than today. Even the Buck Consultants forecasts show unfunded liabilities more than doubling for both plans by the end of 2014, confirming that at the time pension reform was being considered, the prevailing assumption was that unfunded liabilities were about to jump considerably.⁵⁰

⁵⁰ The plan actuary, Buck Consultants, provided a forecast of the plans in their FYE2004 reports (delivered early March 2005). They forecast under all of their current assumptions that APERS's total unfunded liabilities would grow from \$2 billion then to \$4.6 billion by FYE 2014, with a funded ratio of 75.5% (up from 70.2%) on an actuarially valued basis. Accrued liabilities were forecast to grow to \$18.7 billion and actuarially valued assets to \$14.1 billion (all assuming a median projected population growth rate of 1%). See page 33 of the FYE2004 valuation. They forecast under all of their current assumptions that ATRS's total unfunded liabilities would grow from \$1.6 billion then to \$3.3 billion by FYE 2014, with a funded ratio of 62.1% (down from 62.8%) on an actuarially valued basis. Accrued liabilities were forecast to grow to \$8.7 billion and actuarially valued assets to \$5.4 billion (all assuming a median projected population growth rate of 1%). See page 28 of the FYE2004 valuation. Over the long run, actuarially valued assets are equivalent to market valued assets because all the actuarial valuing process is intended to do is smooth out the application of market returns. Both plans in Alaska used five-year smoothing, and actuarial forecasts need to use the assumed rate of return. Therefore, within the Buck Consultants forecasts for APERS and ATRS, by the time the forecasts reach FYE2014 the actuarial and market valuations of assets would be the same.

Of course, properly managed pension reform—i.e. making additional contributions above what was actually paid over the past decade—would have meant policy trade-offs elsewhere in state government, such as less spending on public goods or increases in taxes to cover the full actuarially determined employer contribution. In the moment, legislators likely considered the trade-offs of underfunding the pension plan to be worth it in order to refrain from tax code changes or cuts to separate spending. However, in retrospect, the cumulative contribution requirements of Counterfactual Scenario 2, “Properly Managed Pension Reform” would not have been dramatically larger than actual experience.

Figure 6 shows contributions (DB and DC) for APERS and ATRS combined as a percentage of their combined total payroll (DB and DC members) for Counterfactual Scenarios 1 and 2, along with actual experience.



Contribution requirements for properly managed pension reform (Counterfactual 2) are not substantially more demanding on an annual basis than the actual experience, on average less than 3% of payroll higher, and never more than 6% of payroll higher. This plan does not “cost” more, as the additional contributions are only additional relative to the underfunding history of actual experience. Near-term contributions would have been higher, but the funded status and unfunded liability level would have improved. The no-reform experience (Counterfactual 1) has the lowest contributions in our forecast, but also has the lowest funded ratio.

3. What If APERS and ATRS Adopted a More Accurate Discount Rate?

Alaska’s pension reform effort primarily focused on closing its existing defined benefit plan for general public sector employees, and creating a defined contribution plan for new hires. However, the legislature could have also directed the boards for APERS and ATRS to use actuarial assumptions that better reflected the value of liabilities and reduced the investment return risks to taxpayers. This would have meant larger employer contribution rates, but it would have also more accurately reported the net present value of accrued liabilities and resulted in better funded plans.

We reforecast accrued liabilities and contribution rates under an assumption that APERS and ATRS had adopted an alternate discount rate, specifically a discount rate linked to a high-grade, long-term corporate bond index (which provides a decent proxy for a risk-free rate plus risk premium that should guide setting a discount rate).⁵¹ This approach provides a more accurate reflection of the risk of the liabilities, and thus is a more accurate discount rate. Tables 9.1 and 9.2 report the projected financials from this better discount rate forecast (Counterfactual 3), along with the results of a separate forecast that assumes a discount rate change and proper pension reform management (Counterfactual 4), and a statement of today’s actual experience of pension finances but with liabilities revalued using the more accurate discount rate (Counterfactual 5).

