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The Commitment Credibility of Public-Employee Pensions

by

John Edward Brooks

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Political Science

in the

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of the

University of California, Berkeley

Committee in charge:

Professor Sean Gailmard, Chair

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Spring 2016

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Abstract

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Doctor of Philosophy in Political Science

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Professor Sean Gailmard, Chair

Public-employee pensions have grown significantly in cost in recent years, and will continue to be one of the central policy problems that state and local governments confront in the 21st Century. Pensions show United States' federalism at work: they vary tremendously across and within states. I examine the causes and consequences of this variation. Specifically, I ask how democratically-elected politicians can commit to pension performance, and what are consequences do pensions and politicians' decisions have?

This dissertation presents three separate empirical papers using data from 103 plans across all 50 states from 2001-2011. I also include introductory, transitional, and concluding sections. As discussed both here and in prior literature, politicians have clear incentives to compensate employees through pensions, while disguising expenses and skipping payments. This has led to significant costs and increased attention to pensions.

The first paper focuses on the factors leading to variation in pensions' financial performance, or funding ratios. Centrally, I find that as management board personnel is increasingly insulated from political control, performance improves. The second paper focuses on politicians' contributions into funds. There, I uncover evidence that politicians prefer to commit to pensions covering police and fire employees. They also tend to skip payments when prior economic performance and investment returns are higher. This shows that elected officials prefer to keep taxes low when possible, even at the cost of underfunding pensions.

The third paper pivots to examine a consequence of pensions: how they affect public-employee retirement rates. I present a simple theoretical model showing how reductions in commitments from employers might make public-employees less likely to believe they will receive their full pension benefits, and in turn, more likely to retire. I then present empirical evidence that as pensions are more controlled by politicians, retirements increase. Poorer funding from the prior year also is associated with increased retirements, providing evidence that performance generates feedback effects for human capital. Jointly, my papers provide broad and novel insight into the causes and consequences of variation in public pensions.

To Cordelia, Pliny, my family and friends.

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Chapter 1

Introduction

On February 7, 2011, New York City's Mayor Michael Bloomberg discussed the dangers of increasingly costly public pensions, which had risen from one of every 28 dollars in 2002 to one of every eight dollars by 2011. To seemingly make matters worse, employees only needed to work for five years before their pensions kick in (McMahon et al., 2011). Similarly, in California, pension costs rose 2000% between 1999 and 2009. Between 1929 and 1989, the share of total payroll for U.S. employees supporting benefits rose from 3 to 38.2 percent (Crane, 2010).

For years, public-employee pensions received little attention, likely due to their somewhat complicated and deferred nature. However, rising costs, increased media coverage, and a general shift in political culture have made them more salient and pushed them into the 'problem stream' (Kingdon, 1995). Figure 1.1 demonstrates this increase in salience over time from the a count of Google-search returns for 'public pensions.'

Figure 1.1: Public Pensions' Appearance in Books on Google



The above shows how the appearance of ‘public pension’ has increased over time on Google (Source: <https://books.google.com/ngrams>).

The 2008 economic downturn also left pensions in worse shape, and added to the perception that government employees are better off than those in the private sector. Many Americans view government pensions as concentrated benefits with diffuse costs (Wilson, 1989). A 2011 poll found that about half of Americans felt this way, and felt what is sometimes called ‘pension envy’ directed at public employees. The same study found that in 41 out of 50 states, public employees receive better overall compensation than their private-sector counterparts, particularly due to the rising value of benefits (Cauchon, 2011).

At the same time, though, taxpayers might benefit from pensions, especially if they aid, even indirectly, in the provision of public goods and services. More fundamentally, pension promises represent commitments from government employers. They speak to the ability of democratically elected governments, with their shorter-term election-driven incentives, to commit to the longer-term goal of compensating employees in a fiscally sustainable manner. Although pensions have historically been ‘off limits’ to cuts, they increasingly have become targets of retrenchment.

In this introduction, I briefly trace the history and politics of pensions’ growth over time. I then review relevant literature on pensions and their politics in order to help motivate the research questions and theories in the following three papers. Following that, I preview each of the papers. Throughout, I point to how politics, actuarial factors, and the economy shape pensions. Pensions have become one the largest fiscal undertakings of state governments,

and deserve special consideration in an ‘era of austerity,’ in part because they have helped lead to it.

1.1 American Pension Development

Pensions are income provided to employees that have achieved some pre-defined level of tenure, and decide to leave their jobs. They are funded by contributions from employees and employers, as as returns from those invested contributions (which cover about 75% of all pensions’ assets). Pensions are classified as either defined benefit (DB) or defined contribution (DC). The former place risk with the sponsor, and pay beneficiaries predetermined amounts at fixed intervals. The amount of the benefit typically is based on one or more factors such as years of service, age, and salary. DC pensions place risk with employees, who put contributions aside that accrue interest over time (GAO, 2008). Although there are exceptions, the public sector tends to utilize DB plans (Hacker, 2002; Schneider and Damanpour, 2002), which I focus on in my papers.

Historically, public-employee pensions first appeared as a means to reward soldiers during the Civil War (Skocpol, 1993). Municipal and state governments began using them in the late 19th and early 20th centuries. It is not coincidental that they grew soon after the transition from the Spoils to the Merit System (Johnson and Libecap, 1994; Clark et al., 2003). Reformers believed that pensions would induce more motivation in the workforce, attract employees to government work, and help encourage older employers to actually retire, rather than working until the end of their lives (Lazear, 1979, 1982, 1983a,b; Clark et al., 2003). Additionally, pensions serve a social welfare function by mitigating the difficulties involved in saving for retirement. As the Governmental Accountability Office (GAO) notes, “...there is a federal interest in ensuring that all Americans have a secure retirement, as reflected in the special tax treatment provided for private and public pension funds” (GAO, 2008).

Pensions later enjoyed two major periods of proliferation: the first around the time of the New Deal, and the second during the 1960s and 70s. In the latter period, larger plans enveloped smaller ones, taking advantage of scales of economy and upgraded technologies. Plans’ generosity levels also increased a great deal. There was a more general increase in the size and scope of governments during this period: the number of public employees across the country roughly doubled, contributing to increased pension obligations. By the 1980s, many plans faced funding shortfalls. Nonetheless, state and local governments were not especially eager to raise taxes to improve pensions’ funded status (Clark et al., 2003).

Instead, governments began experimenting with plan policies. Some states tried raising employee contribution rates and freezing or reducing their own contribution rates. In some cases, they established alternate DC plans. Most states, though, began placing their funds in riskier investments, such as stock markets. Governments moved away from explicit legal rules to so-called general standards of prudence, allowing managers to make riskier decisions (Mitchell et al., 2001, p. 14).

This Prudent Pension Rule uses the somewhat nebulous language that sponsors must make investments “with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent man acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with such aims” (Alabama 2012 Comprehensive Annual Financial Report). In more recent years, plan managers have taken on additional risks, investing in equities, real estate, derivatives, and other alternatives.¹ Political pressure also led many plans to invest in local or state businesses, leading to losses in multiple systems (Mactas, 1992).

As early as 1978, these strategies raised concerns. A Congressional survey of state and local plans found the following: “In the vast majority of public employee pension systems, plan participants, plan sponsors, and the general public are kept in the dark with regard to a realistic assessment of true pension costs. The high degree of pension cost blindness is due to the lack of actuarial valuations, the use of unrealistic actuarial assumptions, and the general absence of actuarial standards” (Congress, 1978).

Despite the federal government’s concerns, they opted not to regulate state and local pensions. The justification for this is two-fold. First, states have the ability to tailor plans to their local preferences and economies. Plans can respond to regional factors that might not affect the whole country. Second, public organizations cannot go out of business and can use their coercive powers to raise revenue. Private companies, in comparison, can go bankrupt, which while potentially making retirement come earlier, usually means their employees will have a great deal less money saved up for it. Regulation of private DB pensions thus plays a social welfare role in limiting employee risk that is ostensibly less necessary in the public sector.

Thus, pensions have grown more generous and invested in risk over time. Increasingly, they represent significant budgeting obligations that have become increasingly expensive, and ultimately will have to be paid for at some point.

1.2 Actuarial Politics

A great deal of literature has addressed the reasons behind why pensions vary. A key theme throughout is that it is cheaper to reward employees with pensions than with increases in salary. Governments must cover the costs of salary increases in the current fiscal period. In comparison, pensions are funded through contributions from employees and investment returns, rather than purely through tax dollars. Most plans utilize some form of accrual accounting, which allows managers to charge a percentage of the costs in each payroll period, spreading some of the burden to future generations of taxpayers.

Thus, pensions present politicians with time-inconsistency problems: governments can continually promise to pay for them in the future. Combined with complicated actuarial rules

¹These investments usually involve higher fees, although typically only when they pay off at or above expectations. Further, while these investments depend on market forces, they are not directly tied to the performance of stocks.

and payment automaticity, this helps elected politicians avoid blame for rising costs (Weaver, 1986). In so doing, pensions provide a mechanism to resolve the seemingly inconsistent public demand for more benefits and lower taxes (Converse, 1964). As Arnold (1992) points out, while citizens have little affinity for taxes, they love highly visible taxes even less. Hunter and Rankin (1988), Bartel and Lewin (1981), and Ichniowski (1980) all discuss the attractiveness to politicians of increasing future benefits for public employees rather than salaries.

Wagner (2001) highlights this tension more broadly for financial management, and argues that legislators only really wish to run programs in a fiscally sound manner when their prospects for future control remain in tact. Specifically, he finds that an actual future change in the controlling party of a state's lower house significantly reduces current savings. Johnson (1997) similarly argues that politicians have incentives to offer generous and underfunded pensions to employees, especially in communities where residents are likely to move away before benefits are paid. Hess and Squire (2010) make the same sort of argument for teacher pensions, which they maintain politicians use to encourage the delivery of large short-term commitments to employees, at the expense of responsible long-term fiscal management.

While there is no nationalized regulation of funds, the Governmental Accounting Standards Board (GASB) is a non-profit organization that establishes guidelines that states can elect to follow. These are meant to help encourage some consistency and stability in plan policies, mitigating pensions' inherent moral hazard problems. For example, GASB states that plans should report property taxes as revenue in the period in which they are levied. Doing so associates the costs of services with a specific revenue stream. GASB also requires that plans be able to at least finance the current period's budget obligations. They also stipulate that plans should produce balance sheets showing revenues, expenditures, and changes in balances. Comprehensive Annual Financial Reports (CAFR) typically disclose the actuarial methods and assumptions used in these liability calculations.² However, the agency has no enforcement power.³

Of particular concern is how to estimate the amount of liabilities, or accumulated costs, that plans have. A PEW report from 2007 declared that pensions present a looming crisis to government budgeting and planning, given that \$1.9 of \$2.35 trillion of liabilities across all states were funded, leaving about \$361 billion unfunded (Augustine et al., 2010).⁴ All plans estimate liabilities using a discount rate, which is an assumed investment return. States'

²The GASB says that people looking at reports should ask themselves the following questions: "Did the government's ability to use or provide services improve or deteriorate from previous year? Did the government cover its costs with the taxes it pulled in? Was part of that burden shifted to future taxpayers? How did the government finance its activities and meet its cash requirements? Can the government meet its future obligations? What are the government's spending priorities? Has the government gone through the proper legal and budgetary channels to fund its programs? What resources are available for future expenditures and to what extent are resources reserved or restricted for specified uses? Has the government provided its services in an efficient and effective manner?" (Government Accounting Standards Board, 2006).

³That said, the Securities and Exchange Commission (SEC) has sued Illinois and New Jersey plans so far for not making plan-holders aware of their risks. Thus, there is increasingly some willingness from the national government to intervene via litigation in especially poorly managed plans.

⁴The study excluded local government pensions and most public school teachers.

discount rates tend to be about twice as high as the actual returns.

Even the GASB defends the use of high discount rates in the public sector. According to employee Gerald Miller, reducing risk and enhancing assets by increasing employer contributions would require increasing taxes: “Many would agree with me that using risk-free rates of return to value public plans (which enjoy a long term horizon and capacity to prudently assume equity risks) will almost assuredly overburden today’s taxpayers” (Mitchell, 2009, pp 2-3). Once again, this logic relies on the fact that governments do not go out of business, and will be able to make good on their commitments at some point in the future. In other words, investments are bound to pay off at some point.

Numerous scholars have raised concerns that governments might select discount rates and other actuarial assumptions to understate liabilities. Eaton and Nofsinger (2004) find that when governments experience more fiscal constraints, they manipulate actuarial assumptions to lower their required contributions, adding to underfunding. Further, the authors find evidence that plans respond to political pressure with more optimistic accounting assumptions. Butt (2012) runs simulations on pension funds with stochastic economic and demographic factors, and finds that lower funding is associated with greater mismatches between the discount rate and actual investment return. Chaney et al. (2002) find a negative relationship between states’ balanced budget requirements and funding levels. In other words, in order to make balanced budget requirements, states simply reduce pension funding. The authors also argue that discount rates reflect the state’s fiscal condition and budget-balancing requirements. In comparison, Munnell and Sunden (2001) maintain that while some manipulation occurs, it is rare and typically addressed by the courts.

Manipulation aside, liabilities would be higher if plans used ‘risk-free’ investment assumptions based on actual returns, rather than their current discount rates. Moving to such assumptions would roughly double the overall size of liabilities. Novy-Marx and Rauh (2009) argue that the discount rate should not be based on expected returns, since the two are fundamentally distinct concepts. Novy-Marx and Rauh (2009, 2011) argue that states consistently underestimate liabilities, and recalculate liabilities under more stringent assumptions. Similarly, Peng (2004) warns that plans underestimate risk and over-burden future tax payers.

In this sense, it is important to recognize that plans have taken on more risk over time: while 23% of pension investments were classified were in equities in 1982, 48% were just ten years later. Further, riskier investment strategies are often combined with slightly increased employee contribution rates to improve funding (Munnell et al., 2011b). This creates an increasingly significant opportunity for public-plan sponsors to influence the economy, which may not necessarily be congruous with the goal of simply maximizing returns. Specifically, governments target funds to shape corporate behavior or investing in local business with fund money. *Shareholder activism* refers to when managers monitor companies and base their investment strategies on corporate behavior.

Activism has sometimes occurred for purely political reasons, such as when CALPers divested from tobacco in the early 2000s (Barber, 2009). This behavior is known as *social activism*. The concern is such behavior might be divorced from the goal of maximizing

performance. Romano (1993) and Wahal (1996) find activism offers few benefits. Choi and Fisch (2008) also find it does not do a great job of modifying corporate behavior. Alternatively, activism might not be a major problem if it only happens on the fringe, especially as a consequence of attentive management (Hess, 2005). Del Guercio and Hawkins (1999) and Schneider (2005) both find funds do change firm behavior, and usually for the purpose of value maximization.

However, more work needs to tie these separate strands together. Schneider and Damanpour (2002), Munnell et al. (2008a), Munnell et al. (2011b), and Coggburn and Kearney (2010) all address factors associated with pension funding. Similarly, given that employer contributions into funds are one of the primary factors affecting funding, some prior work has separated this out to examine it directly (Munnell et al., 2008b; Thom and Randazzo, 2015). Collectively, this work points to numerous and sometimes conflicting factors that could shape funding and employer contributions. For instance, Schneider and Damanpour (2002) find funding is worse when more board employees collect pensions, while Munnell et al. (2008a) find no such effect. The findings are dependent on the plans included, the years covered, and the methodology employed. In all cases, they rely on Ordinary Least Squares, and only some seriously consider alternate specifications.

Such work also could go further to examine how political forces shape funds. Factors like legislative ideology, divided government, board composition, and so on are only included in a few of these papers. This lack of attention is important both theoretically and empirically, in that there is an issue of Omitted Variables Bias. Further, many of the control variables in these papers are potentially post-treatment, and should be lagged. There also are more specific problems with the dependent variables, especially in prior work on employer contributions, which I consider in more detail in that paper. Thus, there is still more to know about the way that politics affect pensions' design and performance.

In other recent work on the politics of pensions, Anzia and Moe consider legislation shaping pension policies both before and after the 2008 recession. They find that while both parties took a similar approach to pensions prior to 2008, after the recession they have diverged, with Republican politicians being more willing to slash pension generosity. In a separate paper, Anzia and Moe (2015) find that public-employee unions successfully push for more generous compensation and salaries, and also contribute to poorer performing, or under-funded pensions, in several cities and state governments.⁵

Overall, there is considerable debate over the degree to which pensions represent a crisis for governance. Moderate reform might be sufficient to improve them to a more sustainable point. To be sure, much of the alarmism has been driven by politically motivated groups. Research has not shown that there actually is not a great deal of popular uproar for pension reform (Almedia et al., 2009). Further, at least to some extent, governments do not go out of business, and do retain the coercive power to raise taxes. Importantly, pensions might provide a mechanism for recruiting and retaining diligent employees, while also regularizing

⁵There is a great deal of literature on whether and how unions shape compensation size and government's fiscal health, which I review in the papers.

retirements for employees who are very difficult to fire, due to civil service protections. If pensions do in fact accomplish these goals, harsher reforms could diminish their institutional value.

1.3 What are Pensions' Effects?

Aside from examining why pensions vary, it is also worth considering what public value, if any, funds create. While pensions obviously are valuable to the employees who receive them, funds also could generate social value by contributing to the production of public goods. If so, pensions would be especially useful in the public sector, where pressure for low taxes restricts public salaries, and higher-skilled and educated employees can earn more in private industry. When viable exit options do not exist, pensions could incentivize recruitment, since employees will be less likely to enter lines of work where they have minimal exit options. In order to attract employees to jobs with delayed compensation, there needs to be a low probability of early termination, and a credible expectation that sticking around longer will pay off.

In theory, pensions should be most attractive to low-discounters who value long-term job security. Governments tend to prefer these employees, since civil service protections mean workers often remain in their jobs for long durations. Training costs are also high in the public sector, due to extensive or specialized required skills and security clearances, making it costly for governments to lose employees (Clark et al., 2003). Pensions should help prevent under-performers from ever entering government work: there should be more zealots than slackers (see Gailmard and Patty, 2007). If so, pensions could help state governments as they increasingly compete for talented workers (Ingraham et al., 2000).

Pensions also should incentivize remaining on the job, rather than exiting. A great deal of pension economics work has focused on the decision to retire (Lazear, 1982, 1983a,b; Lazear and Moore, 1988; Mitchell and Fields, 1984; Chan and Stevens, 2004). The public sector has experienced difficulty retaining talent over the years, since pressure for low taxes restricts salaries, and employees often face temptations to retire early and earn more in private industry. Indeed, a fair amount of research links low pay with turnover (Blau and Kahn, 1981; Powell et al., 1994; Leonard and Jacobson, 1990; Lewis, 1991; Park et al., 1994; Shaw et al., 1998; Utgoff, 1983).

Deferred income is also meant to prevent employees from working too long. In the private sector, some companies impose mandatory retirements to keep the workforce from growing too old (Lazear, 1979). Pensions present an alternate solution by levying an implicit tax on continued work. By remaining in their jobs, vested workers forego payments they could receive by doing nothing. Assuming employees place some positive value on leisure, a sufficiently large pension pushes the net value of working under the employee's reservation wage, or the minimum income required to induce work (Clark et al., 2003). Pensions thereby lower the cost of leisure, which is known as the income effect.

However, plans also ratchet up payouts as employees work longer, incentivizing lengthier employment. Economists call this a substitution effect, since employees substitute-in work for increasingly expensive leisure (Ippolito, 1987; Clark et al., 2003). Benefits cease increasing when workers reach the retirement age. Ideally, the tension between these two incentives helps stabilize retirement rates. However, it is possible either the income or substitution effect may dominate.

In summary, formal models lay out incentives that pensions should have on the workforce: deferred income should incentivize the recruitment of long-term minded employees who will remain in their jobs for a specified (and predictable) number of years, but also retire before they grow too old (Lazear, 1979, 1982, 1983a,b; Clark et al., 2003). Some empirical work has examined pensions and retirements. A few separate studies have used data from the United Kingdom to conclude pensions make employees work for more years, but also retire younger on average (Disney et al., 1994; Meghir and Whitehouse, 1997). In other words, the income effect dominates the substitution effect. Blake (2004) similarly finds a 1% raise in aggregate wealth is associated with a 0.5% reduction in workforce participation. There is, however, a significant gap in the literature when it comes to examining the empirical effects pensions have on human capital and the creation of public goods in the United States.

1.4 The Papers Ahead

My three papers examine the causes and consequences of pension variation. All utilize a dataset covering 103 state plans over 2001-2011.⁶ I briefly summarize each paper below.

1.4.1 Political Insulation and Performance: The Case of Public-Employee Pensions

A central question concerns whether bureaucratic insulation from political control enhances or undermines performance. I exploit variation in state-level public-employee pensions boards to address this concern. Pensions have grown quite costly in recent years, and vary in their performance or funding. I consider the following puzzle: how does the politicization of management boards contribute to the variation in funding in funding performance? After controlling for other political, plan, and economic variables, I find that funding improves as board members are insulated from politics. Elected officials can bolster performance by taking an arm's length approach to pensions.

⁶The data comes from the Public Plans Database at Boston College's Center for Retirement Research, the Census, the Bureau of Labor Statistics, and original information I retrieved from plans' Comprehensive Annual Financial Reports.

1.4.2 To Fund or Not to Fund: Committing to Pension Contributions

While the payment of pension benefits is mandatory, politicians' decisions to make their Annual Required Contributions (ARCs) into funds is optional. Given this decision speaks to the degree to which elected officials commit to public employees, I ask what factors are associated making these payments. I use both logistic regression and OLS approaches, and also control for state and year fixed effects. A key finding is that politicians more consistently make their payments into plans covering police and fire employees.

Additionally, officials appear to engage in moral hazard by making smaller contributions as pensions' other two revenue streams increase: investment returns and employee contributions. These findings highlight that politicians prefer not to devote money to pensions in the short term, despite the long-term fiscal benefits. They also show that police and fire employees are especially popular with politicians and voters, and enjoy a privileged status. Thus, politicians have inherent incentives not to commit to pensions, but appear to overcome them when it is politically expedient.

1.4.3 Public-Pension Credibility and the Retirement Decision

State-government pensions have experienced rising costs and declining performance in recent years. In theory, deferred income should stabilize retirement rates and encourage long careers. It is unknown if and how state pensions actually affect retirements. First, I demonstrate how declines in credibility could lead to increased exits. Then, I empirically assess how pensions and state politics affect retirement rates utilizing a new proxy variable collected from plan reports. Retirements seem influenced by the degree of generosity, though in mixed ways. Funding performance and the composition of the retirement board also shape retirements, suggesting that factors shaping pension performance and employees' perceived risk and representation also seem to influence their trust and decision-making. Governments should keep these consequences in mind as they pursue reform.

1.5 Conclusion

Overall, my dissertation provides new insight into why plans vary and how that matters for human capital. I pay special attention to the ways that politics influences these public funds. Broadly, I maintain that pensions are inherently worth studying because they have become one of prominent activities state governments are engaged in, and present one of the fundamental policy challenges facing governments in the 21st Century. Even though these commitments to employees often arise for politically convenient reasons, and are subject to manipulation and moral hazard, they are nonetheless promises. They will need to be paid for at some point, and if governments fail in this regard, there could be severe political and economic fallout.

Even as few citizens relish paying taxes, they demand and expect public goods, much as public employees have come to demand and expect their retirement packages (Hall and Soskice, 2001). Given that public-sector jobs often pay less than comparable private-sector work, particularly for work requiring more education or training, pensions play a might play important human capital roles. State governments will need to figure out ways to limit their moral hazard, and commit to both public employees *and* their pensions.

Chapter 2

Political Insulation and Performance: The Case of Public-Employee Pensions

Abstract

A central question in bureaucratic politics concerns whether insulation of bureaucratic agencies and committees from political control enhances or undermines performance. I exploit variation in state-level public-employee pensions boards to address this concern. Pensions have grown quite costly in recent years, and vary greatly in their performance or funding. They have been a ‘politically cheap’ way for governments to compensate employees while keeping visibility and taxes low. I address the following puzzle: how does the politicization of management boards contribute to the variation in funding in funding performance? After controlling for other political, plan, and economic variables, I find that funding improves as board members are insulated from politics. Elected officials can bolster performance by taking an arm’s length approach to pensions.

2.1 Introduction

In 2009, Prichard, Alabama’s public-employee pension was so under-funded that it stopped sending checks to its 150 retired workers, in defiance of state law, and in spite of the fact that these employees had contributed into their funds throughout their entire careers. Two years later, the employees still had not been paid, and 18 had passed away (Cooper and Walsh, 2011).

Aside from the direct effects on current recipients, poor-performing funds could undermine workers’ trust in their employers (see Hall and Soskice, 2001), hurting governments’ abilities to recruit and retain employees and constraining the production of public goods and services (see Lazear, 1979; Ippolito, 1997; Clark et al., 2003; Lee and Whitford, 2008). Even

more broadly, underfunded pensions can damage credit ratings, making it harder to borrow money or budget for public programs. How can democratically-elected governments commit to healthier funds to avoid these problems?