Counterfactual Scenario 3:

Actual experience, except in 2005 the state adopts a lower discount rate for a more accurate accounting of the net present value of liabilities along with creating the defined contribution plans.

Counterfactual Scenario 4:

Defined contribution plans are created in 2005 as actually happened and the state adopts a lower discount rate, then the state pays 100% of the required contributions, and the defined benefit plans’ assets are better managed so as to actually achieve the assumed rate of return.

Counterfactual Scenario 5:

Actual experience, except the plans revalue accrued liabilities as of FYE 2014 using a lower discount rate.

⁵¹ Some critics have claimed the additional pension debt is because fewer contributors to the plan have meant fewer assets. However, even before reform the employee contribution rate was zero (the plan’s design was non-contributory by employees), so the unfunded liabilities the plan faces today aren’t related to reduced contributions. As noted in the outline of how pension financing is supposed to work, employee contributions are not required to fund benefits for any workers other than the individuals making the contributions. MSERS never relied on employee contributions from active employees to pay the benefits of retired employees. Additional employees do mean additional contributions, but they mean additional liabilities—liabilities that can translate into unfunded liabilities if returns underperform or an employer underpays its required contribution, as happened in Michigan.

**Table 9.1: APERS Actual Experience v. Counterfactual Experience:
FY2014 Pension Financials with Revalued Liabilities (Using Alternate Discount Rate)**

	Counterfactual 3: Adopt Alternate Discount Rate with Pension Reform	Counterfactual 4: Adopt Alternate Discount Rate with Pension Reform and Proper Management	Counterfactual 5: Revaluation of Actual Experience Liabilities
Market Value of Assets	\$9.54 billion	\$12.25 billion	\$7.73 billion
Accrued Liabilities	\$18.18 billion	\$18.18 billion	\$18.91 billion
Unfunded Liabilities	\$8.65 billion	\$5.94 billion	\$11.18 billion
Funded Ratio: DB Plan	52%	67%	41%
DB Plan Contributions, 2005 to 2014	\$4.66 billion	\$4.66 billion	\$3.28 billion

Source: APERS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) "Plan Contributions" represent both employer and employee contributions. The APERS DC plan comprises 31% of the total APERS payroll; the ATRS DC plan comprises 32.6% of the total ATRS payroll. Contributions paid do not necessarily equal contributions actuarially required. (3) "Proper Management" refers both to better management of assets, so as to actually achieve the assumed rate of return, as well as to paying 100% of the required contribution rate. Simply managing the assets differently would have been a significant challenge, as nearly all states failed to meet their assumed rates of return over the past decade, but that difficulty highlights how the additional unfunded liabilities experienced by the plan were not *caused* by closing the defined benefit tier, but were going to happen anyway. Alternate discount rate used in all scenarios is linked to a high-grade, long-term corporate bond index.

**Table 9.2: ATRS Actual Experience v. Counterfactual Experience:
FY2014 Pension Financials with Revalued Liabilities (Using Alternate Discount Rate)**

	Counterfactual 3: Adopt Alternate Discount Rate with Pension Reform	Counterfactual 4: Adopt Alternate Discount Rate with Pension Reform and Proper Management	Counterfactual 5: Revaluation of Actual Experience Liabilities
Market Value of Assets	\$4.98 billion	\$6.22 billion	\$3.77 billion
Accrued Liabilities	\$9.95 billion	\$9.95 billion	\$10.11 billion
Unfunded Liabilities	\$4.97 billion	\$3.73 billion	\$6.34 billion
Funded Ratio: DB Plan	50%	63%	37%
DB Plan Contributions, 2005 to 2014	\$2.9 billion	\$2.9 billion	\$1.98 billion

Source: APERS valuations, Reason Foundation forecast.

Notes: (1) Forecasts use a roll-forward model that uses the plan's assumptions for apples-to-apples comparisons. More accurate actuarial assumptions would likely mean higher required contributions, but lower long-term unfunded liabilities and thus lower long-term costs. (2) "Plan Contributions" represent both employer and employee contributions. The APERS DC plan comprises 31% of the total APERS payroll; the ATRS DC plan comprises 32.6% of the total ATRS payroll. Contributions paid do not necessarily equal contributions actuarially required. (3) "Proper Management" refers both to better management of assets, so as to actually achieve the assumed rate of return, as well as to paying 100% of the required contribution rate. Simply managing the assets differently would have been a significant challenge, as nearly all states failed to meet their assumed rates of return over the past decade, but that difficulty highlights how the additional unfunded liabilities experienced by the plan were not *caused* by closing the defined benefit tier, but were going to happen anyway. Alternate discount rate used in all scenarios is linked to a high-grade, long-term corporate bond index.

We find that with the more accurate discount rate approach, total combined contributions would have been \$2.3 billion higher than actual experience (assuming employers made 100% of their required contributions). Those contributions—accounting for the higher valued cost of liabilities—would have been added to the asset pools and invested along the way. By the end of 2014, APERS and ATRS would have had roughly \$13.6 billion in total unfunded liabilities, but much of this would be due to the revaluation of liabilities. If we revalue the combined liabilities in retrospect using the same alternate discount rate method, then the total unfunded liability would be more than \$17.5 billion.

This means that the pension reform project in Alaska could have adopted a more accurate discount rate for both plans, contributed a combined \$2.3 billion more since the reform, and have \$3.9 *billion less* in unfunded liabilities once promised pension benefits are properly accounted for. And if APERS and ATRS had achieved their assumed rate of return under this alternate discount rate scenario, the combined unfunded liability would be only \$9.7 billion today.

D. Conclusion: Pension Reform Improved the Sustainability of Alaska’s Public Sector Pension System

The effects of SB 141 have meant that unfunded liabilities are lower in Alaska today than they otherwise would have been without reform. While the pension plans are still quite troubled, the problems facing APERS and ATRS are unrelated to the closing of the defined benefit plans.⁵² As of the end of fiscal year 2014, Alaska’s retirement systems are 71% funded, including the DC plans, but still are facing a combined \$8.37 billion unfunded liability. Without reform, the state would be facing \$8.41 billion in unfunded liability and its collective retirement systems would be just 58% funded. This means that *the plan is roughly \$40 million better off because of reform and is substantially better funded*.

Alaska’s retirement system solvency would have been even better off if the state had properly managed the closed plans. If, following the reform effort, lawmakers had paid 100% of the annual actuarially determined contributions and had investment returns match the assumed rates (perhaps by lowering the assumed return to something more achievable), then APERS and ATRS would have just \$4.1 billion in unfunded liabilities. This means that, *with proper implementation of reforms, Alaska’s retirement systems would be \$4.3 billion better off today than if no reform were ever initiated*.⁵³

⁵² Some critics have claimed the additional pension debt is because fewer contributors to the plan have meant fewer assets. However, even before reform the employee contribution rate was zero (the plan’s design was non-contributory by employees), so the unfunded liabilities the plan faces today aren’t related to reduced contributions. As noted in the outline of how pension financing is supposed to work, employee contributions are not required to fund benefits for any workers other than the individuals making the contributions. APERS and ATRS never relied on employee contributions from active employees to pay the benefits of retired employees. Additional employees do mean additional contributions, but they mean additional liabilities—liabilities that can translate into unfunded liabilities if returns underperform or an employer underpays its required contribution, as happened in Alaska.

⁵³ This is taking the difference between the unfunded liabilities of Counterfactual Scenario 1 (\$8.4 billion) with no reform to the system and Counterfactual Scenario 2 (\$4.1 billion) with properly managed reform to the system.

Part 4

Conclusion: Closing Defined Benefit Plans Did Not Cause An Increase in Unfunded Liabilities in Michigan or Alaska

Has pension reform in Michigan and Alaska improved the sustainability of their retirement systems?