Pension funds are separate from states' general budgets. Deferred income payments typically incorporate factors like the worker's years of service, salary, and age.¹ Plan sponsors invest contributions from employees and employers, injecting plans with some risk.² Defined-benefit (DB) plans differ from their defined-contribution (DC) counterparts in terms of who bears that risk. Employers shoulder it in DB plans, which deliver predetermined payments to beneficiaries at fixed intervals (Hacker, 2002; Schneider and Damanpour, 2002). Poor returns might necessitate increasing liabilities or relying on the general budget to cover costs (Ungar, 2011). In comparison, employees bear the risk in DC plans, which link payments to investment performance.³ I focus here on DB plans, which cover the vast majority of public employees.⁴

Importantly, the national government applies a federalist logic of non-regulation to state and local pensions.⁵ Sponsors tailor plans to local conditions, facilitating variation in policies and performance. Further, legislative acts or constitutional statutes often prevent states from reducing or eliminating benefits, potentially adding to costs (see GAO, 2008). In California, for example, costs rose 2000% between 1999 and 2009. It is common for funds to have liabilities that are 100-350% as large as their states' annual general budget revenues. Despite this, state plans have made their payments to employees so far. Governments do not generally go out of business, and always retain the coercive power to raise taxes. Nevertheless, given the ramifications of poor performance, it is worth understanding why plans vary.

Funds are better-poised to make payments when their assets are roughly equivalent to their liabilities. Such pensions have enough money on hand to pay employees and meet old debts on schedule. The ratio of assets to liabilities, referred to as funding, is a key metric of performance. Overall, it has decreased in the last fifteen years, as seen in Figure 4.2. Plans also vary widely in performance: while the average ratio from 2001-2011 is about 83%, it is as low as 19.07% (the West Virginia Teachers plan in Fiscal Year 2003) and as high as 147.7% (the University of California's plan in FY 2001). For reference, the Government

¹Employees become eligible to receive pensions once they have worked long enough to reach the vesting point. Benefit size generally increases until the employee reaches a specified retirement age.

²The sponsor is the government in public-employee pensions.

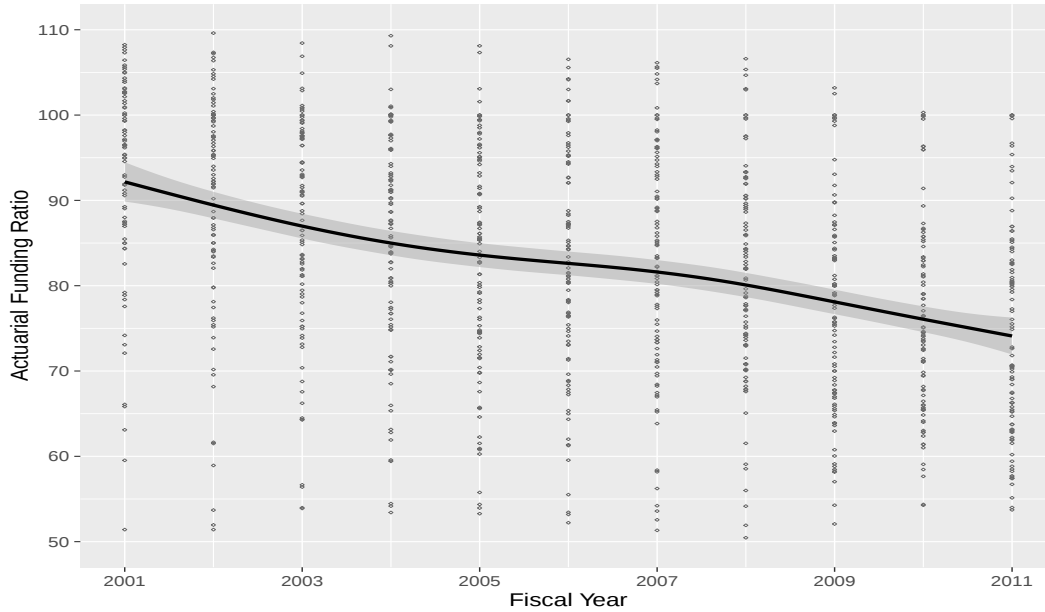
³A common example of a DC plan is a 401k.

⁴Just three states have DC systems. Only a handful more utilize hybrid approaches. Even in these, many employees are grandfathered in under DB plans. While many states offer supplementary DC plans, employees only use them at modest rates (GAO, 2008).

⁵The Government Accounting and Standard Board (GASB) is a non-profit organization that provides some loose guidelines for state and local plans, such as recommending the production of Comprehensive Annual Financial Reports (CAFRs) and being able to finance current budget obligations (Government Accounting Standards Board, 2006). However, the agency's recommendations are not enforceable. Plans vary in what they report in their CAFRs, and sometimes whether they even have them. In comparison, the national government tightly regulates private DB pensions under the 1974 Employee Retirement Income Security Act (ERISA).

Accountability Office (GAO) defines well-funded plans as having ratios above 80%. About two-fifths of the observations fall short of that mark.

Figure 2.1: Plan Funding (2001-2011)



This graph plots the observations by year. The smoothed time trend indicates that funding has decreased over time (Based on Data from Public Plans Database).

I exploit this variation to understand how governments shape performance. There is not an immediately obvious relationship between politics and performance.⁶ Prior work has shown that pensions have been popular with politicians in both parties. For example, as the governor of Wisconsin, Republican Scott Walker has been critical of public employees and rolled back collective bargaining rights. However, he accurately bragged to fellow partisans in 2012 that his state had the best-funded pension in the country (Umhoefer, 2013).⁷

In the ‘red’ state of Alaska, though, average funding over 2001-2011 was just 70.7%, which is especially low in light of the state’s small tax base. Funding there dropped sharply below the national average in 2002 and 2009, demonstrating particular sensitivity to both recessions. Blue states similarly run the gamut. California, which has the most public employees in the country, had an overall ratio of 96%. This happened even as the state’s

⁶The correlation coefficient between the Republican share of the state legislature and the funding ratio, for example, is quite low: 0.14.

⁷The average funding in Wisconsin in my data is 99.4%. Upon hearing Walker’s pronouncement, the audience responded only with scattered applause.

major fund, CalPERS, divested from tobacco in the early 2000s, likely costing hundreds of millions of dollars in foregone revenue.

In comparison, Illinois has some of the worst plans in the country, averaging 63.77% funding over 2001-2011. Despite early signs of trouble, the state never made any real efforts to curb underfunding. It also changed its constitution in 1969 to prohibit benefits from being “diminished or impaired” (Chieppo, 2014).⁸ Interestingly, performance often varies *within* states. For example, Illinois’ Municipal fund has as a mean ratio of 93.7%, while the state’s other three major plans average 54.6%. It appears something has worked in the Municipal fund, but not in the others.

Proper pension management requires making tough decisions to keep funds performing well in the long-term. This might involve contributing more money into funds, increasing contribution rates for new hires, or finding well-performing investments. Strategies to improve pension performance over the long haul may not do much to help politicians’ electoral interests in the short-term, however. The two may even be at odds: politicians are generally reluctant to raise taxes to pay for increased government contributions into funds, for example. In some cases, elected officials have even raided pension funds to finance other government activities. Given the tension between elected-officials’ short-term interests and the longer-term nature of pensions, it is easy to see how elected officials might choose to ignore or even exacerbate pensions’ problems.

Pension boards represent an institutional effort to mitigate this moral hazard temptation. Boards handle investment strategies and set employee and employer contribution rates. Although politicians cede power when they grant authority to boards, doing so still allows them to enjoy the traditional advantages of delegation. That is, politicians may gain politically by making credible commitments to pensions and employees. Politicians also can blame pensions’ problems on boards, and avoid or at least diffuse blame for pensions’ problems (see Weaver, 1986). Additionally, specialization is useful when it comes to pensions, which are intentionally complex and obscure costs through the use of numerous actuarial assumptions. Boards also provide management flexibility, and can tackle new issues as they arise. It is safe to say that pension management is likely beyond the skills of the average state legislator. Boards can cultivate the expertise and experience required to manage pensions over the long-term, and do so in a manner that is disconnected from voters’ preferences and electoral cycles.

I argue that boards are actually quite well-suited to handling the tasks of pension management, generally speaking. However, they are not all created equal. Boards vary in the degree to which they are truly insulated from politics. In some cases, boards primarily consist of politicians and their appointees. In other cases, they consist of bureaucratic employees. This variation can help explain the heterogeneity in plans’ performances. Specifically, I expect funds perform worse when board members are politicians or their appointees. This paper

⁸Like many states, Illinois has turned to riskier investment practices in recent years, which has been controversial. The Securities and Exchange Commission (SEC) recently sued both Illinois and New Jersey for misrepresenting risks to employees (Farmer, 2013).

supports prior arguments that pensions do better when boards are insulated from politics (Cayer, 1998; Hess, 2005). More broadly, it joins literature on the bureaucracy that argues that agency performance improves with insulation from political control (Hecklo, 1977; Ban and Ingraham, 1990; Gilmour and Lewis, 2006).

To assess this account, I examine how variation among boards shapes funding, assets, and liabilities.⁹ The data spans 103 plans in all 50 states from 2001-2011, a period of decreasing performance. I control for political, plan-policy and economic characteristics, and consider several models including state and year fixed-effects.¹⁰ The results provide support for my central hypothesis, and broadly speak to how governments can bolster performance in cases of split authority between elected officials and quasi-independent agencies or boards. Plans' problems do not appear due to gridlock or partisan politics, but rather to pensions' inherent features: they are large and tempting sources of money for politicians, and make it easy to pass costs into the future.

2.2 The Political Logic of Pensions

Given elected officials' deliberate choices to partially compensate employees with pensions rather than entirely through salaries, it is surprising how little political science research has addressed pension governance. In outlining plans' development in the United States, Clark et al. (2003) explain how the advent of Civil Service protections created a new personnel problem for governments: employees remained in their jobs too long, often working until death. Instead of opting for mandatory retirement rules, governments used pensions to encourage employees to leave, making room for new, younger recruits. Pensions appealed to the era's progressive politics: governments used them to help build a professionalized civil service while also improving public employees' welfare. Much of the economics literature on pensions focuses on these work-force incentives: deferred income should attract new long-term minded recruits, but also predictably structure employee retirements (see Lazear, 1979, 1982; Ippolito, 1987, 1997).

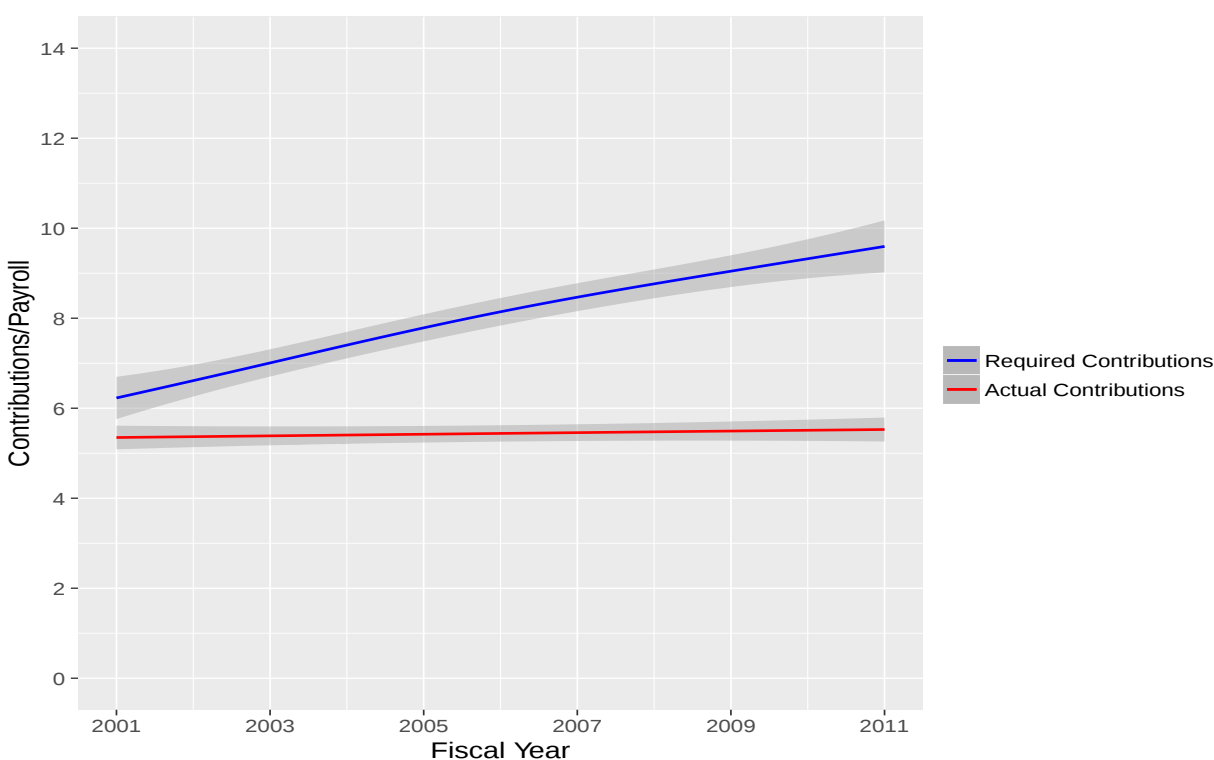
That work, however, does not address the ways in which policies feed back into politics, shaping employees' and politicians' expectations (see Pierson, 1993; Campbell, 2003; Hall and Soskice, 2001). Employees expect and plan their careers around pensions. Just as importantly, pensions allow politicians of both parties to compensate workers while keeping visibility and taxes low Anzia and Moe (forthcoming). While increasing salaries requires setting revenue aside in the current fiscal period, politicians alternatively can expand pensions and partially pass costs into the future (Hunter and Rankin, 1988; Bartel and Lewin, 1981). This keeps taxes lower, offering politicians a partial resolution to constituents' inconsistent demands for more public goods and fewer taxes (Converse, 1964).

⁹The unit of analysis is plan-year.

¹⁰In the Online Appendix, I also explore models without the plan controls, given they could be selected for political reasons, and therefore be post-treatment. Their exclusion does not change the core results.

Pensions present politicians with a moral hazard problem, though. Governments need to pay for them eventually, but can keep delaying costs into the future, adding to liabilities and hurting funding. Complicated actuarial rules and payment automaticity help keep visibility low and insulate politicians from blame (Moe, 1990; Arnold, 1992). When it comes to politicians' budgeting decisions, pensions are better thought of as semi-mandatory costs than mandatory ones (see Patashnik, 2001).

Figure 2.2: Required vs. Actual Employer Contributions as a % of Payroll (2001-2011)



The required contributions set by plan management-boards are consistently greater than the actual contributions made by state legislatures (Based on Data from Public Plans Database).

Specifically, while the payment of benefits is mandatory, the decision to meet obligations is discretionary. State legislatures often do not commit to their required payments. While contributions increased between 2001 and 2011, Figure 4.6 shows actual contributions consistently fell short of the required ones. In the past, politicians have taken ‘holidays’ from making contributions, or sometimes even raided funds, using them as ‘safety valves’ to fund other activities (Hess, 2005). For example, California’s legislature transferred pension funds to the general budget in 1997 and 1998. After litigation, however, the state’s Supreme Court ordered the return of the money to CalPERS (Munnell and Sunden, 2001).

2.2.1 Board Political Staffing Ratio

Boards provide the primary opportunity to mitigate against politicians' moral hazard incentives. Management boards set contribution rates, make investments, and handle day-to-day management. CalPERS board's responsibilities, for example, "include setting employer contribution rates, determining asset allocations, providing actuarial valuations, and more. The board DOES NOT have the ability to add, change, or delete benefits without concurrence from the state legislature" (CalPERS, 2015). Thus, boards likely play an important role in shaping performance.

Boards vary in the degree to which they are truly separate or autonomous institutions, though. Some states misrepresent this relationship. For example, the Montana Public Employee Retirement Association's website states that the governor appoints all members of the 'independent' board. While political science has not paid much attention to pension governance, literature on the bureaucracy has previously addressed how agency personnel politicization influences performance (see Snyder and Weingast, 2000).

I expect that funds do worse as boards increasingly consist of politicians or their appointees. Political appointees inevitably retain allegiances to the institutions placing them in their jobs (Moe, 1982; Wilson, 1989). In comparison, longer-term employees usually have specialized skills and can develop strong relationships with stakeholders (Heclo, 1975). Political employees also turn over more frequently, which can harm institutional knowledge (see Ban and Ingraham, 1990; Heclo, 1977). Gilmour and Lewis (2006) show federal programs run by career managers receive systematically higher management grades than those administered by political appointees. Similarly, Lewis (2007) finds lower performance scores among agencies with politically-appointed bureau chiefs.

In prior research on pensions, Cayer (1998) notes insulating boards from political control can help prevent raiding. Hess (2005) argues that non-politically appointed board-members are more motivated, accountable to plans' beneficiaries, and operate outside of political influence. Their presence prevents legislators from using funds as 'safety valves' to pay for other programs. Further, political board-members often have other job duties distracting them from ensuring strong performance. In Maryland, employee-elected members attended 90-100% of all meetings. In comparison, ex-officio members attended about 60% of the time.

Additionally, political influence might affect investment decisions. For example, Hess (2005) discusses how a general-employee fund in Maryland invested in a management company with strong ties to the governor, even though the firm continually under-performed. Alabama's CAFR goes so far as to explicitly state the plan does well when the state's economy performs well, presumably thanks to localized investments. Relatedly, funds can engage in social activism, targeting investments to influence corporate behavior, as happened when CalPERS divested from tobacco (Barber, 2009). The concern is such behavior might be divorced from the goal of maximizing performance.¹¹

¹¹Romano (1993) and Wahal (1996) find activism offers few benefits. Choi and Fisch (2008) find it does not do a great job of modifying corporate behavior. Alternatively, activism might not be a major problem if it only happens on the fringe, especially as a consequence of attentive management (Hess, 2005). Del Guercio

Perhaps even more importantly, politicized boards might lean more heavily on investment performance. Given the previously discussed difficulties in raising taxes to pay for employer contributions, and the challenges or lack of desire to increase employees' contributions, governments have become increasingly reliant on investment returns. In line with my expectation about boards and performance, more politicized boards might have higher discount rates. The Online Appendix considers this.

An alternative hypothesis is that politicization improves performance by giving elected officials greater ability to respond to pensions' problems. As argued in Moe (1985), additional political appointees could make bureaucratic organizations more responsive, encourage the flow of ideas, and keep boards in touch with interest groups and voters. Schneider and Damanpour (2002) and Hsin and Mitchell (1997) find having more employee representatives on pensions boards hurts funding, while Munnell et al. (2008a) find no significant overall effect for the variable.

A third alternative is that pensions do better with *some* political appointees. Krause et al. (2006) argue that mixed appointments improve agency budget forecasting. Such boards could represent efficient tradeoffs of agency authority with political responsiveness. I consider this in the Online Appendix.

Nevertheless, I maintain that insulation improves funding. Additionally, I suspect politicians exert greater control over funds with more assets and liabilities. Given the politically cheap cost of expanding pensions, elected officials may succumb to pensions' moral hazard temptations, and contribute to the gap between plan assets and liabilities.

2.3 Data and Variables

I estimate several models of funding and its component parts, while controlling for political, actuarial, and economic variables. I utilize panel data from 103 DB plans in all states between 2001 and 2011. Boards estimate the dependent variables, potentially introducing bias designed to improve funding (see Novy-Marx and Rauh, 2009, 2011). I control for key actuarial techniques that potentially inflate funding to limit this concern.¹²

Notably, funding's components are distinct from each other. The ratio's decline over time has been driven by liabilities growing at a faster rate than assets. Potentially, some of the independent variables might primarily exercise influence through one of the components. Likewise, some variables may not appear to influence funding, but push both components in the same direction. Further, assets and liabilities are unlikely independent of each other, given funding's salience, and the fact that the same individuals estimate both. Regression models of each are prone to unobserved and correlated errors, motivating the use of seemingly-unrelated regressions, as discussed in the next section.

and Hawkins (1999) find funds do change firm behavior, and usually for the purpose of value maximization.

¹²Any bias is surely in the positive direction. Were the error more systematic, and in both directions, then causal inference would be quite difficult. Further, this problem is unlikely to exist in all states, especially given the attention to pensions, and the SEC's willingness to engage in legal action.

As for the board variable, members are bureaucrats or their elected representatives, politicians or their appointed agents, or ex-officio members, who are usually career politicians. I combine the latter two, since both reflect politicized control. Roughly 66.6% of members are politicized, though there is a sizable standard-deviation of 31.5%.¹³ Looking at the mean of this variable for all observations across each fiscal year, it appears at first that there is not a great deal of variation in board composition.

A closer examination, however, uncovers a fair amount of variation, both between boards and over time. First, there are numerous instances of variation between different plans within the same state. Specifically, 17 states feature multiple plans with distinct allocations of political seats on boards. Additionally, a substantial minority of plans (24 out of 103) experience board variation at one or more points between 2001 and 2011. Variation within boards over time either originates from deliberate statutory changes to plans, or alternatively simply due to failures by politicians or public employees to replace members who step down. My models exploit this variation to provide insight into how boards shape funding performance.

2.3.1 Political Controls

I now turn toward additional political factors that could influence funds. With the possible exception of unionization, none of these affect private pensions.¹⁴ Legislative conditions might shape pension design and performance, since politicians can pass laws affecting pensions. Three useful variables are divided government, polarization, and partisan composition of the legislature. For my purposes, I take these as exogenous, and do not attempt to do justice to their varying causes.

Some authors maintain that divided government obscures accountability and slows policy-making by diminishing politicians' abilities to build minimum-winning coalitions (Sundquist, 1992; Fiorina, 1992). Mayhew (1991), however, conducted a study of major national legislation, and found no difference in the amount of significant bills passed under divided and unified government. Potentially, divided legislatures might be less able to pass reforms, exacerbating underfunding.

Polarization is quite distinct from divided government, and typically defined as both increased ideological distance between the parties and ideological homogeneity within each party. High polarization implies there is little room for cross-partisan consensus, potentially facilitating gridlock. I use data from Shor and McCarty (2011), measured in terms of ideological distance between the median Republican and Democrat in the lower legislative chamber.¹⁵ Some work also argues that gridlock is actually due to the combined effects of polarization and divided government (Jones, 2001; Binder, 2003). As such, I include a dummy for the interaction between the two. One empirically testable hypothesis is that funds might perform worse in the case of gridlock.

¹³This is congruous with Hsin and Mitchell (1997), who point out appointed and ex-officio members make up about 60-70% of boards.

¹⁴Low labor participation in the private sector renders this point mostly moot, anyway.

¹⁵Estimating the models using upper-chamber polarization does not change the results.

Separately, party elites might pursue different strategies with regard to pension legislation and management. I include a variable for the percentage of the lower chamber held by Republicans.¹⁶ Given the earlier examples of varied performance in both red and blue states, I do not anticipate this variable will be significant.

Unions present a separate potential source of political influence on pensions. I control for the percent of unionized state-government employees.¹⁷ Downs (1967) and Niskanen (1968) argue organizations need resources to survive, incentivizing workers to organize to expand compensation. Unions seem like an especially salient culprit behind rising costs, particularly as battles to curb collective bargaining rights play out in states like Wisconsin and Ohio. Government employees are more likely to belong to unions than their private-sector counterparts: membership grew from about 10% of employees in the 1950s to about 38% in 2011 (Munnell et al., 2011a). In the private sector, however, membership shrunk from about 35% in the 1950s to just 7% in 2010.¹⁸ In my data, just under 40% of public employees are unionized.¹⁹

Evidence is mixed as to whether unions actually expand benefits and salaries for employees, though. Freeman and Valletta (1988) find employees in states with strong collective bargaining laws had higher wages than their counterparts in other states. Kearney and Morgan (1980a,b) recover significant wage gaps across various types of public employees.²⁰ Lewis (1986) and Jarrell and Stanley (1990) survey 75 studies, and recover a wage gap of about 8 to 12%, with substantial gaps in fringe benefits.

Taking a regression-discontinuity approach, however, DiNardo and Lee (2004) recover a null effect of collective bargaining on wage differentials and several other private-sector employer outcomes.²¹ Lovenheim (2009) find a similar null result for teacher pay, but show union presence leads to more employment. Munnell et al. (2011a) do not find a significant relationship between unions and pension growth, but do find a correlation between membership and slightly higher wages. In contrast, Anzia and Moe (2015) find unions increase the number of state and city employees, as well as the size of salaries, health benefits, and pensions. It is an open empirical question whether public unions affect pension performance. On the one hand, they might increase liabilities by demanding more benefits. On the other

¹⁶The data does not include Nebraska, which has a unicameral legislature. This variable also avoids the multicollinearity problem of including both divided government and united Republican control in the same model.

¹⁷The data comes from the Union Membership and Coverage Database (Hirsch and Macpherson, 2003). Unfortunately, this includes all state employees, and does not segment by occupation. I cannot isolate the effects of different types of union organizations. For example, in Wisconsin, police and fire pensions are more secure than other funds, likely due to the differences in union strength (Cooper and Walsh, 2011).

¹⁸Unions often translate into increased benefits for employees and higher prices, so competition tends to push against their influence. Since private companies frequently go in and out of business, and new ones typically open as closed shops, it follows unions' influence will continue to diminish in that sector.

¹⁹A standard deviation of 17.7% suggests a great deal of variance.

²⁰They find that firefighters receive greater compensation and work fewer hours when unionized. Their results for police are mixed, though.

²¹They compare cases where where a single vote determined union election-outcomes.

hand, they also could push for policies generating greater assets, such as sound investment strategies or higher taxes.

As a final political control, I examine whether plans complement deferred income with Social Security (SS). Previous work has shown public employees who do not participate tend to receive larger pensions (Almedia et al., 2009). At the time of their formation, state and local plans excluded workers from the program. Various court decisions and congressional reforms since then have extended coverage, though. Still, as of 2011, about 6.4 million employees were not eligible to receive SS (Clark et al., 2009). In my data, about 76% of the observations offer SS.

2.3.2 Pension Plan and Economic Controls

A central concern in estimating funding is that it results from a number of actuarial assumptions. Given the moral hazard temptations pensions present, it is possible governments choose assumptions to exaggerate plan health and delay costs. Peng (2004) warns that plans underestimate risk and over-burden future tax payers. Similarly, Novy-Marx and Rauh (2009, 2011) argue that states consistently underestimate liabilities.²² However, Munnell and Sunden (2001) maintain that while political manipulation sometimes occurs, it is rare and typically addressed by the courts. Either way, any empirical analysis must account for these actuarial choices. I control for several central assumptions, including the discount rate, whether or not the plan uses market valuation, and more.

First, the discount rate refers to the expected investment return, and is used in calculating liabilities.²³ Smaller discount rates reflect more liabilities, lowering funding. The discount rates in the data range between 4.5% and 9%, with a mean just below 8%. Given the actual return rate of 4.2%, most plans fall well below expectations.²⁴ This has generated some controversy, particularly as private-sector plans tend to use lower rates (Bogle, 2012; Disalvo, 2013).

In calculating discount rates, plans utilize either Market Valuation of Liabilities (MVL) or Actuarial Accrued Liability (AAL). MVL equates the discount rate with the current market rate of a group of high-quality fixed income investments, making it more responsive to economic fluctuations.²⁵ In comparison, AAL's longer smoothing periods spread costs into the future.²⁶ I include a dummy for the usage of MVL. Most public plans use AAL, and

²²Novy-Marx and Rauh (2011) recalculate liabilities under more stringent assumptions.

²³Novy-Marx and Rauh (2009) argue that it should not be based on expected returns, since the two are fundamentally distinct concepts. Namely, while it is sensible to use returns to estimate assets, there is no reason to do so to estimate liabilities.

²⁴See "Contribution Rates and Investment Returns" in the Online Appendix for an extended discussion. Also see 2.7.7 "Factors Associated with Higher Discount Rates" for a brief analysis of the factors associated with higher discount rates.

²⁵See Section "Additional Background on Pension Actuarial Techniques" in the Online Appendix for a more thorough discussion.

²⁶The Financial Accounting Standards Board requires MVL in the private sector.

would decline in funding if they switched (Gold and Latter, 2009; Novy-Marx and Rauh, 2009).²⁷

I also control for investment returns, which plans rely on to cover costs. If positive returns do a great deal to improve funding after controlling for other factors, then this strategy would appear sound. If they have a null effect, though, the shift to investments is not likely to do a great deal to improve funding overall. Additionally, I control for three major investment-types: equities, real estate, and alternatives. If the chosen investment strategy turns out not to matter much for funding, though, there is little reason to expect a certain kind of risk will pay off.

Actuarial plan type is an additional control used in liability estimation. My data contain four of six possible methods. I include dummy variables for Entry Age Normal (EAN) or Projected Unit Credit (PUC) plans, since most plans use those two methods. Generally, the PUC method estimates more liabilities, so I expect the EAN variable will be associated with improved funding.²⁸

Next, the employer contribution rate is a broad measure of generosity. Employees also contribute to funds, which they see as deductions from their gross pay. I examine both as percentages of real employee-payroll, in order to consider these relative to normal compensation.²⁹ Employer contributions have increased over time as plans have tried to cover rising liabilities. One might expect higher contributions to improve funding. However, the proportion of assets generated by contributions is small. Plans requiring larger contributions might be more generous or trying to make up for earlier poor performance.

Additional controls include plan age and occupation. Older systems might accrue more liabilities or assets over time. I also control for public-safety and teacher plans, which might differ due to factors like union strength, personnel needs, or partisan preferences. Finally, I account for states' economic characteristics by controlling for the ratio of debt to Gross State Product (GSP).³⁰

2.4 Empirical Analysis

My empirical approach is similar to Krause et al. (2006), who employ a number of models to examine variation in their dependent variable across states, including fixed effects.³¹ Doing so improves on prior work relying on Ordinary Least Squares (OLS), or examining just a couple years of data or case studies (see Schneider and Damanpour, 2002; Clark et al., 2003;

²⁷Gold and Latter (2009) report funding for four public plans using both AAL and MVL. Under MVL, plans were between 50 and 80% funded, while with AAL, funding ranged from 66 to 106%.

²⁸See "Additional Background on Pension Actuarial Techniques" in the Online Appendix for a more thorough explanation.

²⁹On average, employees contribute about half as much as employers.

³⁰It is lagged by a year to avoid controlling for a potentially post-treatment covariate.

³¹In particular, they analyze how combinations of political and civil service appointments affect bureaucratic competence, defined in terms of fiscal projection accuracy.

Hess, 2005; Munnell et al., 2008a). Additionally, little work has concurrently examined variation in assets and liabilities.

States differ in important and unobserved ways. There might be unobserved factors that matter over time, such as poor management. In the following, c_i represent these non-random unobserved characteristics, i is the given plan, t is the year, β_1 is the vector of point estimates of the main independent variable, $\beta_3 - \beta_5$ are vectors of the point estimates of the political, pension, and economic control variables, and ϵ_{it} is the random part of the error:

$$Y_{it} = \beta_0 + \beta_1 Board_{it} + \beta_2 Politics_{it} + \beta_3 Pensions_{it} + \beta_4 Economics_{it} + c_i + \epsilon_{it} \quad (2.1)$$

Examining funding with OLS assumes the c_i are uncorrelated with the explanatory variables. If that is not the case, OLS generates biased standard errors. That said, I report OLS results for comparison's sake, and adjust for some of the potential endogeneity by using Eicker-Huber-White 'robust' standard-errors. Further, I cluster standard errors at the state level to account for the fact that plans are not independent of each other within states. State legislatures often simultaneously determine pension policies for several of their plans, making it essential to cluster the standard errors at that level.

Fixed effects allows for modeling the correlation between the unobserved characteristics and the observed covariates.³² The method assumes the ϵ_{it} are independent of the observables after conditioning on the individual effects. Implementing this requires estimating an additional set of dummy variables, R'_i , to account for states or years, depending on the model:

$$Y_{it} = \beta_0 + \beta_1 Board_{it} + \beta_2 Politics_{it} + \beta_3 Pensions_{it} + \beta_4 Economics_{it} + R'_i c + \epsilon_{it} \quad (2.2)$$

Thus, I include an OLS model with robust clustered standard-errors, and models controlling for year, state, and state and year fixed effects, as is standard in much empirical work.³³ Further, in the Online Appendix, I present a model that leaves out the pension controls, and another that lags them by a year, since it is possible that the political variables influence the selection of the actuarial techniques, making the latter post-treatment.

In order to estimate liabilities and assets, I utilize seemingly-unrelated regression (SUR). I use logged measures of both.³⁴ Sponsors always have funding in mind, particularly when they choose actuarial policies that influence the processes for estimating each of its components. While modeling assets and liabilities separately would provide consistent estimates of the multivariate relationships, doing so likely would be inefficient, due to the correlated errors across the two equations. Instead, SUR is a feasible Generalized Least Squares method of modeling the correlation while estimating the two dependent variables (Zellner, 1962). The

³²In comparison, a random effects model, or Generalized Least Squares (GLS), assumes that these two are independent, or as good as randomly assigned. I do not have reason to believe this is the case, given the number of possible governmental features associated with more robust pensions.

³³The last model should not be confused with controlling for state-year fixed effects, which would only examine variation within a particular state in a given year.

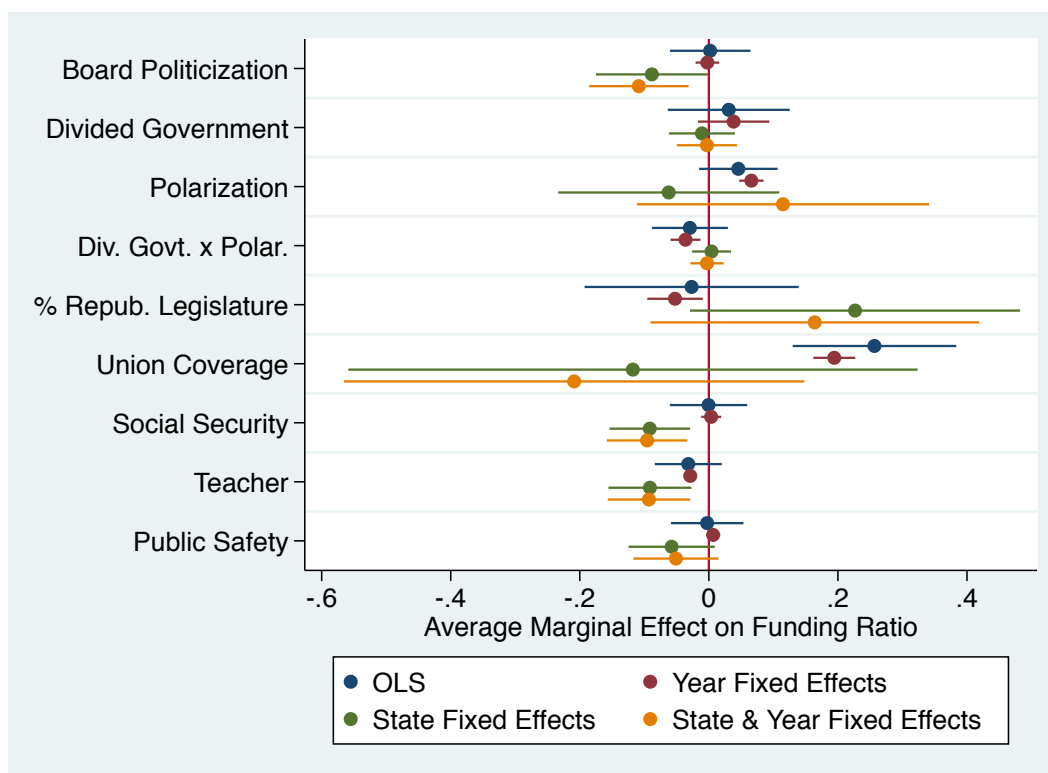
³⁴Doing so makes the distributions more normal and downweights outliers. Additionally, I estimate models both with and without lagged assets and liabilities. In all cases, the results are quite similar to the ones reported here.

model consists of two linear regression equations, which SUR solves as a system.³⁵ The results are distinct from the OLS estimations, which I do not report here, suggesting some correlated error indeed exists across the equations.

2.5 Results and Discussion

The results confirm my hypothesis that board insulation is associated with improved funding.

Figure 2.3: Political Variables Associated With Improved Plan Funding



This is the coefficients and 95% confidence intervals of regressing plans' funding ratios on all of the independent variables.

In the state and year fixed-effects model, funding decreases by about 10.8% when the entire board is politicized. Holding all else constant, replacing a non-political member with

³⁵Calculating the SUR estimator is straightforward. First, I estimate both equations using OLS and use the residuals to generate a covariance matrix. Second, that matrix is used to construct a second-stage GLS estimator. Additionally, the error terms are assumed to have zero mean, be independent across individuals and homoskedastic.

a political one on a ten-person board is associated with about 1% decrease in funding.³⁶ Further, there is little evidence that boards with both political and non-political members have better funding, as presented in the Online Appendix. The board variable is not significant, however, in the OLS and year fixed-effects models. This suggests that differences in politicization within a state, as well as increased in board politicization within a given plan, drive decreases in funding.

This raises the question, though, of why such a relationship might exist. Boards control many aspects of pensions. A straightforward explanation is that more politicized boards do a worse job managing the ratio of assets to liabilities. Politicized members likely have shorter time-frames in mind, due to electoral pressures. They may lack financial acumen, feel pressure to invest or divest for political reasons, or be vulnerable to moral hazard. An alternative explanation, however, is that elected officials rein in poor performance with politicization. If the latter is true, rather than the former, then it is not clear how and if board composition drives pension performance.

In order to assess these two potentially competing claims, I first consider an alternate specification of funding, by regressing it in year t on the independent variables at time $t - 1$. As seen in the results in Figure 2.4, board politicization has a negative and significant (at the 1 percent level) relationship with funding in the model with both state and year fixed effects. This provides additional evidence that board politicization shapes future funding. Interestingly, unlike in the non-lagged model, there is also evidence that more unionization is associated with poorer funding in the state and year fixed effects model.³⁷ Teachers and public safety plans also seem to do worse, which could provide further evidence of unions' influence.

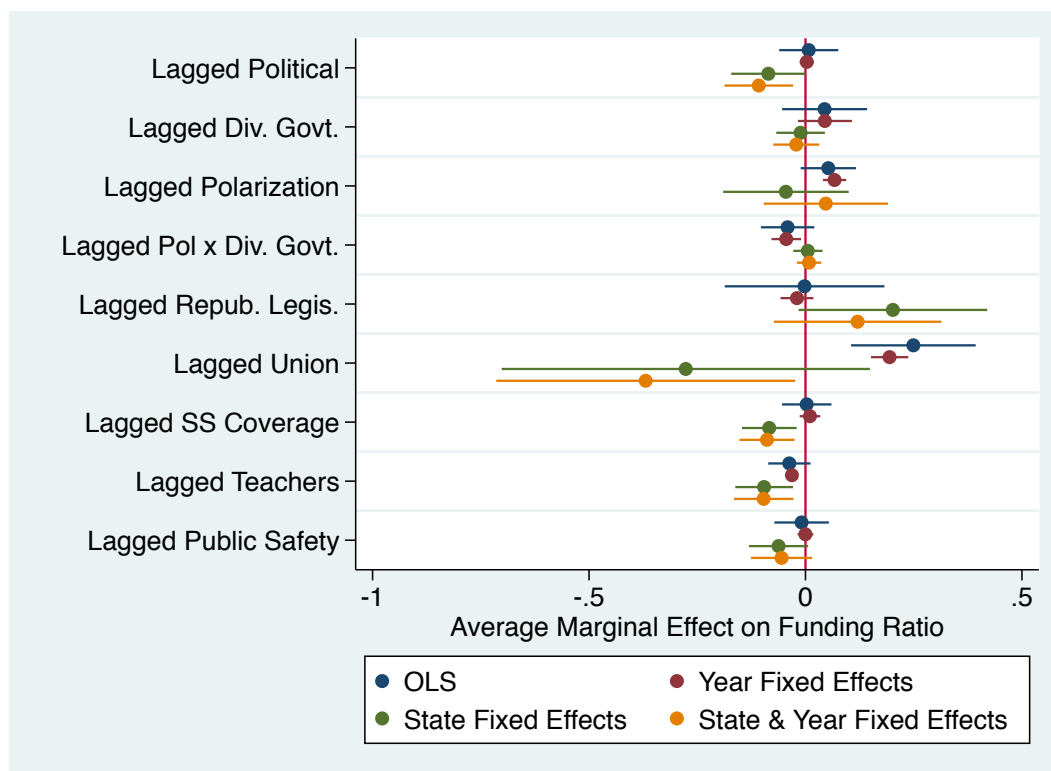
Second, I explore whether funding feeds back into board politicization. If politicians 'rein in' poor performance, funding at time $t - 1$ should have a *negative* relationship with politicization at time t . Alternatively, a *positive* relationship between prior funding and board politicization would indicate that politicians distance themselves from poor-performing funds in later years, while exerting additional control over better performers. Table 2.5 presents the results of regressing board politicization on one-year lagged versions of funding and all of the independent variables, excluding board composition.

The relationship between boards and lower funding just misses significance at the 10% level. Taken together, these results suggest that boards shape funding performance, rather than the other way around. These results also suggest that unionization appears to feed into more bureaucratic representation on plan boards in the following year. It makes a great deal of sense that unions would push for greater representation of bureaucrats, rather than politicians, on pension plan boards.

³⁶Given the post-treatment concern, this is likely a conservative estimate. In the state and year fixed effects models without actuarial controls, politicization decreases funding by nearly 24 percent. In that case, switching a member on a 10 person board would be associated with about a 2.4% drop in funding.

³⁷However, in an alternate specification where all the independent variables are lagged and the actuarial variables are excluded, considered in the Online Appendix, unionization is no longer significant.

Figure 2.4: Prior Year Variables Associated with Better Funding in the Current Year



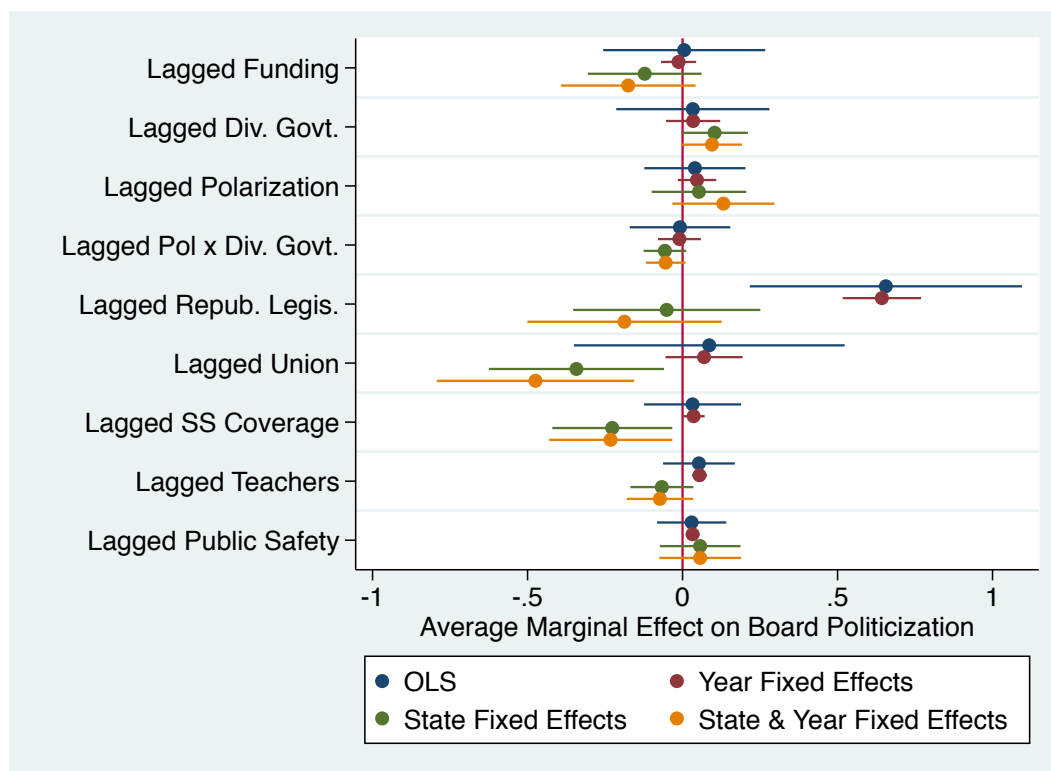
The above examines if board composition and the other controls influence pension performance in the following year. It shows the coefficients and 95% confidence intervals of regressing funding on the lagged independent variables.

I then examine the degree to which boards shape funding's two components: assets and liabilities in Figures 2.6 and 2.7. Interestingly, politicized boards do not have significant relationships with the amount of assets or liabilities. This indicates that politicization is not especially contingent on the size of the pension fund's assets or liabilities.

In comparison, divided government, polarization, and partisan composition of the legislature all have null relationships with funding and both of its components. This could be due to the more direct influence of boards, as well as the fact that pensions have historically been popular with both parties Anzia and Moe (forthcoming). It may very well be the case many pension practices are quite durable once in place. Reform is difficult, particularly when individual legislators can somewhat credibly claim plans' problems are someone else's fault.

Republican control of the legislature also does not appear to have a clear relationship with funding, which is also consistent with Anzia and Moe (forthcoming). Given that pensions

Figure 2.5: Variables Associated with More Board Politicization in the Current Year

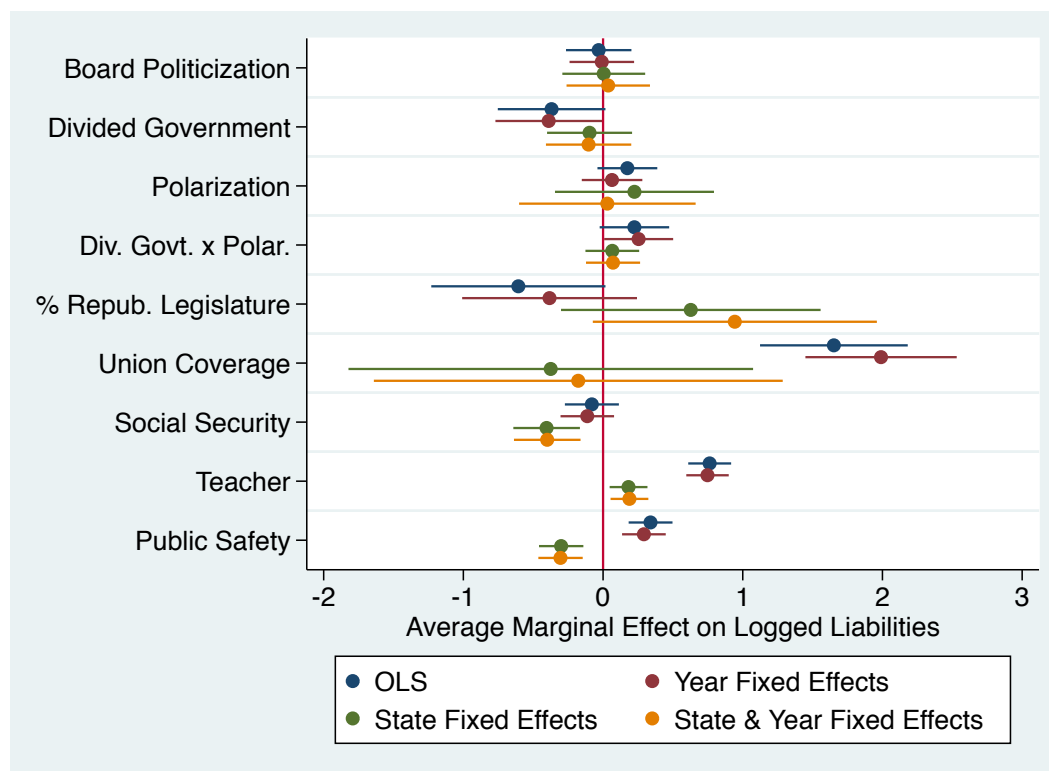


The above examines if there is a feedback effect from performance into board composition. It shows the coefficients and 95% confidence intervals of regressing the board political variable on the funding ratio and the other independent variables from the prior year.

have been historically popular with both parties, there is little reason to expect performance to vary by partisanship, once conditioning on the appropriate factors. However, it does appear associated with plans with more assets, showcasing that pensions might actually be slightly larger in more Republican states. It also is associated with more board politicization in the OLS and year fixed-effects models, but not the state fixed-effects ones. This suggests that more conservative states tend to have more politicized boards, but as the legislature becomes more conservative within the same state, there is no evidence that they change the politicized portion of the board.

Union coverage also has mixed effects in these models. Lagged unionization is associated with both worse funding and less politicized boards. Unionization in the current year does not appear significantly related to funding, however. It also does not significantly shape the size of assets or liabilities. While unions might push for expanded benefits, they also

Figure 2.6: Political Variables Associated With More Logged Liabilities



This is the coefficients and 95% confidence intervals of regressing the logged amount of plan liabilities on all of the independent variables.

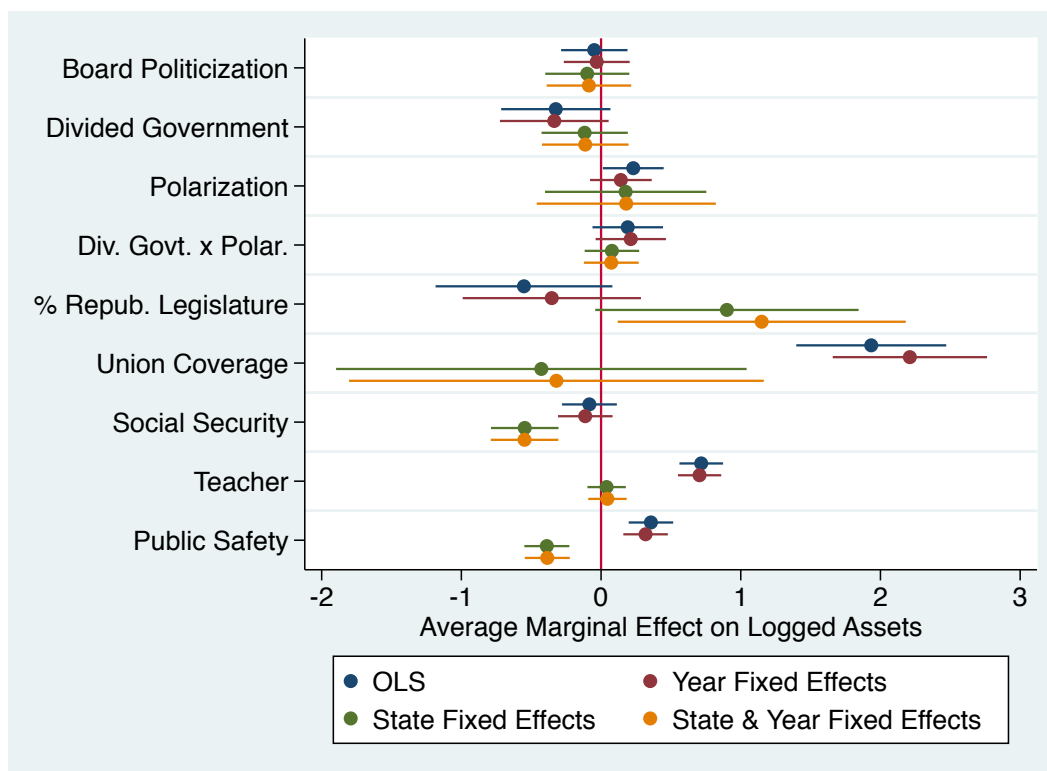
probably prefer that pensions perform well. While unions do shape many aspects of pensions through collective bargaining, it is difficult to know their overall effects with this data.