By developing a forecast of what plan experience would have been like without closing to new members, we find Michigan is about \$450 million better off today *because* of pension reform. As of the end of 2014, MSERS has an unfunded liability of \$5.2 billion and combined funded ratio of 88%; by contrast, without pension reform closing the defined benefit tier, we estimate the plan's unfunded liability would be \$5.6 billion with a funded ratio of 70%. Assuming the plan would have experienced the same contribution rates, actuarial assumption changes, and investment returns, this means pension reform has saved Michigan around \$450 million over 18 years. Plus, if the state had achieved its assumed rate of return and paid 100% of its annual required contributions, we estimate MSERS would actually be overfunded by about \$2.1 billion, as of 2014—a \$7.7 billion better financial position than without pension reform.

Similarly, Alaska is at least \$40 million better off than if it had not closed its two main plans to new members. As of the end of 2014, APERS and ATRS have a combined \$8.37 billion unfunded liability, and funded ratio around 71%. However, without reform the plans would be facing \$8.41 billion in unfunded liabilities and a 58% funded ratio. Assuming the plan would have experienced the same contribution rates, actuarial assumption changes, and investment returns, this means pension reform has saved Alaska at least \$40 million over 10 years. Plus, if the state had achieved its assumed rate of return and paid 100% of its annual required contributions, we estimate APERS and ATRS's combined unfunded liability would be just \$4.1 billion, meaning the plan would have been \$4.3 billion better off if properly managed during reform compared to having no reform.

These findings are in contrast to a 2015 study from the National Institute on Retirement Security (NIRS), which argued, “changing from DB to DC does not decrease retirement plan costs, can drive up pension debt, and will almost certainly increase retirement insecurity.”⁵⁴ The study specifically highlighted Michigan's pension reform as evidence for how closing pension plans increases unfunded liabilities: “while the plan had

⁵⁴ National Institute on Retirement Security, “Case Studies of State Pension Plans that Switched to Defined Contribution Plans,” February 2015, p. 5, <http://bit.ly/1cy9HQI>

excess assets on hand of some \$734 million in 1997, by 2012, the plan amassed a significant unfunded liability of \$6.2 billion.”⁵⁵

However, as we’ve shown, such a finding is conflating correlation with causation and inaccurately blaming the pension reform itself for the increase in pension debt. By constructing counterfactual scenarios, we’ve shown that the additional unfunded liabilities are due to factors unrelated to the closing of a defined benefit plan: the state’s failure to pay its full employer contribution and underperforming investment returns (which would have happened with or without the reform).⁵⁶

Our analysis, thus, leads us to three conclusions:

(1) ***Pension Reform Improved Sustainability.*** Closing defined benefit plans in Michigan and Alaska made the plans more sustainable, saving taxpayers tens to hundreds of millions in reduced unfunded liabilities since the reforms.

(2) ***Pension Reform Did Not Make Matters Worse.*** Claims that pension reform in Michigan and Alaska made outcomes worse are based on misunderstandings of the actual experiences of the plans since reform and incorrect articulation of how pensions are funded.

(3) ***DB-to-DC Reforms Are Not Enough.*** Reforms that closed defined benefit plans in favor of opening defined contribution plans have been a net benefit for Michigan and Alaska, however unfunded liabilities are still a serious concern even after such pension reforms. The bulk of unfunded liabilities added to the plans has been from underperforming invested assets, and the magnitude of these additional unfunded liabilities highlights the fact that phasing out defined benefit plans in favor of defined contribution plans is not a silver bullet reform. Policymakers should consider further steps when seeking to ensure the solvency and stability of legacy liabilities in a closed defined benefit pension plan.

Policymakers considering similar reforms to Michigan and Alaska should be encouraged that closing a defined benefit plan and replacing it with a defined contribution plan *can improve sustainability*. They should also heed the warnings that Michigan and Alaska present in recognizing that responsibly managing plans after reform is just as important as getting the initial terms of the reform right.