In terms of covered occupations, there is a fair amount of evidence that plans covering teachers have worse funding in both the current year and lagged models. The evidence for public-safety plans is mixed, in comparison. There is some evidence that teacher boards are more politicized, but only in the year fixed-effects model. However, teacher plans appear to have more liabilities than assets. Public safety plans, in comparison, tend to have less of both in the state fixed-effects models.³⁸

The actuarial variables play mixed roles for funding. The discount rate is negatively associated with funding, suggesting plans with higher discount rates actually have worse funding ratios, once controlling for other factors. The use of MVL, which influences discount-rate selection, is not associated with better or worse funding. Similarly, EAN, which is the

³⁸The fact that the direction of the relationship changes underlines the importance of including state fixed-effects.

Figure 2.7: Political Variables Associated With More Logged Assets



This is the coefficients and 95% confidence intervals of regressing the logged amount of plan assets on all of the independent variables.

most popular technique in the public sector, is associated with an increase in funding. The PUC one has a null effect on funding, though.

Interestingly, actual investment returns do not significantly affect funding. The various investment types also are not significant. Relying on any one type will pay off sometimes, but fail other times. Plans therefore would do well to select relatively safe investments with minimal side fees.

Employer contributions have negative and significant associations with funding. Employee contributions have no effect, though. While some might find this surprising, sponsors can raise contributions to make up for shortfalls. System age has a small but significant negative relationship with the funding ratio. Older plans also tend to have more assets and liabilities, but slightly more of the latter than the former, contributing to the decline in funding. Thus, pensions seem to decline in funding performance over time, even after controlling for other factors. worse funded.

Overall, these results provide insight into how the politicization of pension administration

shapes performance. While my inferences rely on observational data, and are unlikely to be as good as those made under random assignment, I maintain that my various models expand on earlier literature in important ways, and provide new insight into how governments shape pension performance in a robust manner.

2.6 Conclusion

Public-employee pensions are political creations, and have been historically popular with both parties and employees. They originated as less visible and *indirect* mechanisms for recruiting and motivating employees, while also regularizing retirements (Clark et al., 2003). Additionally, they are a relatively cheap means by which politicians can deliver services to taxpayers. Given state pensions have been in operation since the turn of the twentieth century, they represent incredibly durable institutional victories.

The United States government takes a federalist approach to regulating state pensions, facilitating variation in policies and performance. Plans are less well-poised to make payments to employees now and in the future when their funding levels are low. Poor funding often bleeds over into states' general deficits, harms credit ratings, constrains the ability to borrow money or fund other programs, and potentially discourages employee recruitment and retention. Several state governments, such as Illinois, have received downgraded ratings in recent years. Employees could lose faith they will receive their full pensions. I ask how state governments can avoid underfunding pensions.

While elected officials can coerce funding through increased taxes, they generally lack the will to do so. At the local level, underfunded pensions have contributed to several governments' failures to make their payments to employees on time. While this has not yet happened at the state level, it could in the future. Simply making payments to retirees on time also will not protect credit ratings. Even the national government was downgraded from AAA to AA by Standard and Poor's after nearly defaulting on its loans twice, due to difficulties raising the debt ceiling (Standard and Poor's, 2011).

I ask how management board insulation via staffing shapes variation in pension performance. Boards set contribution rates and manage investments. Centrally, I find that insulation also improves funding, supporting literature arguing that the politicization of administration tends to hurt performance (Gilmour and Lewis, 2006; Lewis, 2007; Hecl, 1975; Ban and Ingraham, 1990). These results highlight the inherent tension between politicians' reelection incentives and the long-term goal of sustaining pensions.

As liabilities have grown, governments have considered various reforms. There is likely no simple solution. Raising employee contributions, for example, might hurt workers' perceptions of credibility, undermine pensions' personnel incentives, and do little to bolster funding. Simply making more or new kinds of investments also might not generate enough revenue. Further, one popular idea of switching to DC pensions actually cuts off new employees from paying into DB plans, exacerbating underfunding (see Hiltzik, 2015). Some plans, though, have changed very little. While there is debate over the extent to which pensions are in

trouble, it seems likely costs will grow. Plans need to walk a fine line between refusing to adjust and going overboard, instituting severe cuts. Politicians can commit to pensions and employees by granting more authority to independent and qualified management boards. Alternatively, more national regulation of state and local funds likely would help improve pensions by limiting moral hazard opportunities.

Anzia and Moe (forthcoming) present a nice complement to my research, focusing on how partisan politics have led to variation in pension legislation. They find no major partisan differences before the 2008 economic crisis. I also find no partisan effect. However, they maintain the 2008 crisis helped politicize the issue, leading to some sorting in which Republicans made more cuts than Democrats. In comparison, analysts at Morningstar and Moody's recently have argued there is no clear red-blue pattern addressing pension problems (Balz, 2013). The issue is far from settled, but it certainly seems possible parties could polarize over pensions in the future.

Future work might examine how pensions shape bureaucratic behavior. Namely, how does their variation affect employees' decisions to join and remain in public employment? Do cuts in generosity encourage employees to leave? Such work also could analyze pensions through surveys of current and potential bureaucrats. More qualitative analysis of the relevant legislation also could allow for a more nuanced sense of how boards and other state political factors matter for pensions.

The situation is not necessarily dire. States have more than enough assets to make payments to employees well into the future. Further, state pensions are in better shape than many private or local funds. Looking at the results, these state funds actually seem quite robust to politics. However, states ultimately need to deal with rising costs at some point. Piling liabilities constrain future budgetary options, damage credit ratings and shape politics and the provision of public goods in numerous unforeseen ways. Until plans can become more financially stable, they will continue to remain salient. Governments should consider taking a hands-off approach to management, and staff boards with competent trustees.

2.7 Appendix

2.7.1 Information About the Variables

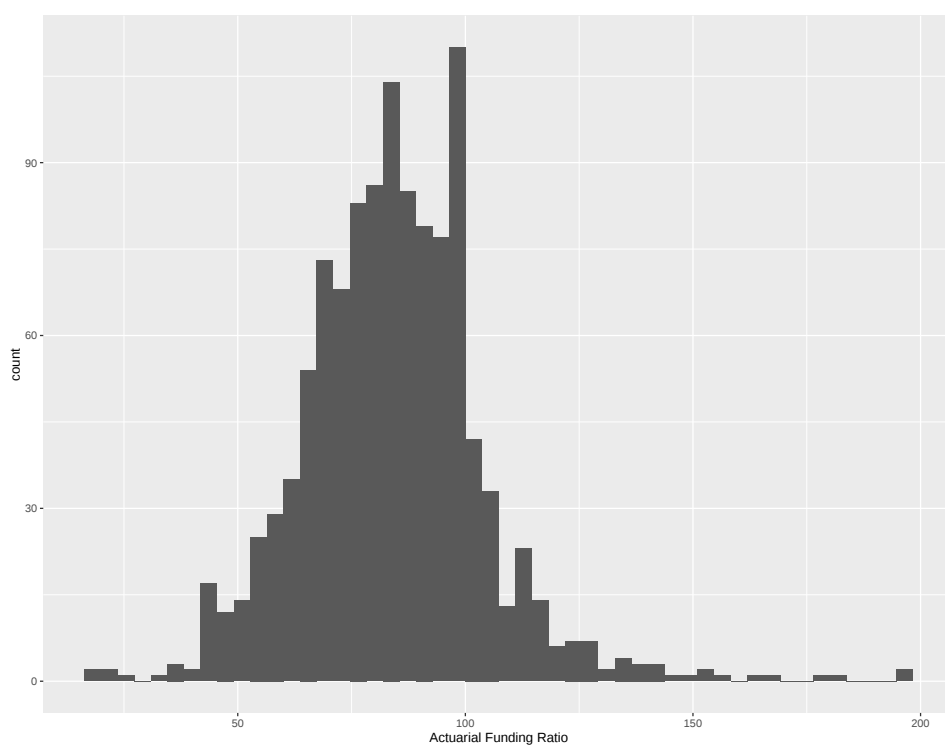
The descriptive statistics for all relevant variables are presented in Table 4.1. The main dependent variables are the funding ratio and its two component parts: assets and liabilities. Both assets and liabilities are estimated values. The former are based on the current market value of holdings and investments plus a portion of the prior years' unrealized gains and losses. Liabilities, sometimes more formally referred to as a plan's Actuarial Accrued Liability, is an estimation of the present value of future benefits that must be paid out to employees.

Figure 2.8 shows that the average plan between 2001 and 2011 had a funding ratio of about 84%, but with a great deal of variance. The decline in funding has been driven by funds' liabilities outpacing assets, as seen in Figure 2.9. States increasingly have fallen under the traditional 80% funding benchmark, as seen in Figures 2.10–2.12. Figures 2.13 and 2.14 show the distributions of both assets and liabilities, which are right-skewed. Aside from their large size, the distributions' shapes motivate the decision to use logged measures. Doing so imposes a more normal distribution, which better comports with traditional regression assumptions. Additionally, logging downplays especially large outliers.

Table 2.1: Descriptive Statistics

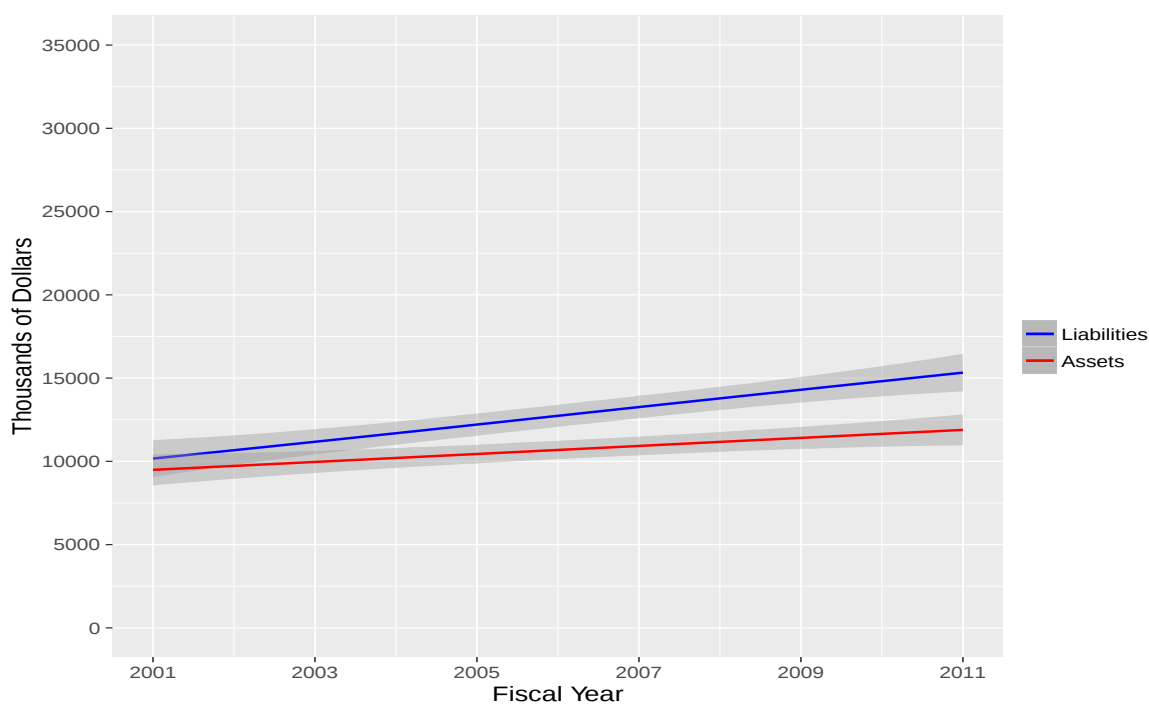
	Observations	Mean	Std. Dev.	Min	Max
Funding Ratio	1130	84	20	19	197
Political App.	1132	.67	.31	0	1
Divided Government	1132	.52	.5	0	1
House Polarization	1025	1.51	.52	.45	3.29
% Republican	1019	.47	.14	.08	.83
Per. Union Coverage	1132	.39	.18	.1	.75
Social Security	1133	.76	.43	0	1
Republican Control	1019	.47	.14	.08	.83
Employee Contribution	1079	.05	.03	0	.23
Employer Contribution	1056	.09	.08	-.06	1.79
Discount Rate	1072	.079	.004	.045	.09
Market Valuation	1133	.07	.25	0	1
Investment Return	1027	4.2	12.07	-29.63	28.83
Equities	1108	55.85	11.0	0	82
Real Estate	1090	5.34	4.65	0	22.08
Alternatives	1081	3.81	6.62	0	50.42
EAN	1111	.76	.43	0	1
PUC	1042	.15	.36	0	1
System Age	1133	58.37	17.35	1	100
Teachers	1132	.51	.5	0	1
Public Safety	1132	.46	.5	0	1
Lagged Debt to GSP	1132	.07	.04	.02	.23

Figure 2.8: Distribution of Funding (2001-2011)



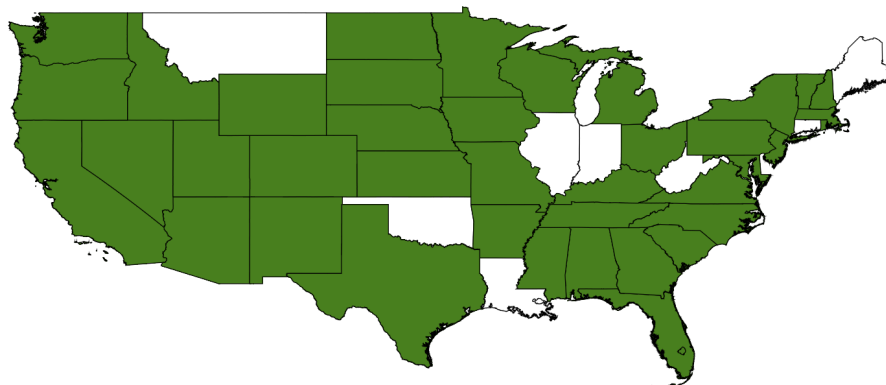
The above histogram shows the distribution of the funding ratio for all plan-year observations (Source: Based on Data from Public Plans Database).

Figure 2.9: Plan Assets vs. Liabilities (2001-2011)



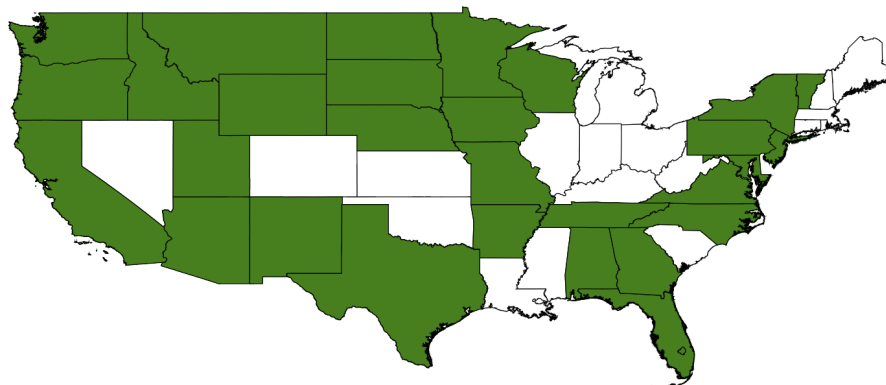
The above figure demonstrates how the growth of liabilities has outpaced the growth of assets over time in my data, contributing to the downward trend average funding. (Source: Based on Data from Public Plans Database).

Figure 2.10: States with Average Funding Above 80%: 2001



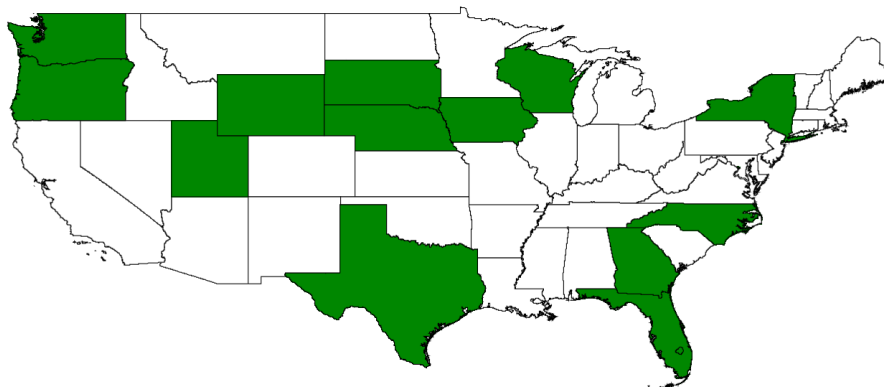
Funding levels in this map are the summed liabilities divided by summed assets of all plans in a given state in the data (Source: Based on Data from Public Plans Database).

Figure 2.11: States with Average Funding Above 80%: 2005



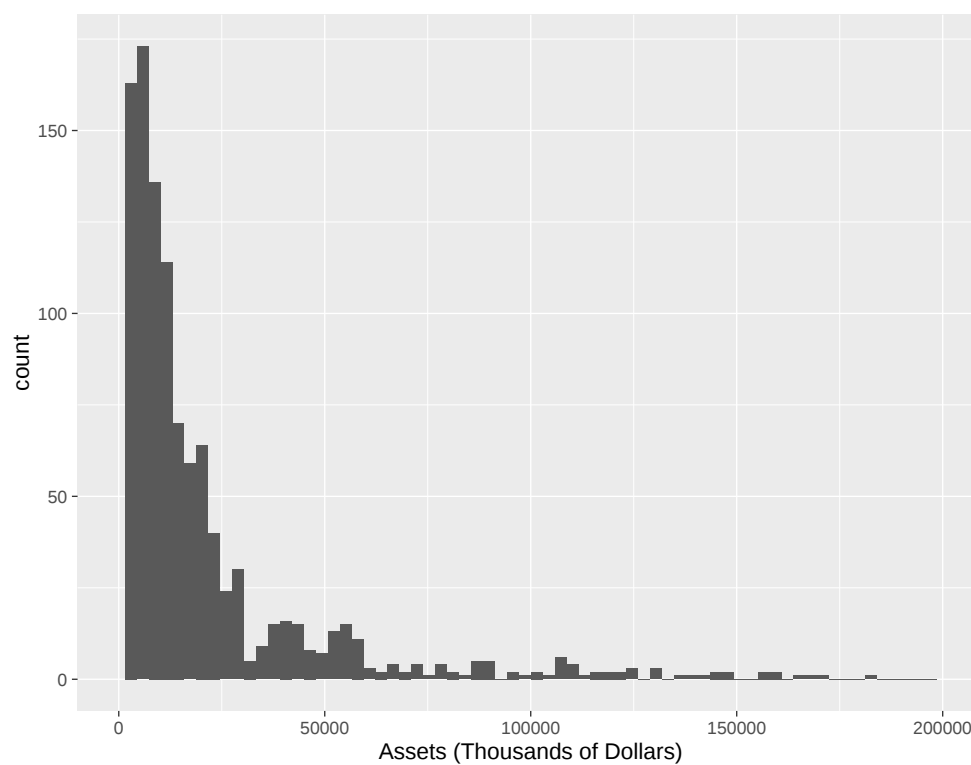
Funding levels in this map are the summed liabilities divided by summed assets of all plans in a given state in the data (Source: Based on Data from Public Plans Database).

Figure 2.12: States with Average Funding Above 80%: 2010



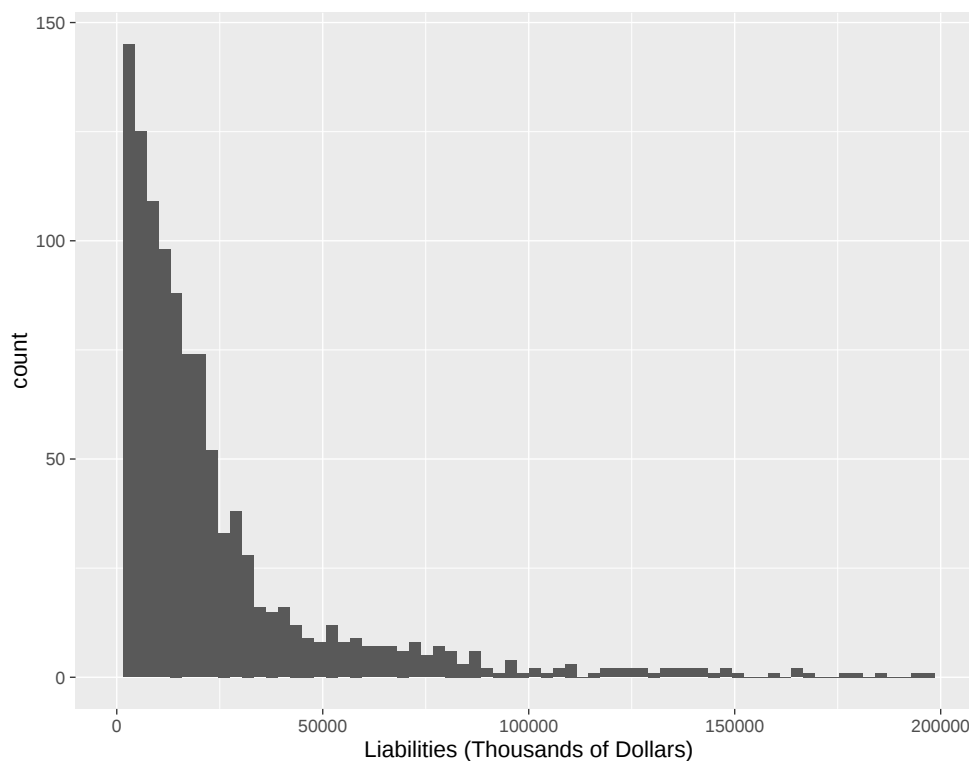
Funding levels in this map are the summed liabilities divided by summed assets of all plans in a given state in the data (Source: Based on Data from Public Plans Database).

Figure 2.13: Distribution of Plan Assets (2001-2011)



There is a fair amount of variation in plan assets, with a clear right skew (Source: Based on Data from Public Plans Database).

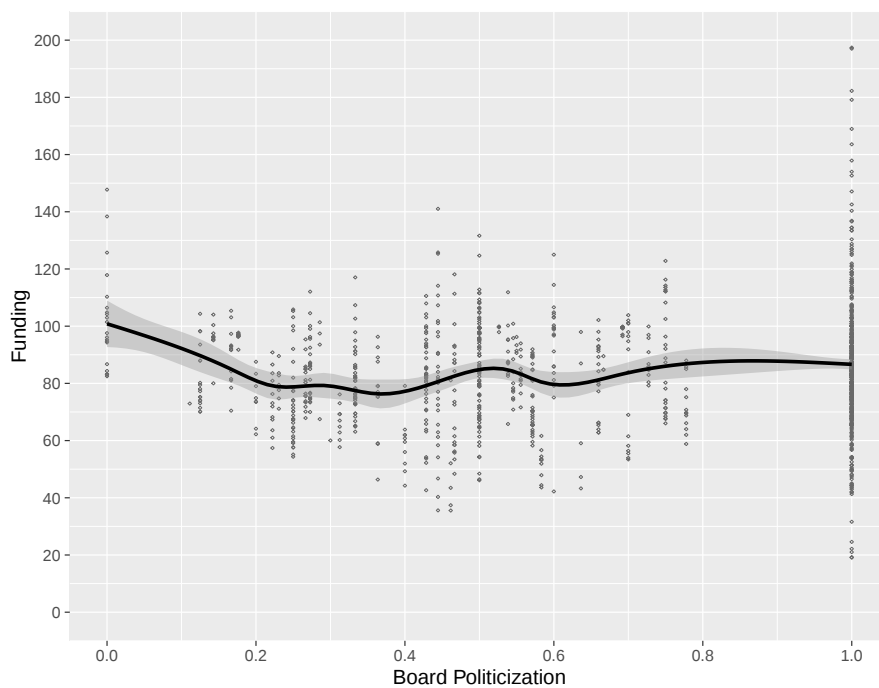
Figure 2.14: Distribution of Plan Liabilities (2001-2011)



There is a fair amount of variation in plan liabilities, with a clear right skew (Source: Based on Data from Public Plans Database).

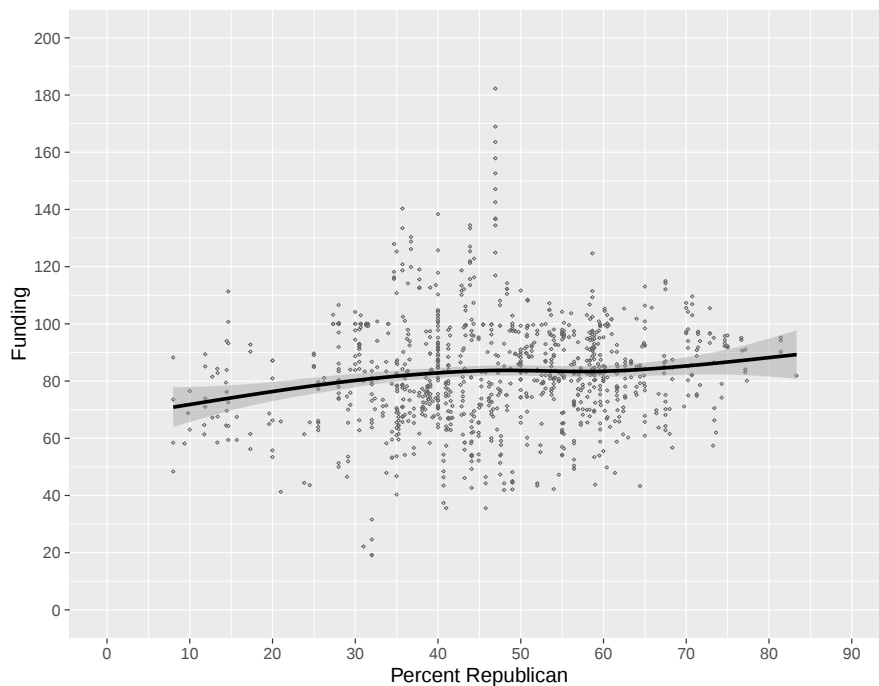
In Figures 2.15 – 2.17, I present graphs of the bivariate relationships between the funding ratio and key political variables. Though these obviously do not control for any other factors or provide a causal account of funding, they are worth considering in their own right. For example, plans in Republican states do not appear any less funded than plans in Democratic states. Further, plans in more polarized states oddly appear *better* funded, which is probably not what many scholars or pundits would initially expect. In comparison, divided government appears as though it does not play a major role.

Figure 2.15: Funding and Political Appointments (2001-2011)



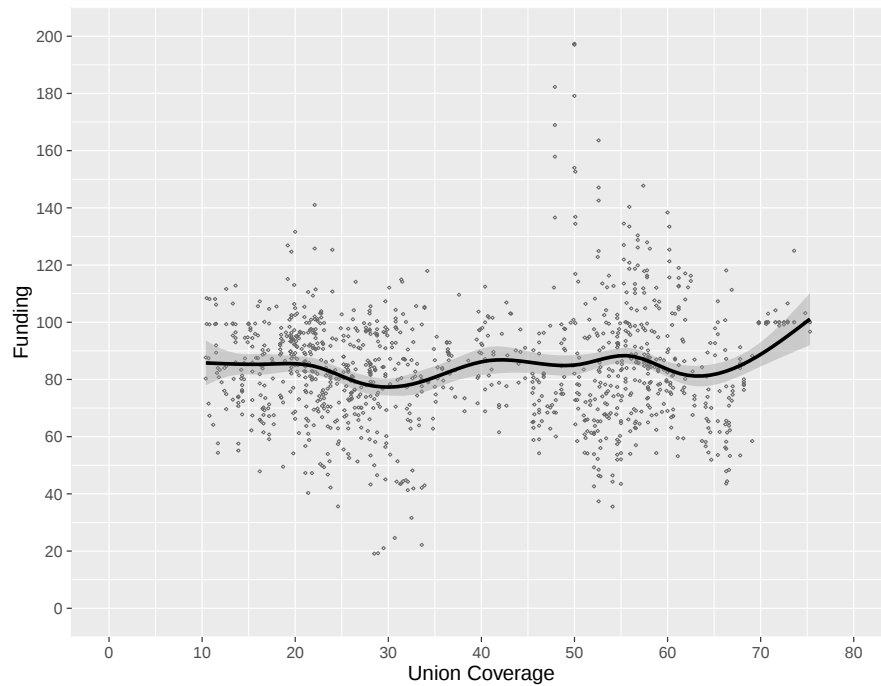
This plots the bivariate relationship between funding and the political appointments board variable (Source: Public Plans Database and Annual State Plan Reports).

Figure 2.16: Funding and Republican Legislative Control (2001-2011)



This plots the bivariate relationship between funding and the percentage of seats of the state's lower legislative chamber controlled by Republicans (Source: Public Plans Database and National Conference of State Legislatures).

Figure 2.17: Funding and Unionization (2001-2011)



This plots the bivariate relationship between funding and the percentage of public employees in the state who are covered by unions (Source: Public Plans Database and Unionstats.com).

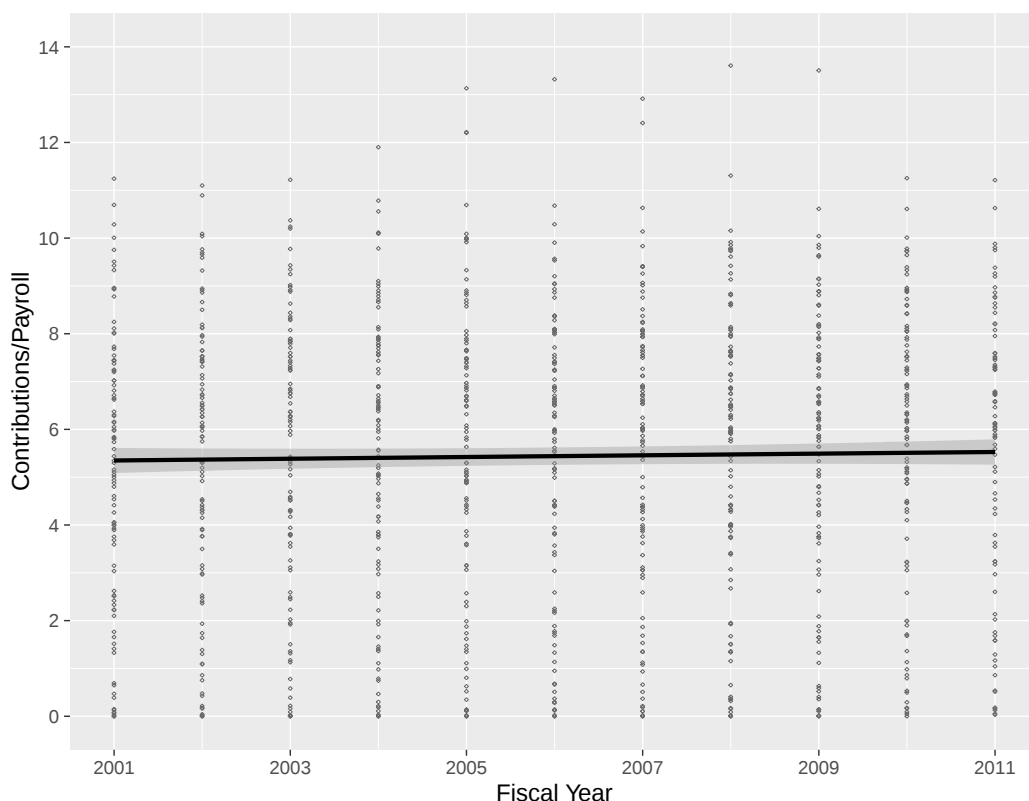
2.7.2 Contribution Rates and Investment Returns

Defined benefit (DB) and defined contribution (DC) plans are financed in a similar way: both depend on contributions from employees, employers, and investment returns. Employers in DB plans, however, must pay employees their ‘defined benefits,’ irrespective of investment performance. They bear the all of the risk, in other words. In pure DC plans, employers bear none of the risk. In so-called ‘hybrid’ plans, the risk is shared. In well-funded plans, employer contributions should come entirely from assets.

Plan managers wish or are forced to maintain plan generosity by not raising employee contribution rates. Figure 4.3 shows that employee contributions have remained quite flat from 2001-2011. At the same time, employer contributions have increased, likely in an attempt to cover increasing costs. However, as discussed in the main paper, governments’ actual contributions have consistently fallen short of their required contributions, on average.

There is a great deal of evidence that governments have allowed their plans to take on more risk over the years, especially since doing so, when combined with more lax accounting

Figure 2.18: Employee Contributions (2001-2011)



Although there is some variation, over time, average employee contributions have remained quite flat (Source: Based on Data from Public Plans Database).

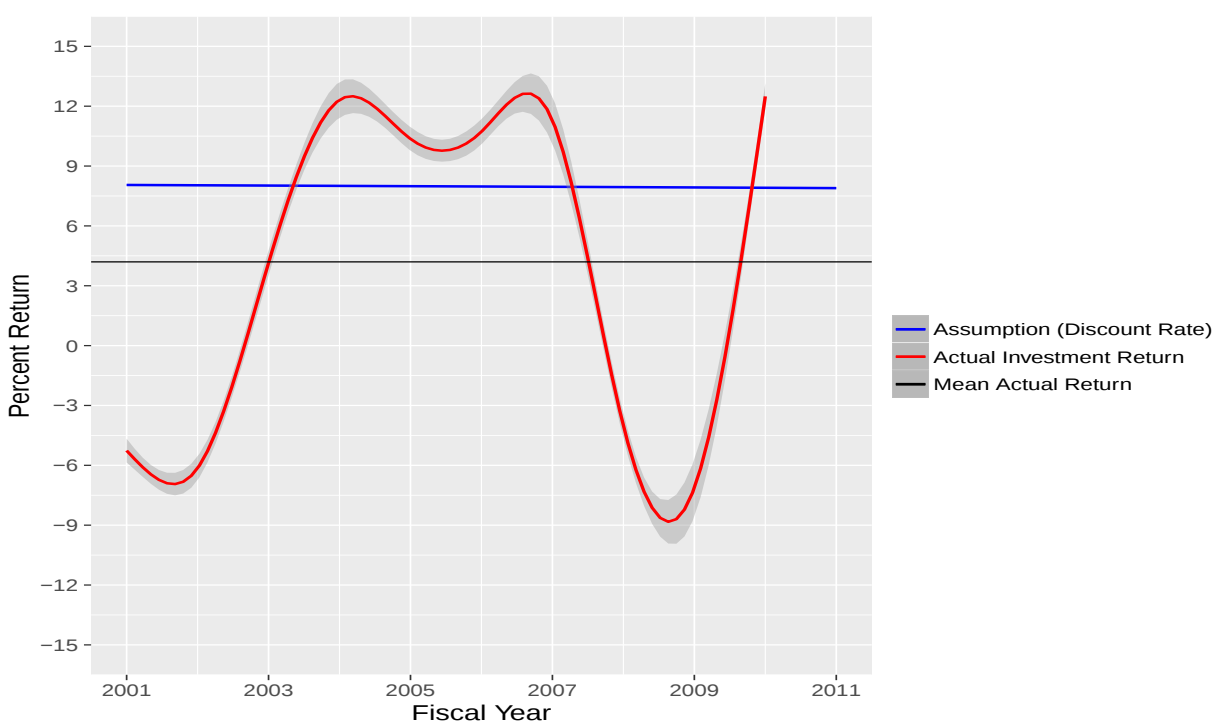
practices, allows politicians to maintain or expand the size of employee benefits without having to raise taxes. As early as 1978, a survey of state and local plans conducted by the national government pointed out that state governments seemed to have little desire to inform the public about these costs: “In the vast majority of public employee pension systems, plan participants, plan sponsors, and the general public are kept in the dark with regard to a realistic assessment of true pension costs. The high degree of pension cost blindness is due to the lack of actuarial valuations, the use of unrealistic actuarial assumptions, and the general absence of actuarial standards” (Congress, 1978).

Given the pressure to essentially do more with less, boards began expanding the size and scope of investments to pay for rising liabilities.³⁹ While governments have promised

³⁹Specifically, states moved away from explicit laws to the more vague Prudent Pension Rule (Cayer, 1998). This nebulous rule requires sponsors make investments “with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent man acting in a like capacity and familiar with such

investments will pay off in the long-run, this strategy led to more heterogeneity in funding performance. According to Governmental Accounting Standards Board (GASB) employee Girard Miller, reducing risk and enhancing assets by increasing employer contributions would require increasing taxes: “Many would agree with me that using risk-free rates of return to value public plans (which enjoy a long term horizon and capacity to prudently assume equity risks) will almost assuredly overburden today’s taxpayers” (Mitchell, 2009, pp 2-3).

Figure 2.19: State Pension Plan Investment Returns (2001-2011)



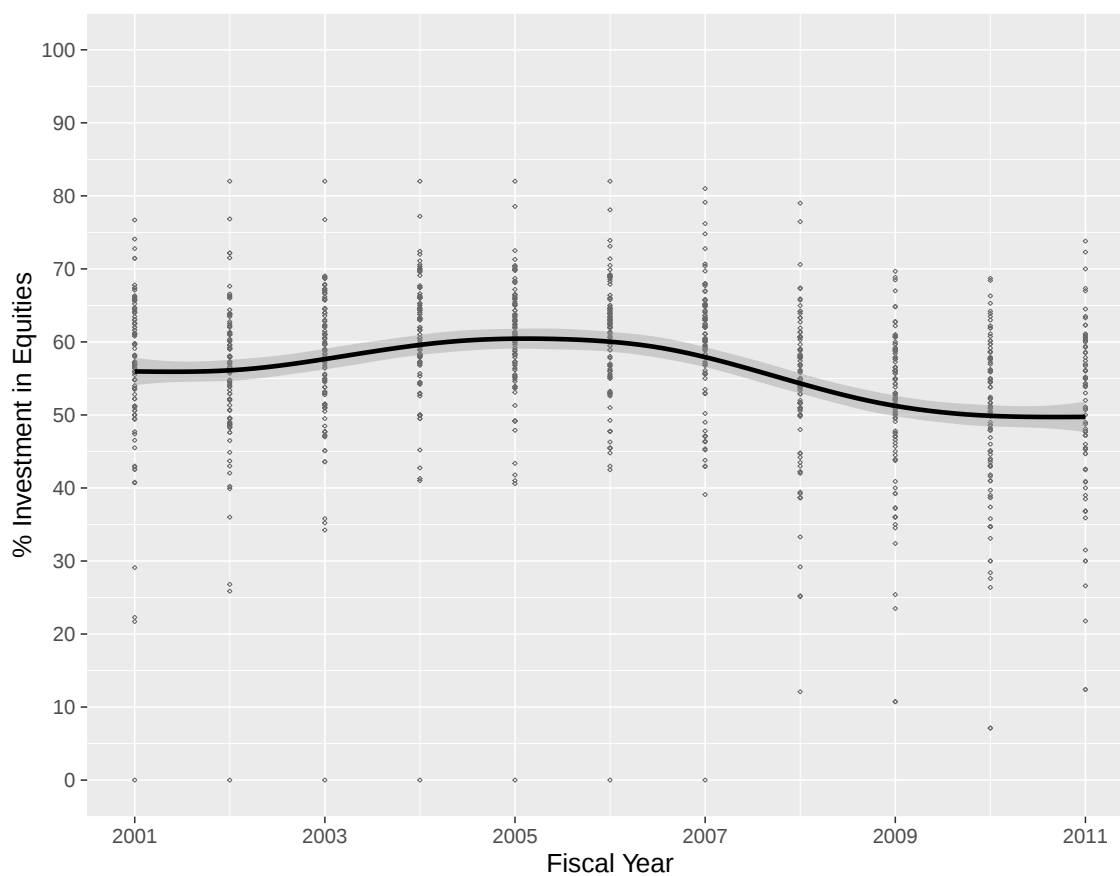
The above plots the discount rate versus actual investment returns over time. It also plots an average of the actual investment returns over time, highlighting a significant disparity between the expected and actual average returns (Source: Based on Data from Public Plans Database).

In becoming increasingly reliant on investment performance, boards typically operate on the assumption that their portfolios eventually will deliver the required returns to keep plans well-funded. Unsurprisingly, this is one of the most controversial public-sector plan practices in recent years. The discount rate simply means the expected investment return. Figure 4.7

matters would use in the conduct of an enterprise of a like character and with such aims” (Alabama 2012 CAFR).

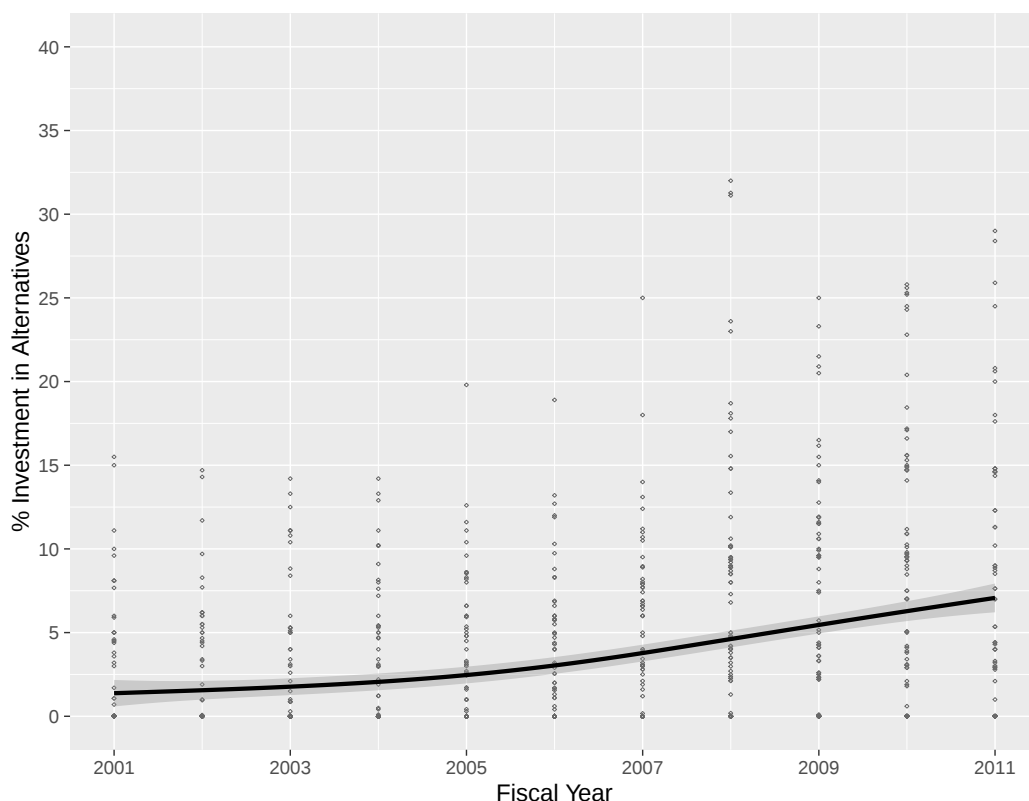
shows how the discount rate is much higher than the actual rate of return. Plans also have adjusted their investment strategies over time, in an attempt to realize these large returns on which they have increasingly come to depend. We see in Figures 2.20 and 2.21 how these two different types of investments have changed over time.

Figure 2.20: Percentage of Plan Investments in Equities (2001-2011)



This plots equities over time. Plans appear to have moved away from traditional equities somewhat around the 2008 recession (Source: Based on Data from Public Plans Database).

Figure 2.21: Percentage of Plan Investments in Alternatives (2001-2011)



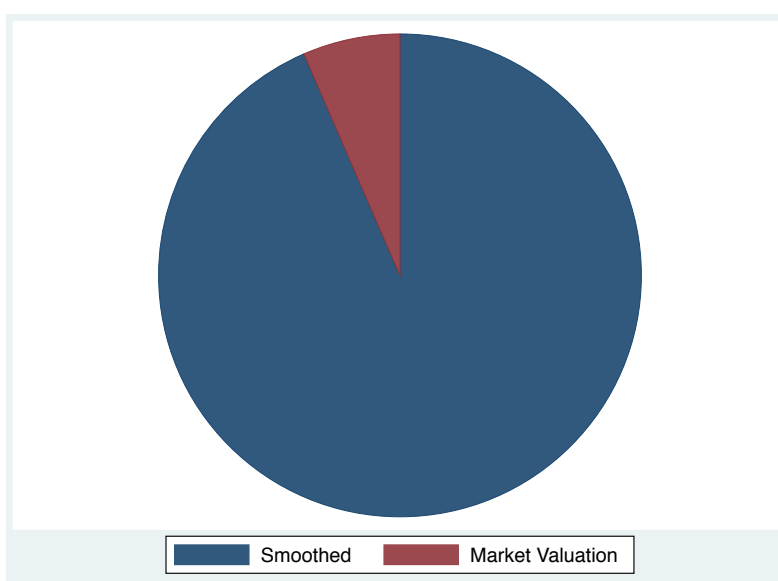
This plots the growth of alternative investments over time (Source: Based on Data from Public Plans Database).

Briefly, equities refer to shares of stock, which grants holder voting rights. Alternatives, in comparison, refer to investments that are not in stocks, bonds, or cash. Usually, these are investments in tangible goods like metals, alcohol, coins, antiques, and so on. They also include investments in hedge funds, venture capital, carbon credits, and so on. Plans also have made a number of other kinds of investments, in things like real estate, or other properties, including even golf courses. So far, there has been no clear study indicating that any of these different kinds of investments are more or less likely to pay off. Additionally, alternative investments often come with higher fees, which might make them a particularly fruitless strategy.

2.7.3 Additional Background on Pension Actuarial Techniques

The plan sponsor chooses the discount rate, which is based on the yields from plan investments. Plans utilize either Market Valuation of Liabilities (MVL) or Actuarial Accrued Liability (AAL) to calculate discount rates. MVL involves equating the discount rate with the current market rate of a group of high-quality fixed income investments, which makes it more responsive to economic fluctuations. Specifically, it utilizes a portfolio of traded securities that matches employee benefits in amount, timing, and payment probability. The portfolio is independent of the expected return on investments, meaning that market performance does not affect funding simply due to using MVL. In comparison, AAL uses longer actuarial smoothing periods to spread costs into the future. The vast majority of public plans use AAL, as seen in Figure 3.8.

Figure 2.22: State Pension Plan Asset Valuation Type (2001-2011)

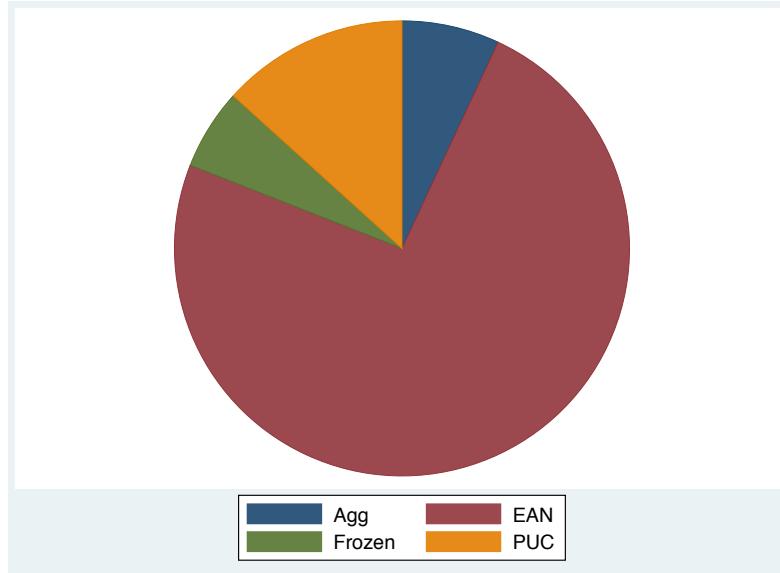


Source: Based on Data from Public Plans Database

Actuarial plan type is used in liability estimation. My data contain four of six possible cost-estimation methods, as seen in Figure 3.9.

I just include dummy variables for Entry Age Normal (EAN) or Projected Unit Credit (PUC) plans, since most plans use those methods. Generally, the PUC method estimates more liabilities. EAN plans allocate the present value of lifetime retirement benefits equally each year employees work, adding to the liability as employees remain in their jobs. In comparison, PUC estimates benefits as a function of the present value of additional lifetime

Figure 2.23: State Pension Plan Actuarial Cost Estimation Type (2001-2011)



Source: Based on Data from Public Plans Database

benefits employees expect by retirement. Given that employee-salaries typically increase with age, PUC calculates more liabilities.

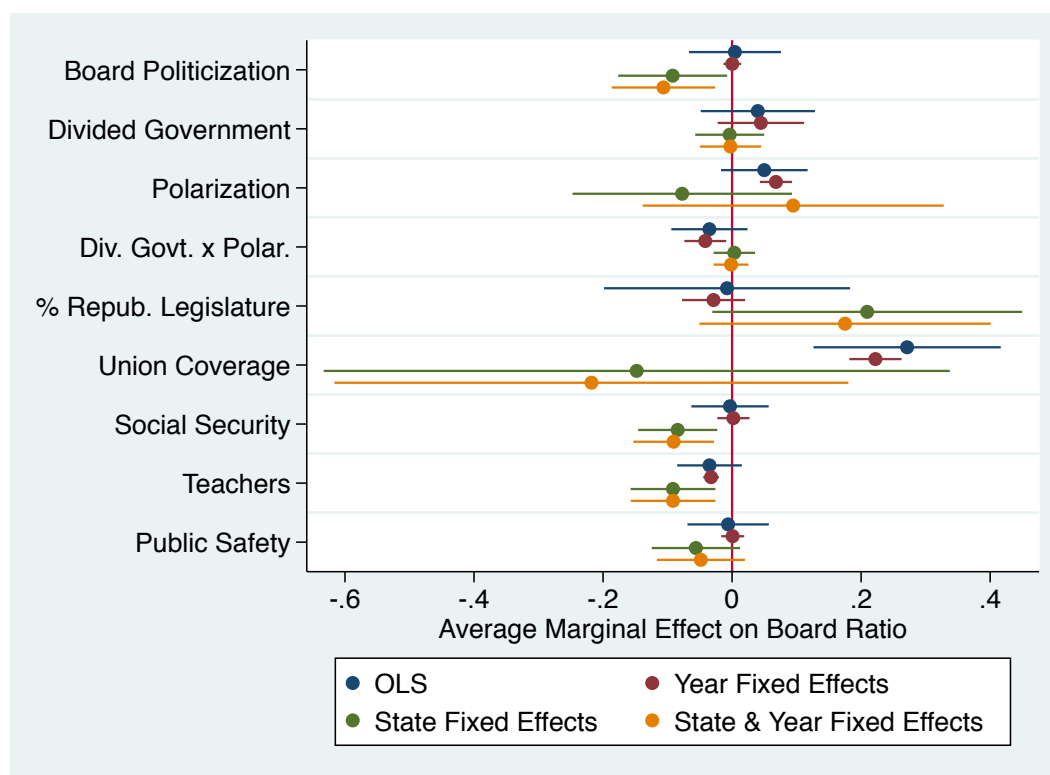
Those and the Traditional Unit Credit Method all directly calculate liabilities at each evaluation date. In comparison, the Frozen Initial Liability and Attained Age Normal methods evaluate liabilities at one date, but do not update in the future, except to amortize liability funded by plan contributions. Lastly, the Aggregate Method does not determine any accrued liability and counts all liabilities as future normal costs, meaning plans appear 100% funded at all times. In the private sector, plans always utilize PUC. In the public sector, though, any plan type is considered acceptable. While some plans in my data use the aggregate method, I lump this with other approaches due to its small frequency. I expect that PUC plans will have a negative relationship with funding, while EAN plans will have a smaller, but still negative relationship. Not including a Frozen dummy should make both variables have negative relationships with funding, since Frozen plans appear fully funded by construction.