⁵⁵ Ibid., <http://bit.ly/1cy9HQI>

⁵⁶ The NIRS study made the same error in its analysis of Alaska’s pension reform efforts. To their credit, NIRS did recognize the underperforming markets and missed contributions as “factors” contributing to the unfunded liabilities. But they dismiss these as principle causes of the increased unfunded liabilities and instead suggest the debt has grown because of “demographic” factors. This demographic story fails to understand the legalities of pension financing, claiming that closing a defined benefit plan means spreading pension payments over a decreasing payroll base. However, there are no GASB requirements that a plan change its amortization schedule after closing a plan. Plus, amortization payments in a closed plan can still be calculated on a dollar basis and then paid as a percentage of declining payroll or total payroll, but in either case the dollar amount paid will be the same.

About the Authors

Anthony Randazzo is director of economic research for Reason Foundation, a nonprofit think tank advancing free minds and free markets. His current research focuses on public sector pension funding, with an emphasis on identifying the factors that cause public officials to underfund pension obligations. Randazzo's work has been featured in *The Wall Street Journal*, *Forbes*, *Barron's*, *Bloomberg View*, *The Washington Times*, *The Detroit News*, *Chicago Sun-Times*, *RealClearMarkets*, *Reason* magazine and various other online and print publications.

Randazzo has also testified before the House Financial Services Committee on topics related to housing policy and government-sponsored enterprises, as well as before state and local legislative bodies on privatization and pension policy matters. He holds a multidisciplinary M.A. in behavioral political economy from New York University.

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Related Studies

Many aspects of the defined benefit to defined contribution debate are outside the scope of this study. For more see the following content:

- *Pension Reform Handbook: A Starter Guide for Reformers*, Lance Christensen and Adrian Moore, Reason Foundation (July 31, 2014).
- *Addressing Common Objections to Shifting from Defined-Benefit Pensions to Defined-Contribution Retirement Plans*, Lance Christensen, Truong Bui and Leonard Gilroy, Reason Foundation (June 16, 2014).
- *The ‘Transition Costs’ Myth: Why Defined-Benefit to Defined-Contribution Pension Reform Is Commonly Misunderstood*, Anthony Randazzo, Reason Foundation (October 28, 2014).
- *‘GASB Won’t Let Me’—A False Objection to Public Pension Reform*, Robert M. Costrell, Laura and John Arnold Foundation (2012).
- *Defined-Contribution Pensions Are Cost-Effective*, Josh McGee, Manhattan Institute (August 2015).
- *Overprotecting Public Employee Pensions: The Contract Clause and the California Rule*, Alexander Volokh, Reason Foundation (July 10, 2014).
- *Pension Reform Case Study: Michigan*, Anthony Randazzo, Reason Foundation (March 17, 2014).

Methodology

Data Collection: We started by downloading the pension financial data available at publicplandata.org. For Michigan we collected 2001 to 2013; for Alaska we collected 2004 to 2013. For Michigan we added data for 1996 to 2000 from the MSERS valuations publicly available at michigan.gov/ors.

Data Adjustment: We checked the downloaded data for accuracy and corrected any errors using publicly available valuations and comprehensive annual financial reports for MSERS, APERS, and ATRS. Most adjustments were to market valued rates of return and normal cost rates.

Counterfactual Model: In order to forecast unfunded liabilities under alternate scenarios (T1) to actual experience (T0), we built a model that drew on the pre-reform data. Our inputs included:

- **Market Valued Assets (MVA).** $MA_{T1} = MA_{T0} + \text{total contribution} - \text{total benefit payment} + \text{net investment return}$.⁵⁷
- **Actuarial Accrued Liabilities (AAL).** $AAL_{T1} = AAL_{T0} + \text{normal cost} - \text{total benefit payment} + \text{interest cost} + \text{change in assumptions} - \text{liability gain/(loss)}$.
- **Normal Cost (NC).** We projected the normal cost by applying the original normal cost rate to the alternate payroll, which equals the original defined benefit (DB) plan's payroll plus the defined contribution (DC) plan's payroll.
- **Total Benefit Payment (TBP).** For Michigan, we made small adjustments to the outflows to test whether benefit payments being slightly different if the defined benefit plan had stayed in place would substantively change the outcome, but there was little statistical difference. For Alaska, we consider the outflows from assets to pay retirement benefits during actual experience to be the same as if there were no reform because there would have been no vested defined benefits for new employees during the time period we analyze. In either case, employee contributions would have most certainly differed under the counterfactual scenario, but not meaningfully enough to change the results.
- **Interest Cost.** We use the same interest cost calculation used in the valuation reports. Interest cost = $(AAL_{T0} + \text{Normal cost}) * \text{Assumed return} - \text{Total benefit payment} * ((1 + \text{Assumed return})^{1/2} - 1)$.