2.7.4 Models without the Actuarial Controls

As discussed in the main paper, there is a potential concern that plans' actuarial characteristics are chosen for political reasons. If this is true, then we might be concerned that these variables are post-treatment, and therefore should not be included in the right hand

side of a regression model along with the key political variables of interest. I therefore estimate two modified funding models to serve as robustness checks to the main model. In the first, I use one-year lagged versions of all the actuarial variables, which removes much of the post-treatment concern. As seen in Figure 2.24, the magnitude of the effect is nearly the same, or about -10.6% in the state and year fixed-effects model.

Figure 2.24: Political Variables Associated with Improved Funding - Lagged Actuarial Controls

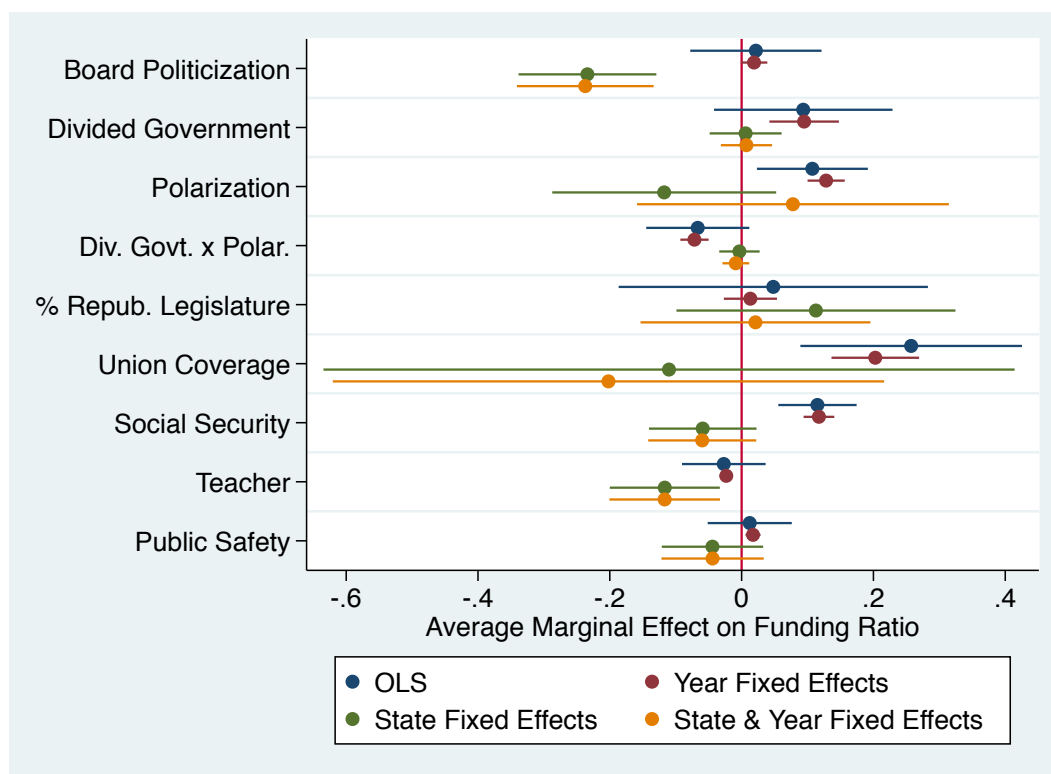


This is the coefficients and 95% confidence intervals of funding on the current year's political variables, as well as lagged economic and actuarial variables.

However, it is still possible that politicians' pension board design decisions happened years ago, while the selection of actuarial policies occurred later, thereby still making them post-treatment. Given this possibility, I estimate an additional model that excludes all of the actuarial variables: this examines how pensions perform solely based on the political variables and a lagged indicator of the state's economy. I present these results in Figure 2.25. As can be seen, the inclusion or exclusion of these variables does not change the direction of the core results. The board's effect is larger now, however: it is associated with about a 23.7% reduction in funding in the state and year model. In both cases, though,

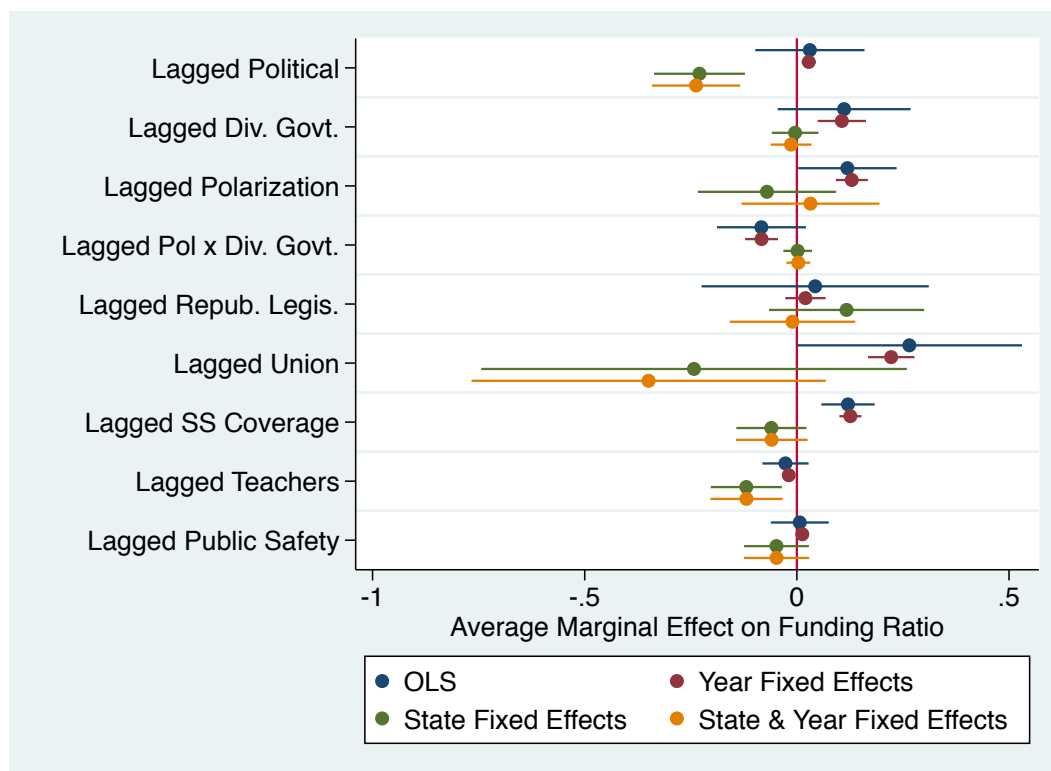
the results indicate that politicized boards contribute to poorer funding in both of the state fixed-effects models.

Figure 2.25: Political Variables Associated With Improved Funding - No Actuarial Controls



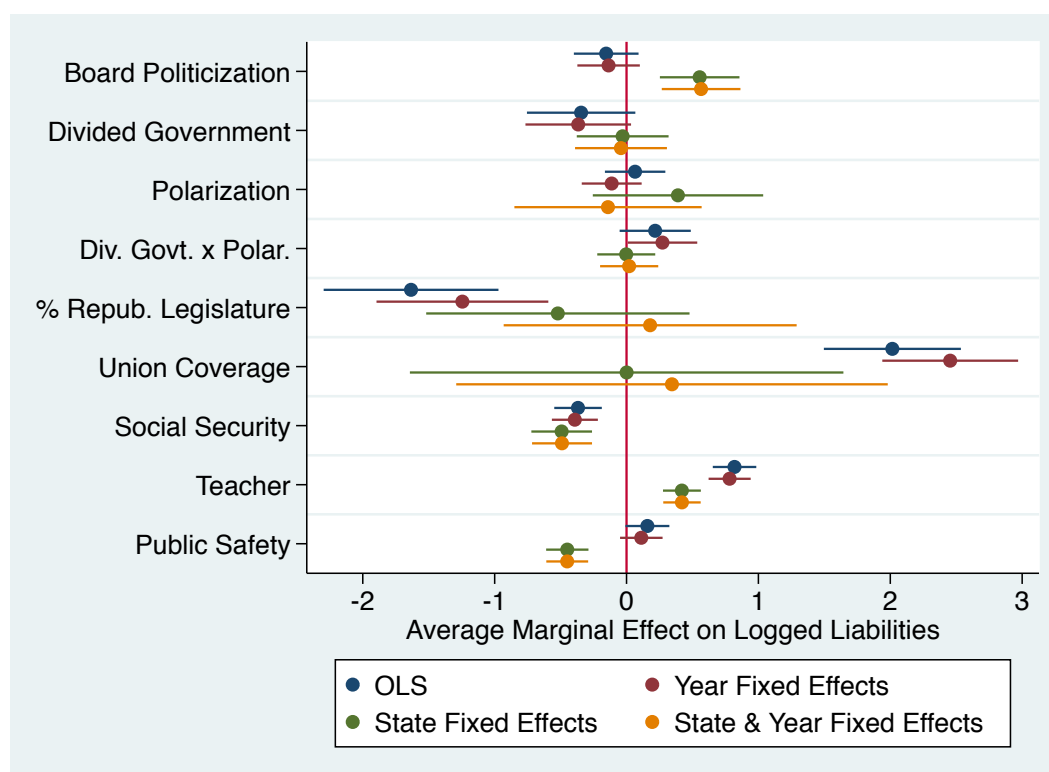
This is the coefficients and 95% confidence intervals of regressing funding plan on all of the independent variables excluding the actuarial ones, in case they are post-treatment.

Figure 2.26: Lagged Variables Associated With Improved Funding - No Actuarial Controls



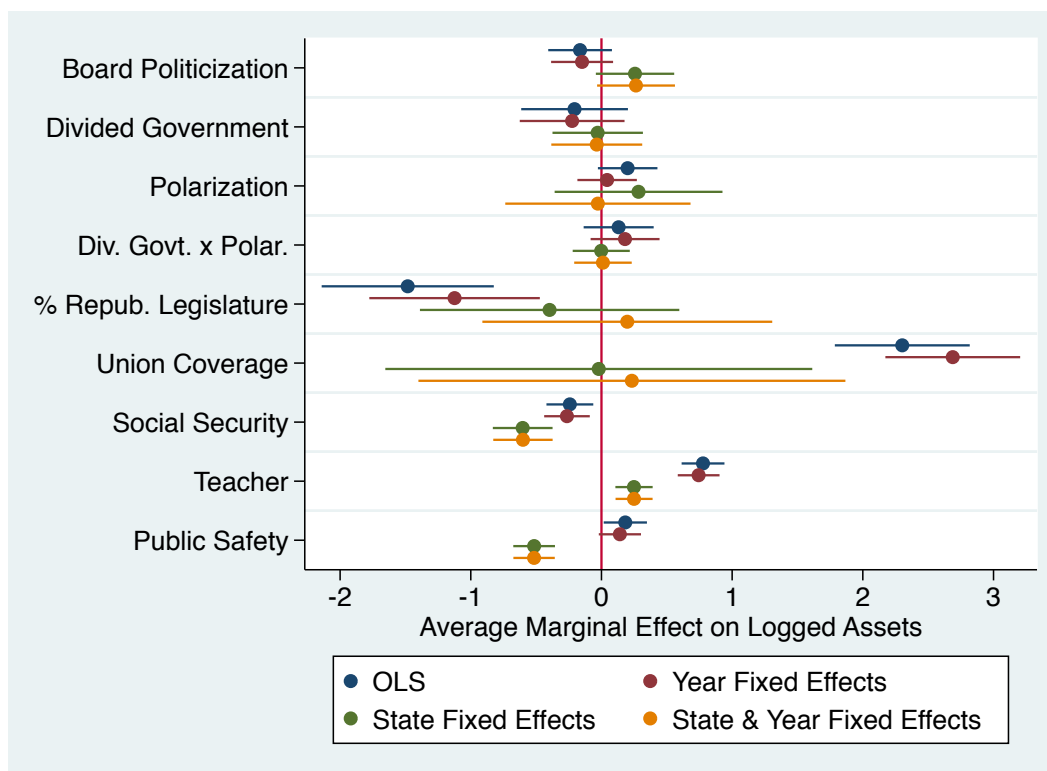
This is the coefficients and 95% confidence intervals of regressing funding plan on lagged versions of the independent variables excluding the actuarial ones, in case they are post-treatment.

Figure 2.27: Political Variables Associated with More Logged Liabilities - No Actuarial Controls



This is the coefficients and 95% confidence intervals of regressing logged plan liabilities on the independent variables, except for the actuarial controls.

Figure 2.28: Political Variables Associated with More Logged Assets - No Actuarial Controls



This is the coefficient and 95% confidence intervals of regressing logged plan assets on the independent variables, except for the actuarial controls.

As an additional robustness check, I examine funding's relationships with the lagged variables, excluding the actuarial variables, and present the results in Figure 2.26. This makes doubly sure to avoid controlling for anything that is post-treatment. The results are quite similar to those in Figure 2.25.

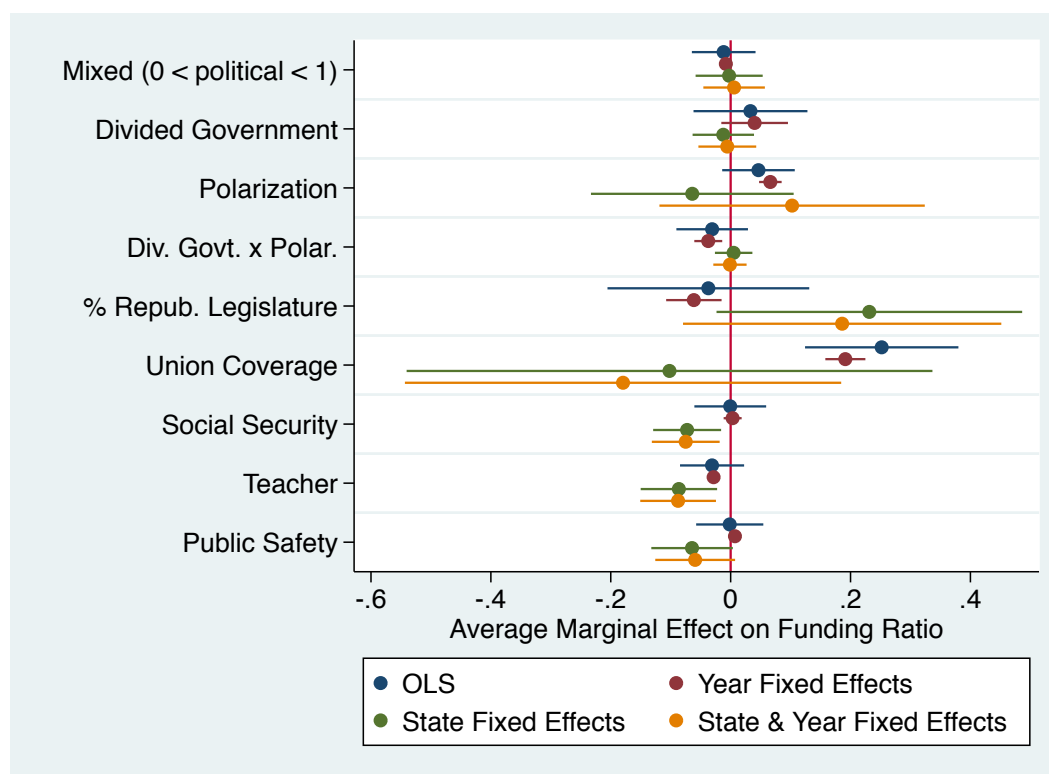
Lastly, I also estimate the logged assets and liabilities models without the actuarial controls, and present the results in Figures 2.28 and 2.27. As can be seen, the board variable is now significantly associated with more liabilities in the two state fixed-effects models. It just misses significant in the assets models, however. This is a very interesting result, which suggests that boards likely select actuarial assumptions that may very well hide the true size of pension liabilities. I examine this in more detail below in Section 2.7.7.

2.7.5 Mixed Boards Results

In the paper, I consider three competing hypotheses about how boards contribute to funding performance. In the first, more politicized boards should be associated with worse

funding, indicating that insulating pensions from the control of elected officials generally helps them perform better. In the second, less politicized boards might hurt funding, especially if such appointees are interested in maximizing the size of benefits, and more political control allows elected officials to quickly respond to pensions' problems or fire alarms. Finally, consistent with some prior work (Krause et al., 2006), combinations of the two might be best for funding, balancing the advantages of political responsiveness with more specialized skills and the needs of employees.

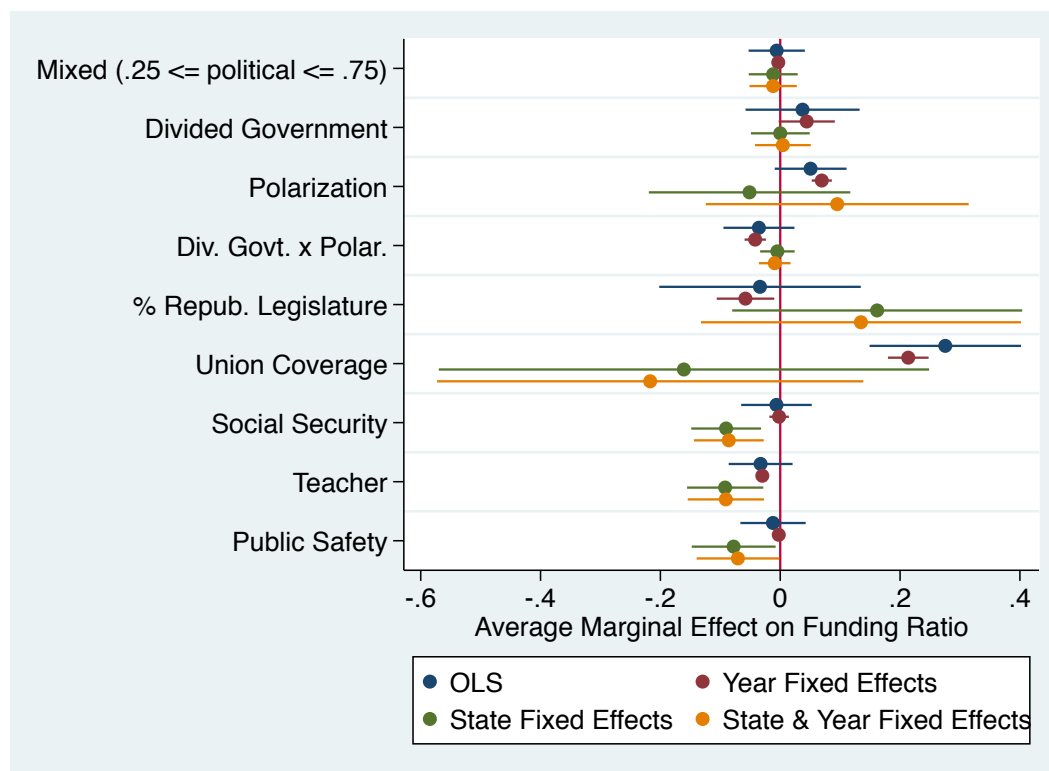
Figure 2.29: Political Variables Associated with Improved Plan Funding (Mixed Boards Results One)



This presents the coefficients and 95% confidence intervals of regressing plans' funding ratios on with both political and non-political members have with plans' funding ratios (and the other independent variables).

The evidence in the main paper supports the first over the second hypothesis. In testing the third hypothesis, I create a dummy for all plans with some mix of both kinds of board members (i.e. boards have some political appointees on them, but do not entirely consist of them). As seen in Figure 2.29, I cannot distinguish the influence mixed boards on funding from the null of no effect. If I instead set the mixed bounds as greater than or equal to 25%

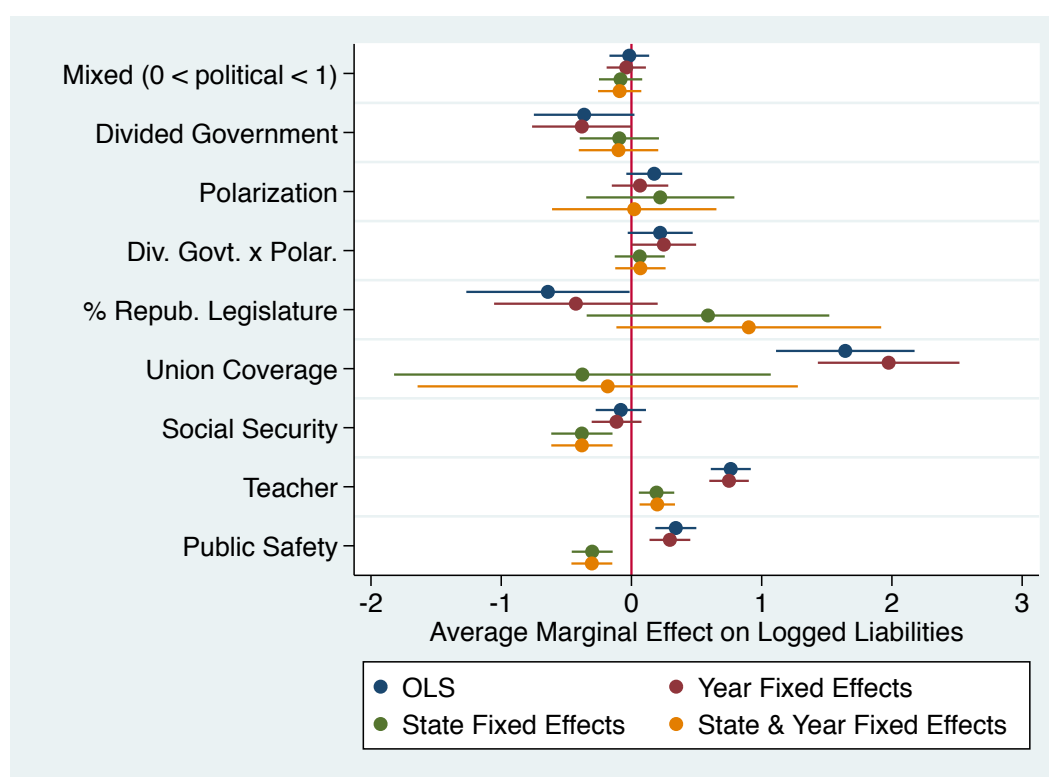
Figure 2.30: Political Variables Associated with Improved Plan Funding (Mixed Boards Results Two)



This presents the coefficients and 95% confidence intervals of regressing plans' funding ratios on with both political and non-political members have with plans' funding ratios (and the other independent variables).

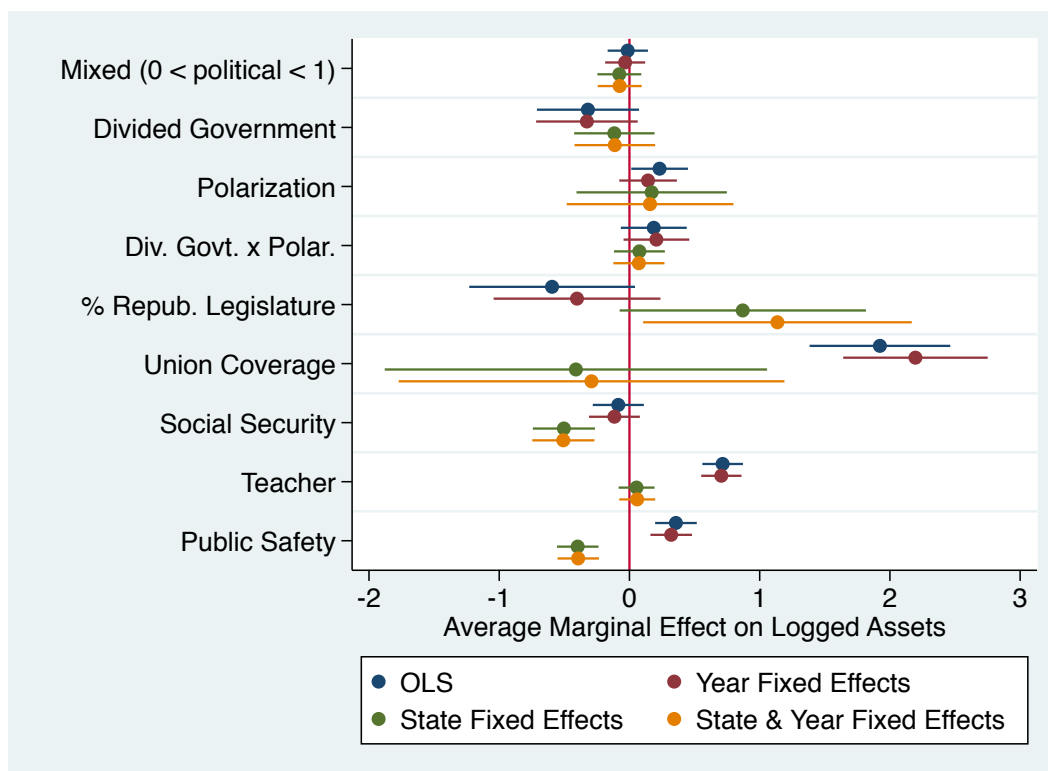
and but less than or equal to 75% politicized, I similarly recover a null effect. Finally, boards that consist of between 0-25% political appointments tend to improve funding, but by about 3-7.5%, which is not as strong as when no board members are politicians or their appointees. Alternatively, as seen in 2.30, when board politicization is between 75% and 100%, there is either a negative or null effect on funding, depending on the model. Overall, the evidence from this robustness check does not indicate that any mix of personnel improves funding. Instead, boards that increasingly consist of political appointees appear to have worse funding.

Figure 2.31: Political Variables Associated with More Logged Liabilities (Mixed Boards Results One)



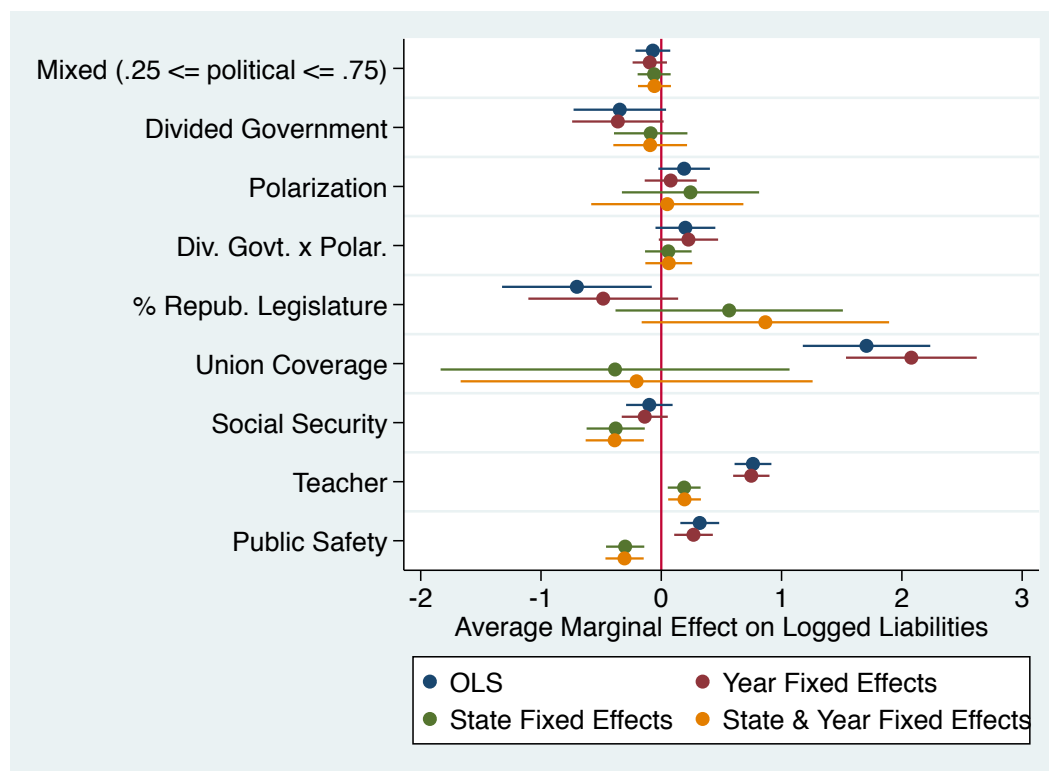
This is the coefficients and 95% confidence intervals of regressing the logged amount of plan liabilities on the fraction of boards with both political and non-political members (and the other independent variables).

Figure 2.32: Political Variables Associated with More Logged Assets (Mixed Boards Results One)



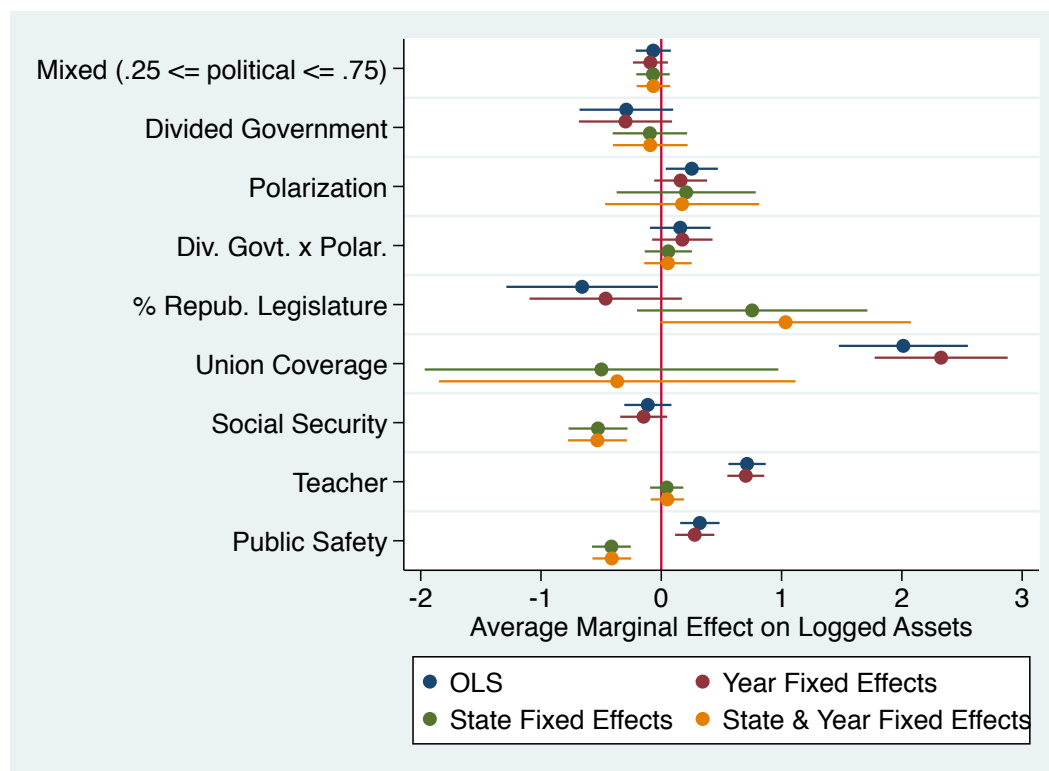
This is the coefficients and 95% confidence intervals of regressing the logged amount of plan assets on the fraction of boards with both political and non-political members (and the other independent variables).

Figure 2.33: Political Variables Associated with More Logged Liabilities (Mixed Boards Results Two)



This is the coefficients and 95% confidence intervals of regressing the logged amount of plan liabilities on the fraction of boards with both political and non-political members (and the other independent variables).

Figure 2.34: Political Variables Associated with More Logged Assets (Mixed Boards Results Two)



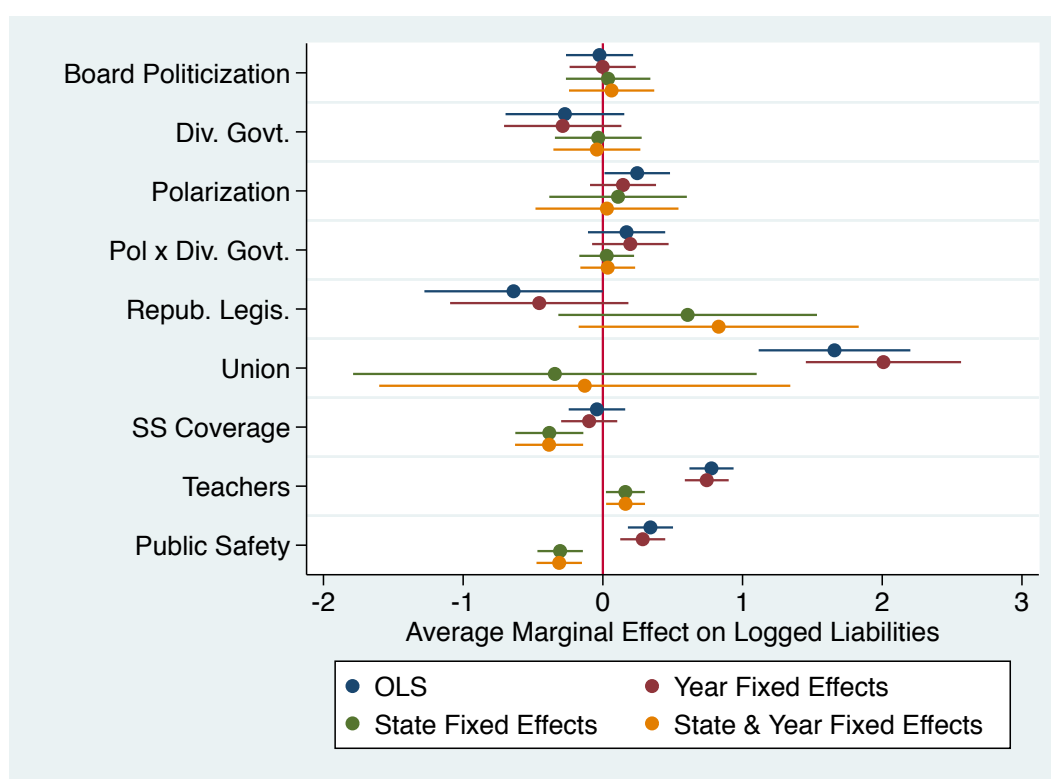
This is the coefficients and 95% confidence intervals of regressing the logged amount of plan assets on the fraction of boards with both political and non-political members (and the other independent variables).

When I examine the effect of mixed boards on funding's components with seemingly unrelated regressions in Figures 2.31-2.34, the mixed variable is associated with fewer logged assets and liabilities in both specifications. This provides some additional evidence that boards controlled entirely by politicians tend to have the largest amounts of assets and liabilities.

2.7.6 Additional Tests of Relationship Between Boards and Funding

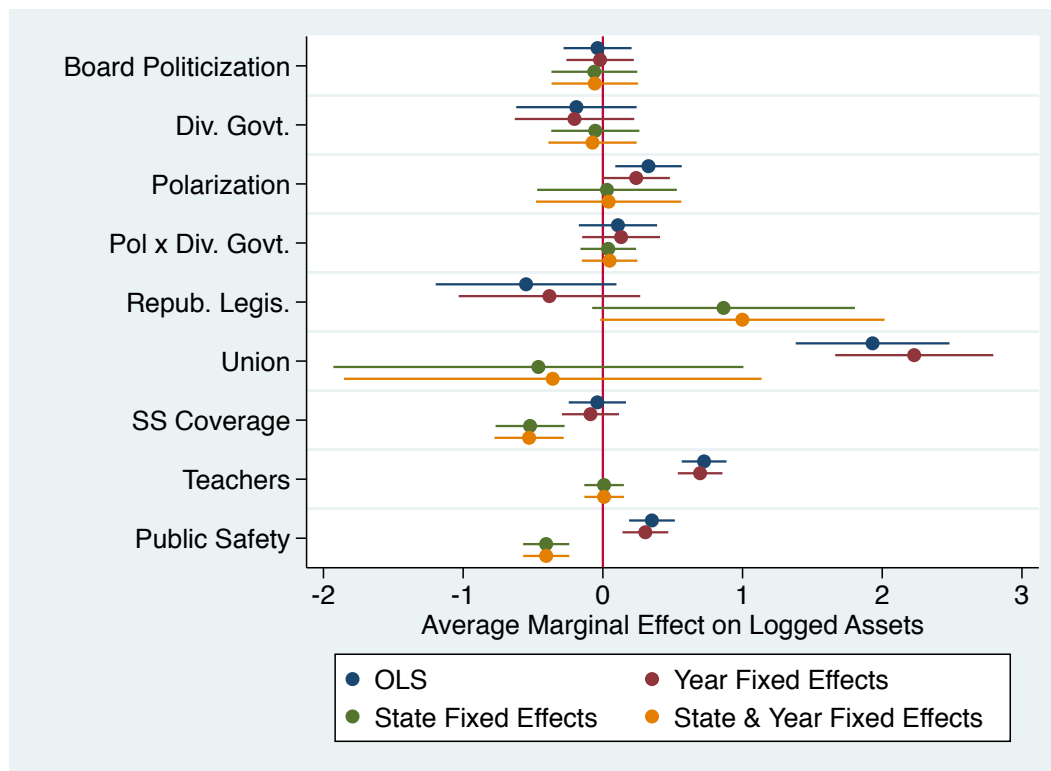
As an additional robustness check, I consider the impact of boards on funding's dual components: assets and liabilities. I regress both of those on lagged versions of all the independent variables to understand the nature of these relationships over time, and present the results in Figures 2.35 and 2.36. The results are quite similar to the non-lagged analyses in the main paper, in which politicization does not appear to contribute to more liabilities in the following year, provided that the actuarial controls are included.

Figure 2.35: Prior Year Variables Associated with More Logged Liabilities in the Current Year



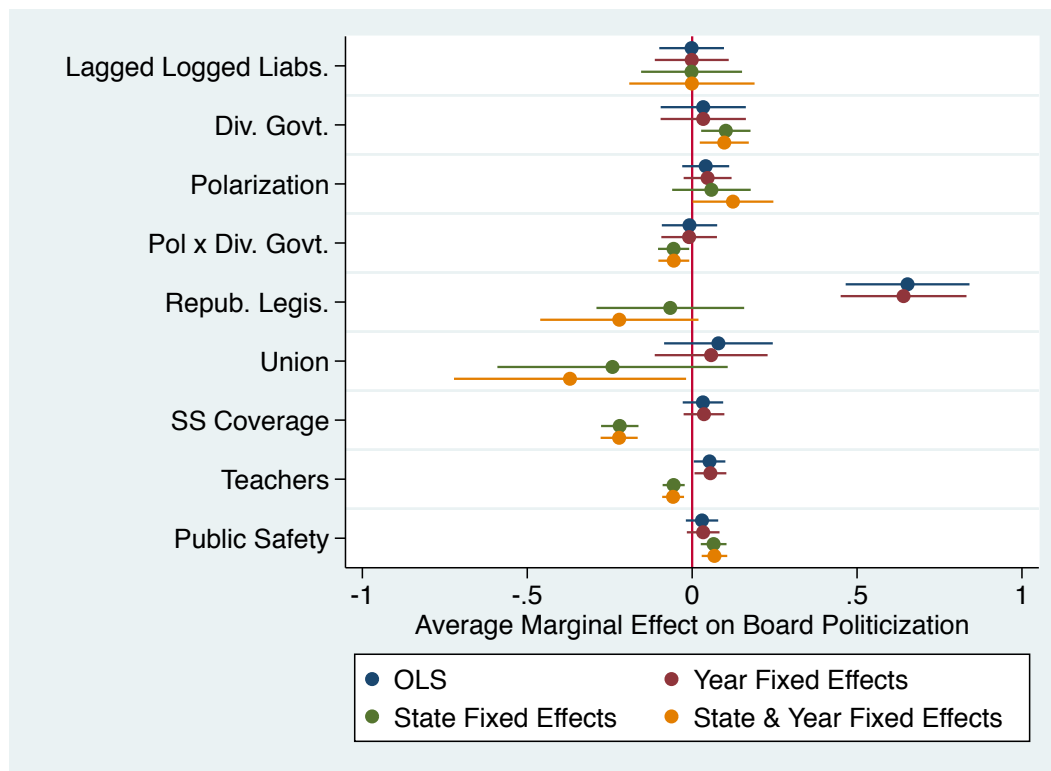
The above examines if board composition and the other controls influence liabilities in the following year. It shows the coefficients and 95% confidence intervals of regressing funding on the lagged independent variables.

Figure 2.36: Prior Year Variables Associated with More Logged Assets in the Current Year



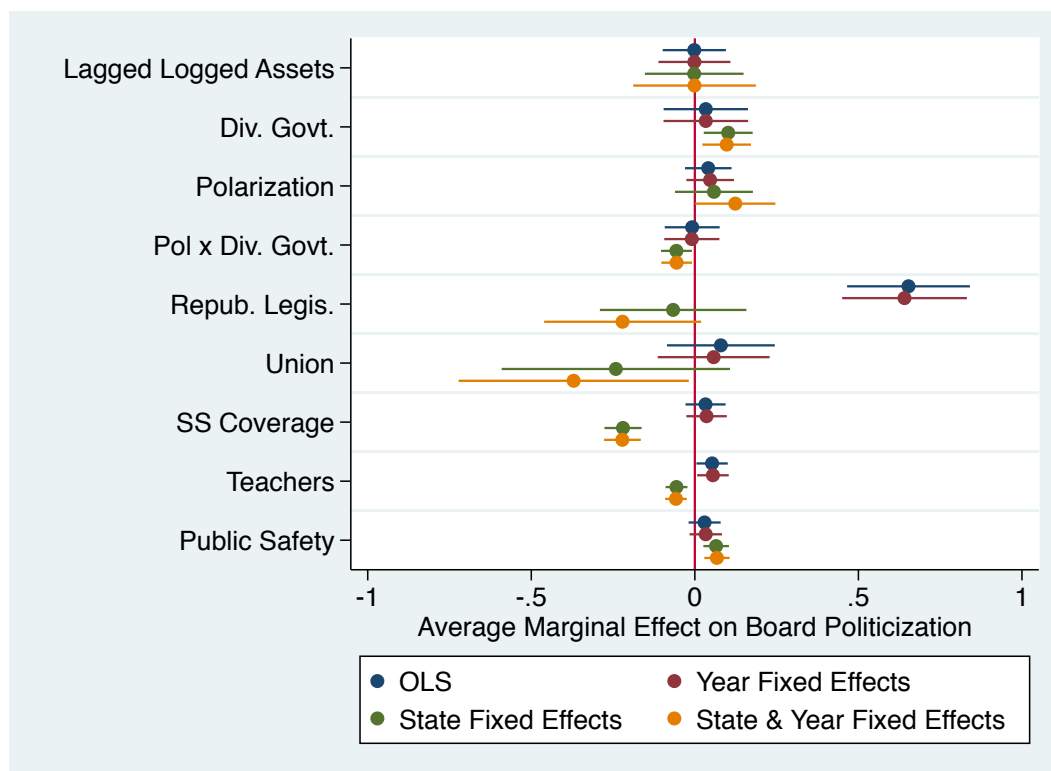
The above examines if board composition and the other controls influence assets in the following year. It shows the coefficients and 95% confidence intervals of regressing funding on the lagged independent variables.

Figure 2.37: The Effect of Lagged Logged Liabilities on Current Board Politicization



The above examines if lagged logged liabilities and the other controls influence boards in the following year. It shows the coefficients and 95% confidence intervals of the various above models.

Figure 2.38: The Effect of Lagged Logged Assets on Current Board Politicization



The above examines if lagged logged assets and the other controls influence boards in the following year. It shows the coefficients and 95% confidence intervals of the various above models.

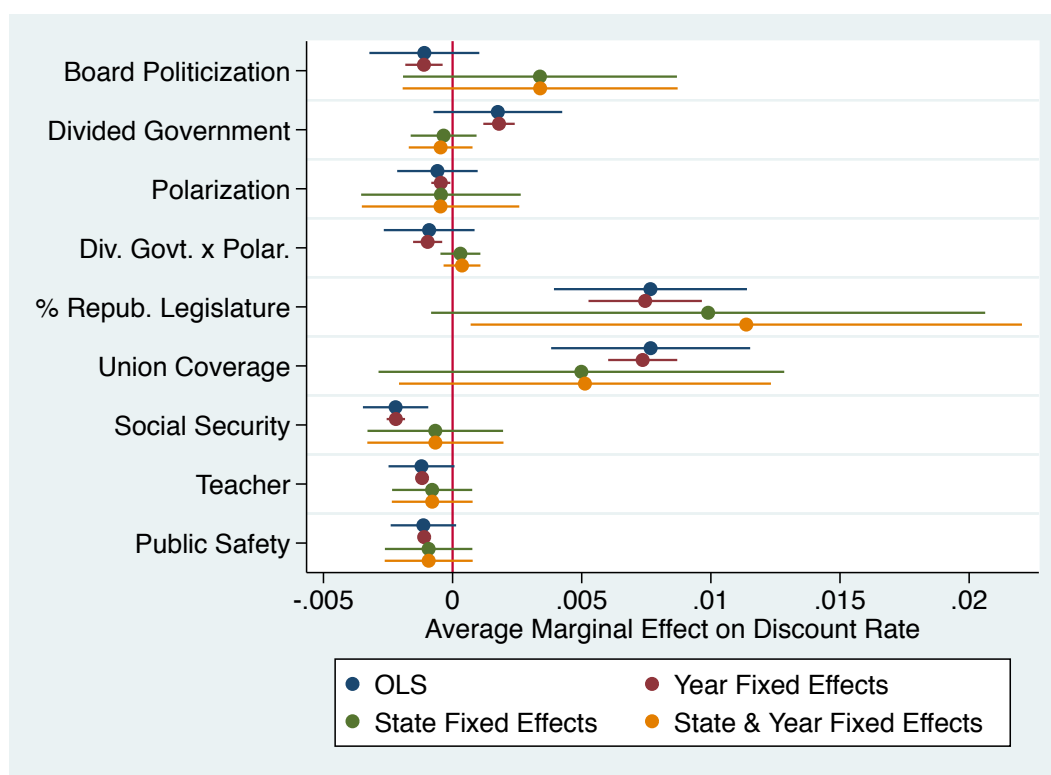
I also utilize seemingly unrelated regressions to assess the relationship between board politicization and one-year lagged versions of liabilities and assets, respectively. I present these results in Figures 2.37 and 2.38. These show that neither liabilities nor assets seem to influence the degree of board politicization in the upcoming year. Thus, if politicians do reign in pension funds (of which there is little clear evidence), they do not do so because of funding's individual components.

2.7.7 Factors Associated with Higher Discount Rates

In order to better understand why politicization of the board might contribute to worse funding, I examine the factors associated with higher discount rates. Pensions that rely on higher discount rates lean more heavily on investment performance to keep pensions afloat, instead of employee or employer contributions. In other words, such pensions rely more

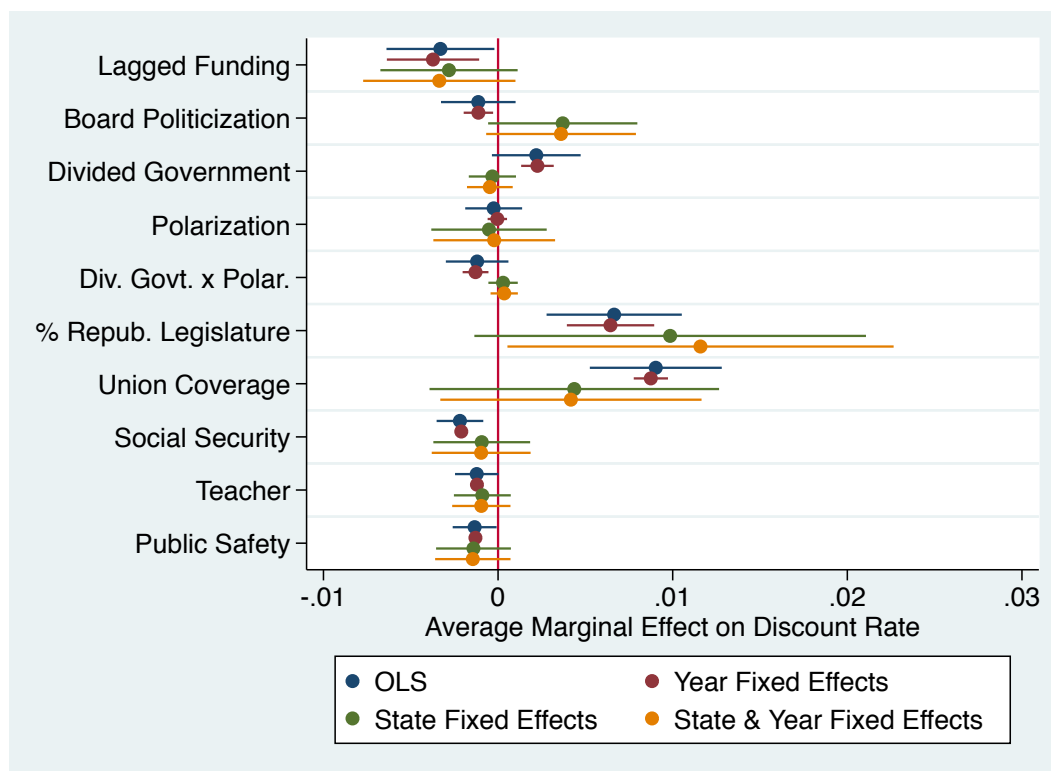
heavily on potential future investment returns instead of tax dollars. As I hypothesize in the main paper, more politicized boards might be associated with higher discount rates. Politicians have incentives to keep taxes low, and also keep public workers relatively happy by not significantly increasing their contribution rates.

Figure 2.39: Variables Associated with Higher Discount Rates



The above examines the political factors associated with higher expectations for investment returns. It displays coefficients and 95% confidence intervals.

Figure 2.40: Variables Associated with Higher Discount Rates, Including Lagged Funding



The above examines the political factors associated with higher expectations for investment returns, including lagged funding as an independent variable. It displays coefficients and 95% confidence intervals.

I present the results of regressing plans' discount rates on the board variable, as well as all the other regressors discussed in the paper, in Figure 2.39. I exclude all of the other actuarial variables, with the exception of lagged actual investment returns, since they could be post-treatment. I include the investment returns covariate since plans with higher returns in the prior year might be justified in increases their discount rate assumptions. Though the political variable has a positive relationship with the investment assumption, it is not statistically significant in the state fixed-effects models. Somewhat interestingly, it is significant and negatively associated with discount rates in the year models. There also is evidence that states with more Republican legislatures have higher discount rates, even after controlling for the prior year's returns.