⁵⁷ We chose to use MVA instead of the smoothed values of assets for two reasons. First, the market value is simpler and more straightforward; it communicates exactly how much in assets the pension fund has on hand at a specific time. Second, it is consistent with the new GASB standards, under which smoothing techniques are no longer allowed.

- **Liability Gain/(Loss).** When actual experience, apart from investment experience, deviates from actuarial assumptions, there is a liability gain/(loss). We believe a relatively similar scale in gain/(loss) would have been experienced if the plans had not been closed. The difference that might have arisen would have been insignificant in terms of the trend of unfunded liabilities. We assume the liability gain/(loss), then, would have been the same relative to payroll.
- **Total Employer Contribution (EC).** Our calculation of employer contribution varied depending on the counterfactual scenario we wanted to develop a forecast for.

Counterfactual Scenarios:

- **Scenario 1:** *What would have happened if there had been no reform, and the plan had made the original contribution amounts, plus the normal costs for new employees?* We used the actual total normal cost rate and applied it to the defined contribution members' payroll (assuming the same hires would have been made). We weighted this amount by the percentage of required contributions actually paid. Then we added that sum to the actual total contributions paid.⁵⁸
 - $\text{Original total contribution} + ((\text{total normal cost} * \text{DC payroll}) * \% \text{ of total contribution paid}) = \text{Alternative Total Required Contributions}$
- **Scenario 2:** *What would have happened if the plan had paid 100% ARCs and actual returns had matched assumed returns?* $\text{Total Employee Contribution} = \text{Original contribution} + \text{ARC} * (1 - \% \text{ paid})$.
- **Scenario 3:** *What would have happened if the defined benefit plan was closed and at the same time a lower discount rate for the plan was adopted?* We revalued accrued liabilities using an alternate discount rate tied to a five-year rolling average yield on the Moody's Seasoned Aaa Corporate Bond Index. We report two approaches to revaluing. The first approach was to retrospectively revalue liabilities using the alternate discount rate. The second approach was to forecast an alternate experience where, as part of pension reform, a plan adopted the alternate discount rate. This approach would have meant higher normal cost rates; we report how that would affect the assets and what the additional contributions would be.
- **Scenario 4:** *A combination of Scenarios 2 and 3.*
- **Scenario 5:** *What would happen if the current value of accrued liabilities were revalued using a lower discount rate, as outlined in Scenario 3.*

⁵⁸ Alternatively, we could take a different approach to contributions by adding in additional amortization payments that would have arisen on the additional employees added to the defined benefit plan (those that were otherwise put into a defined contribution plan). The additional liabilities in the plan would have generated additional unfunded liabilities, particularly with regard to underperforming investments. If we added payments to the assets of the plan based on increasing the dollar level of amortization payments (relative to the increased unfunded liability with the additional workers), then the employer costs necessarily increase without reform. In such a scenario we would use the actual experience contribution rates as a percentage of declining payroll and apply that rate to projected growing payroll in a no-reform counterfactual forecast. In this second methodological approach we consistently get better funded plans, but with greater employer costs. The alternate method overestimates the size of the unfunded liability amortization payments, since the additional unfunded liabilities related to new members would not have been paid off in full as our method does—that is why the method leads to a better funded plan and with greater employer costs. The take away is that, in a counterfactual scenario without reform, the degree to which the plan would be well funded over time is directly related to *employer* contribution rates. The greater the employer contributions (i.e. taxpayer dollars) into the plan, the lower the unfunded liability.



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