In Figure 2.40, I present the results of an alternate specification that also includes the funding ratio from the prior year as a control. This is in case plans respond to poor performance by increasing their funding assumptions in the next year. As can be seen, the

other variables do not change significantly. Moreover, there is no evidence that plans adjust discount rates upward in response to poor funding in the prior year. Rather, it seems more likely that high discount rates are due to the inherent features of pensions, which allow governments to keep taxes low by relying heavily on investments, under the assumption that doing will pay off and cover costs at some point in the future. It also might be the case that Republican states, which have more pressure to keep taxes low, are especially likely to rely on investment returns to cover costs. These findings deserve further exploration in future work.

Funding Performance vs. Employer Contributions

In the prior paper, I uncover evidence that politics matters for public-employee pensions, though in particular ways. Namely, as boards become more politicized, they appear worse funded. By examining variation over time, I also establish that while board composition shapes funding in the following year, funding does *not* affect board composition in the following year, suggesting it is indeed the board generating this relationship, rather than the other way around.

The dependent variable, though somewhat manipulable through the selection of discount rates, is a general metric of performance. This allows for a testing of a more general theory, which asks to what degree does politicization of agencies or government management boards shape performance. I maintain that the variation in plan policies and boards provides an excellent opportunity to empirically test this theory.

Interestingly, other political factors do not seem to directly impinge on pension performance, whether or not I control for actuarial policies, as well. It is interesting that this is the case, given that legislators and governors determine many specifics of plan policies. No board is purely autonomous, even if none of the seats are politically controlled. Further, these political factors vary across plans and states, as well as over time. Yet, pensions seem remarkably insulated from them. Thus, even though pensions cannot be divorced entirely from politics, they seem to perform fairly similarly in different kinds of states.

Of course, the funding ratio is just one specific variable that gives a particular perspective of pension performance. That paper cannot provide as much insight into the ways that politicians govern the portions of the funds over which they have direct control. Though governments must make payments to employees in defined-benefit funds, elected officials do not have to make their required payments into funds each year. That is, politicians can choose to under-fund pensions by contributing less to them. Funding and the percentage of the contributions that are made by governments are strongly correlated in my data, and clearly endogenous. However, they are conceptually two distinct variables, and deserve separate analyses.

As will be seen in the following paper, the board ceases to be critical in affecting politicians' decisions to make their contributions into funds. I discuss this disparate result further in the Conclusion. Further, the lower legislative branch's ideology appears to matter,

where Republican legislatures contribute more into funds. The other major difference is that pension funds covering teacher and especially public safety employees tend to receive their payments from politicians more consistently, providing substantive empirical evidence that police and fire employees are popular and especially privileged in both ‘red’ and ‘blue’ states. Interestingly, these funds do not appear better or worse-funded in the first paper, though. I also find evidence that economic and investment performance seems to undercut politicians’ willingness to contribute.

Thus, though both papers focus on ways in which plans vary, the first is focused on a more objective metric of performance, while the second actually makes a macro-behavioral point about states’ elected officials. However, both papers underline the moral hazard temptations that pensions inherently present to politicians, as well as the ways in which certain states actually do manage to commit to their employees.

Chapter 3

To Fund or Not to Fund: Committing to Pension Contributions

Abstract

While the payment of pension benefits is mandatory, states do not have to make their Annual Required Contributions (ARCs) into funds. This decision speaks to the degree to which elected officials commit to public employees. Here, I ask what factors are associated making these payments. I use both logistic regression and OLS approaches, and also control for state and year fixed effects. A key finding is that politicians appear especially committed to making payments into plans covering police and fire employees. Politicians also make smaller contributions when pensions' other two revenue streams increase: investment returns and employee contributions. These findings highlight that politicians prefer not to devote money to pensions in the short term, even if doing so would improve their long-term fiscal standing. However, they do commit to pensions when it is politically expedient, as is the case when demonstrating support for police and fire employees.

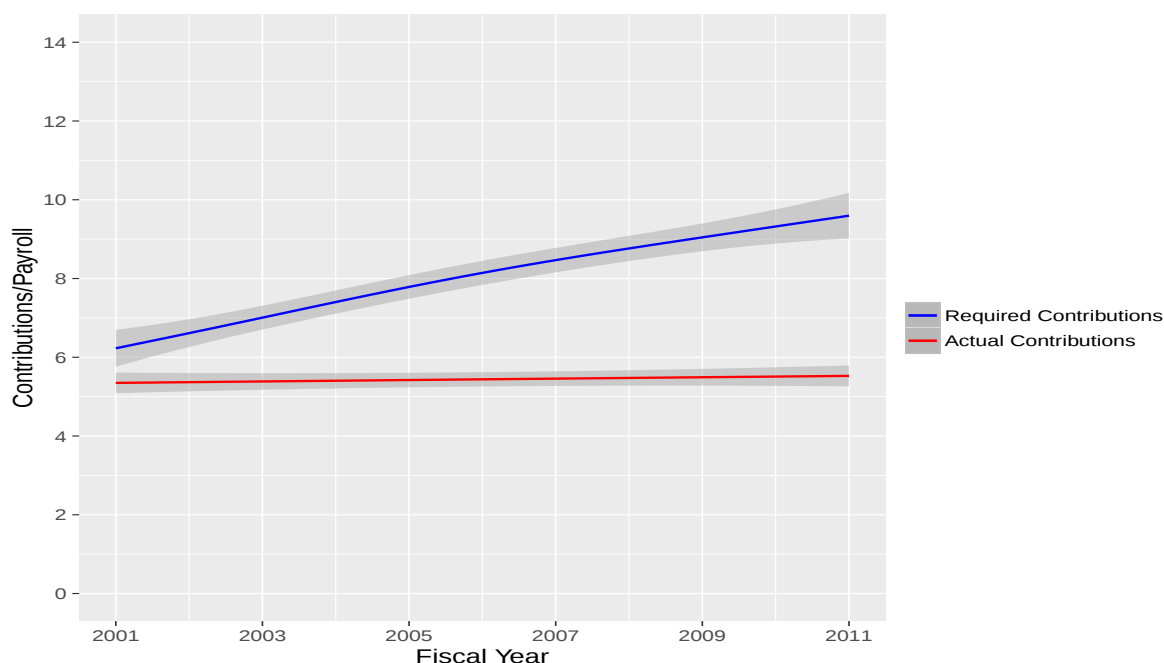
3.1 Introduction

New Jersey had its pension credit ratings downgraded in 2014. An employee of the state's pension board went so far as to sue Governor Chris Christie in response, complaining that the government chose to spend money on public projects it deemed more politically popular than pensions (Pizarro, 2014). In other words, the government did not make good on meeting its annual required contributions (ARCs) into plans, which led to significant underfunding and a downgraded credit rating. Why would elected officials in New Jersey or any other state opt not to make their full ARCs? What factors are associated with greater commitment to pension contributions?

Defined benefit (DB) plans have to pay out benefits to employees, by definition. These benefits are based on factors like the employee's age, salary, and the number of years worked.

Pensions impose a *normal cost*, which the present value of projected lifetime benefits¹ the government must allocate for in the current fiscal year, as determined by the actuarial cost method.² In order to cover this normal cost and also amortize past unfunded accrued liability, the board calculates an ARC, which it then signals to elected officials. Given that pensions historically have been seen as ‘off limits’ to cuts, one potential solution to improve funding has been to raise government contribution rates. This has in fact happened, as seen in Figure 3.1. However, at the same time, governments have on average consistently failed to meet these increased ARCs.

Figure 3.1: Required vs. Actual Employer Contributions as a % of Payroll



As seen above, while required contributions have increased over time to meet growing pension costs, the actual contributions made by elected officials have hardly budged at all (Based on Data from the Public Plans Database).

There is no national requirement that states have to make these required contributions.³ In this sense, pensions are better thought of as semi-mandatory costs. In the long term,

¹Projected benefits include three components: the remaining pension benefits that need to be paid to current retirees, the defined benefits earned by active employees to date based on their years of service and salaries, and finally the impact of future increases in salary on the benefits owed to active workers.

²I discuss actuarial cost methods below, and ultimately include the two most commonly used ones as controls.

³The Government Accounting and Standard Board (GASB) is a non-profit organization that provides

of course, states need to figure out a way to pay for them. In the short term, though, elected officials can opt to skip or only partially make ARCs, reducing taxes for voters and likely helping their reelection goals. If pensions receive fewer contributions than they need from employers, then both employee contributions and investment performance become more important in keeping pensions afloat. In times of strong economic performance, it has been common for states to skip ARCs and simply let strong economic returns cover costs. Pensions cannot hope for this at all times, though, and clearly it is very important to plans' fiscal healths that politicians make their full ARCs. The decision to not make a full ARC is essentially a choice to underfund a pension, and speaks elected officials' commitment to their state employees and pensions' fiscal health.

As such, it is worth knowing what factors are associated with making the full ARC each year. Of particular concern is how politics shapes this decision. Plans are managed by combinations of authority split between independent councils, legislators, and sometimes governors. These officials choose actuarial policies, determine generosity rates, and invest plan money. While boards set ARCs, elected officials then have the leeway to make whatever portion of the ARC they see fit.

My findings provide unique and robust evidence that state politicians are committed to pensions for police and fire employees. States rely on pensions to attract and retrain people to enter such dangerous professions. These employees also generally tend to enjoy support from politicians in both parties, and also from voters. This helps explain politicians' reluctance to cut their pension benefits. Illinois recently made two billion dollars in cuts for all public employees in the state - except for police and fire employees. Republican governor Bruce Rauner stated to the public: "Those who put their lives on the line in service to our state deserve to be treated differently" (Scheiber, 2015).

Additionally, the results also show how politicians can succumb to moral hazard. Namely, when alternate income from pensions' other two major revenue streams (employee contributions and investment returns) is greater, governments make *less* of their required contributions in the following year. Though I do not analyze data from the late 1990s here, many actuaries noted during this period that many governments opted to take 'pension holidays' due to strong economic returns. The problem with this approach, of course, is that economic booms do not last forever, and such pensions might be especially hurt in cases of sudden downward turns in performance. Lastly, this also means that there are states who ask a lot of employees, while comparatively asking very little of taxpayers.

There are some other factors, which I discuss below, which appear significant in one of the two major sets of models. Overall, my findings show politicians would prefer not to devote tax dollars to pensions. At the same time, though, they are sensitive to political

some loose guidelines for state and local plans, such as recommending the production of Comprehensive Annual Financial Reports (CAFRs) and being able to finance current budget obligations (Government Accounting Standards Board, 2006). However, the agency's recommendations are not enforceable. Plans vary in what they report in their CAFRs, and sometimes whether they even have them. In comparison, the national government tightly regulates private DB pensions under the 1974 Employee Retirement Income Security Act (ERISA).

realities, and will make credible commitments when politically expedient.

3.2 The Politics of Legislative Contributions

Politicians can compensate employees while also avoiding blame for rising costs, thanks to complicated actuarial rules and payment automaticity (Weaver, 1986). Pensions thereby provide a partial mechanism to resolve the seemingly inconsistent public demand for more benefits and lower taxes (Converse, 1964). Arnold (1992) argues that politicians have incentives to reduce the visibility of aspect of government that are not popular with voters, such as taxes. Hunter and Rankin (1988), Bartel and Lewin (1981), and Ichniowski (1980) all discuss the attractiveness to politicians of increasing future benefits for public employees rather than salaries.

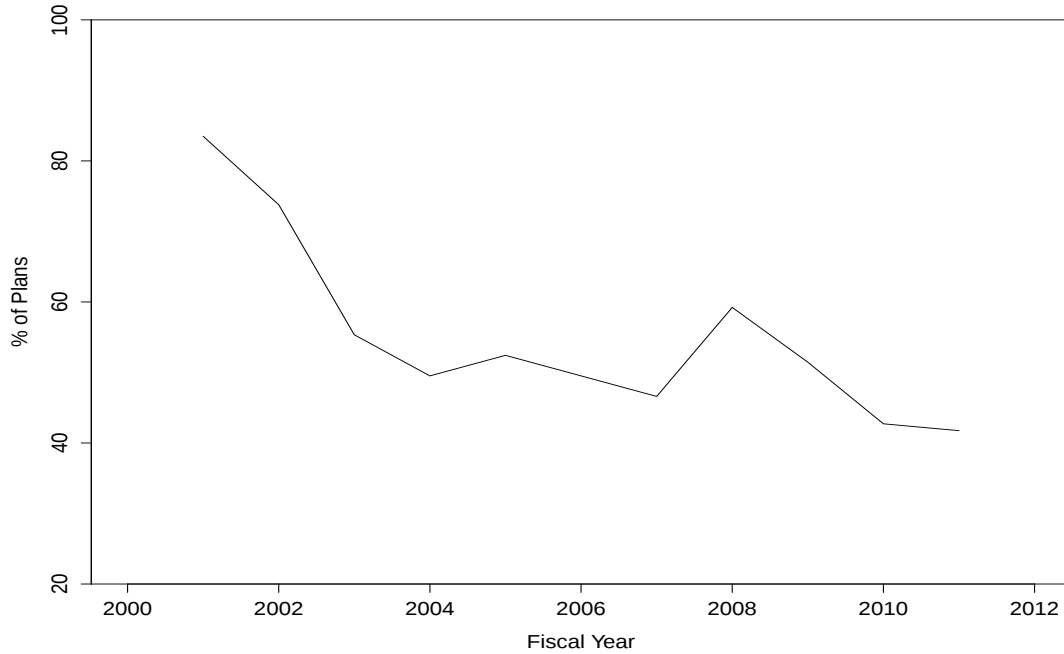
In so doing, though, pensions present politicians with time-inconsistency problems: governments can continually promise to pay for them in the future. Wagner (2001) highlights this general tension in financial management, and argues that legislators only run programs in fiscally sound manners when their prospects for future control remain in tact. Specifically, he finds that future changes in a state's lower house's controlling party are associated with significantly reduced current savings. Johnson (1997) similarly argues that politicians have incentives to offer generous and underfunded pensions to employees, especially in communities where residents are likely to move away before benefits are paid. Hess and Squire (2010) make the same sort of argument for teacher pensions, which they maintain politicians use to prioritize short-term commitments to employees over sounder long-term fiscal management. In examining employer contributions, Thom and Randazzo (2015) find that legislative professionalism and collective bargaining contribute to states' decisions to underfund pensions.

Thanks to the lack of nationalized contribution, states often fail to make their full payments. Overall, just 61.2% of the plan-year observations make 100% payments. Not only that, but states appear to have declined in their willingness to make ARCs over time (see Figure 3.2).

Elected officials can justify failing to make the full ARC by planning to contribute more in the future, or instead expecting future investment returns will cover the gap. In the past, some states have taken holidays from making their contributions into plans, and sometimes even raided funds to finance other government operations (Cayer, 1998). As seen in the New Jersey example above, this could have ominous implications for states' overall fiscal health and credit ratings, as well as the extent to which employees view pensions as credible.

In examining factors associated with making ARCs, I ask a similar research question as Munnell et al. (2008a). However, my work is distinct in several ways. First, I frame the dependent variable as a political choice. Politicians can opt to make pension payments, but doing so takes careful financial planning, and a clear commitment to employees and their pensions. These relationships are much more easily understood as political choices, rather than something that just happens to pension funds. Second, I include a number of additional political variables that are not considered in Munnell et al. (2008a). Given the dependent

Figure 3.2: Percentage of Plans Receiving Their Full ARCs Each Year



The above Figure shows how on average, fewer plans have made their full contributions over time (Based on Data from Public Plans Database).

variable is political in nature, it is important to consider what other political forces could shape it. Third, I include fixed effects for states and years in order to account for unobserved variation that could be associated with the outcome variable, and therefore bias my empirical estimates. I also lag all of the independent variables, due to post-treatment concerns.

Fourth, I estimate two different versions of the dependent variable, whereas Munnell et al. (2008a) only evaluate it as a binary variable. A potential concern is that a state that has a healthy pension might just miss making the full ARC in a few years, or prefer to make a 200% contribution every two years.⁴ For this reason, I also examine factors associated with making a greater *percent* of the ARC, which then will tend to downplay the difference between funds receiving 100% vs 95% of their required contributions. Thus, my approach here is both theoretically and empirically distinct.

Thom and Randazzo (2015) also examine politicians' contributions into funds, both in terms of the percent of the ARC made, and whether or not it is made.⁵ Though the two

⁴Not that any plan in my data takes this latter approach

⁵In terms of the latter, it differs slightly from my approach, in that it focuses uses states making under

outcome variables are similar to mine, that paper still is different in some important ways. First, it averages multiple plans within the same state together, and thereby misses potentially important factors that differ across plans, such as boards, and especially employees' occupations. Second, as I discuss below, it does nothing to control for the especially large outliers in the percent ARC model. Third, none of the independent variables are lagged. Many of them, such as the actuarial funding ratio, are clearly post-treatment. Thus, my goal here is to improve upon these works to better understand when politicians choose to commit to pension performance.

3.3 Data and Variables

I estimate several models of employer contributions, while controlling for political, actuarial, and economic variables. I utilize panel data from 103 DB plans in all states between 2001 and 2011. Much of the plan variables come from Boston College's *Public Plans Database*, which compiles information from annual reports and surveys of plan administrators.⁶ I also include economic and other demographic controls from the U.S. Census Bureau, and labor union information from the Public Sector Collective Bargaining Law data.⁷ Information on divided government and legislative control comes from the National Conference for State Legislatures.⁸ State legislative polarization data comes from path-breaking work done by Shor and McCarty (2011). Finally, I collected data on autonomy from plan's websites and relevant legislation.

I estimate the ARC in two alternate ways. In the first, the outcome variable is a binary indicator of whether governments make their full contributions to plans. This provides a sense of the factors associated with states meeting their entire commitment to employees, year after year. States that do not make it one year are likely more willing to gamble with employees' pension funds in the hopes they will be able to pay it back in a future year. Likewise, making 1000% of the ARC is not necessarily an indicator that plans are more committed to funds. A plan that makes a large ARC payment one year may very well be correcting for smaller payments in prior years. My empirical approach is to use logistic regression, which provides estimates of the likelihood that governments make their entire contributions.

In the second set of specifications, I estimate the percent of the ARC made by governments. This approach leverages more of the variation in the dependent variable. Moreover, a state that makes 95% of its ARC to a plan in a given year is quite different than one making 30%. It is important to note, however, that the percent ARC's distribution has a clear right-skew (Figure 3.3), thanks to some states that make especially large contributions in a given

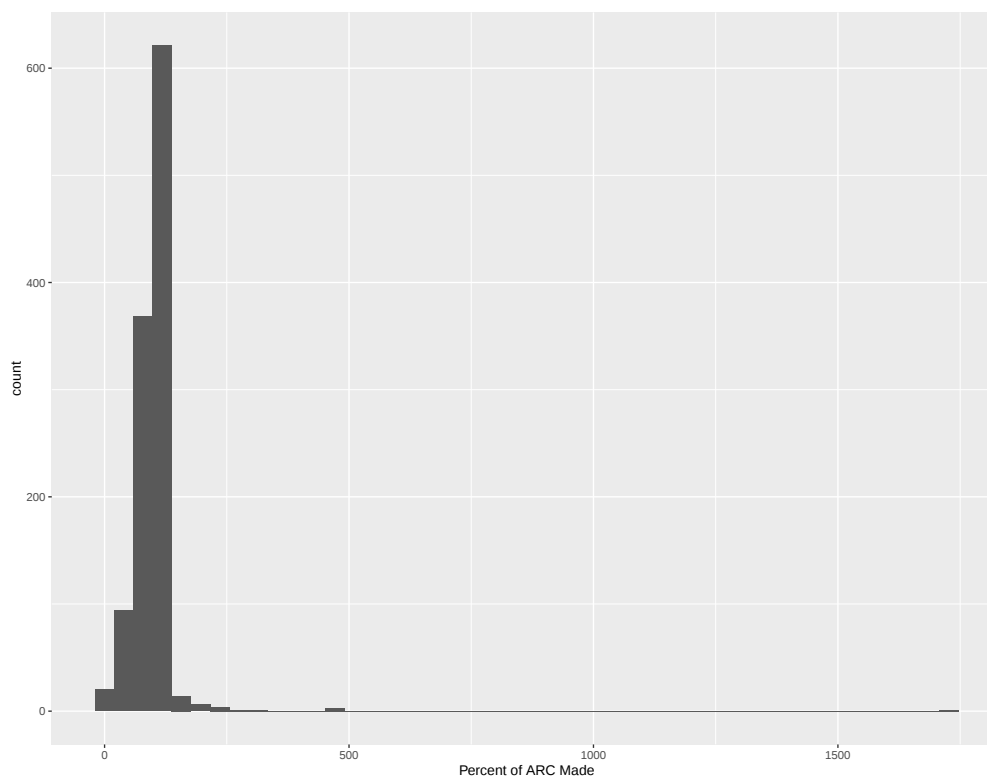
70% of the ARC as the threshold for underfunding, and above 95% for funding.

⁶The database also has information on several local plans, which I exclude to make more specific claims about state plans.

⁷<http://data.nber.org/publaw/>

⁸<http://www.ncsl.org/>

Figure 3.3: Distribution of Percent of Annual Required Contributions Made



This is a histogram of the percent of the ARC that is made by elected officials. Clearly, most plans make around 100%, but many make less. Further, some plans make exceptionally large contributions, as seen by the distribution's long right-tail (Based on Data from Public Plans Database).

year. These observations are unusual outliers, and do not provide much information about the broad factors shaping most plans. Thus, it is important to downweight their influence, which I do by logging the percent of the ARC made.⁹ Logging also imposes a more normal distribution on the dependent variable, better satisfying the assumptions of regression.

3.3.1 Political Independent Variables

There are a number of political variables that could influence plans' abilities to make their required contributions. The first I consider is the politicization of the pension manage-

⁹An alternative approach is to drop especially high percents, such as those over 200%. I present the results of the dropping approach in the Appendix. In comparison, logging avoids throwing out such information all together. Nonetheless, the coefficients and confidence intervals of the two different tactics are quite similar.

ment board. Members are bureaucrats or their elected representatives, politicians or their appointed agents, or ex-officio members, who are usually career politicians. I combine the latter two, since both reflect politicized control. Roughly 66.6% of members are politicized, though there is a sizable standard-deviation of 31.5%. Looking at the mean of this variable for all observations across each fiscal year, it appears at first that there is not a great deal of variation in board composition.

A closer examination, however, uncovers a fair amount of variation, both between boards and over time. First, there are numerous instances of variation between different plans within the same state. Specifically, 17 states feature multiple plans with distinct allocations of political seats on boards. Additionally, a substantial minority of plans (24 out of 103) experience board variation at one or more points between 2001 and 2011. Variation within boards over time either originates from deliberate statutory changes to plans, or alternatively simply due to failures by politicians or public employees to replace members who step down.

My models exploit this variation to assess whether board composition affects politicians' abilities to make the required contributions set by boards. One hypothesis is that more politicized boards might coordinate on setting and making ARCs that are easier to make. They do not want to embarrass state legislatures, and possibly themselves in turn. Stated somewhat differently, money provided by the government can be thought of as a form of discretion, since it provides boards with resources required to operate pensions. Under the sort of argument put forth by Epstein and O'Halloran (1999) which is making the employer contributions, occurs when legislators have more control over funds. Alternatively, more politicized boards might be associated with less ability to make the ARC, if these states simply less competent or committed when it comes to pension management. In comparison, a null hypothesis here provides evidence of the separateness of pension management boards as institutions.

Aside from that, legislative conditions could shape contributions. Here, I include a variable for legislative professionalism (see Carey et al., 2000). This variable considers whether serving as a state legislator is a full-time job, and also comes with a staff and support. The national legislature is highly professionalized. In comparison, states vary widely in legislative professionalism. For example, states with term limits often have shorter-term legislators working in office. The variable used here is a unidimensional measure that combines these factors. It is possible that legislatures are more likely to make their ARC payments with increases in professionalism. Alternatively, longer-term and better-paid legislators could be the ones most prone to pension' moral hazard temptations. Less professionalized legislatures might actually be more willing to take boards' ARC recommendations at their word.

I also include variables for divided government, polarization, and an interaction between the two. Polarization is quite distinct from divided government, and typically is defined as both increased ideological distance between the parties and ideological homogeneity within each party. High polarization implies that there is little or no room for consensus across the aisle, potentially harming the government's ability to pass policies. Here, I use data from Shor and McCarty (2011) on polarization in state legislatures, measured in terms of ideological distance between the median Republican and Democrat in the lower chamber.

Some work also argues that gridlock is actually due to the combined effects of polarization and divided government (Jones, 2001; Binder, 2003). As such, I include a dummy for the interaction between the two.

The central question is how gridlock affects elected officials' willingness to listen to the recommendation of a quasi-autonomous management board, and also then commit to public employees. Epstein and O'Halloran (1999) explore links between discretion and divided government. It is possible that a unified government might be in a better place to make a decision to under-fund. Under such an argument, divided government actually would increase discretion, which then might enhance making the ARC. Alternatively, divided government could raise transaction costs and hurt a government's ability to make its ARC. Strategic disagreement could get in the way. In any case, it is not theoretically obvious which of these competing hypotheses will dominate. I test here how, and if these forces matter.

Unions are a separate force that could matter for governments making their required contributions. It is possible that legislators are more likely to make their contributions to funds when unions are stronger. Under the sorts of arguments made by both Downs (1967) and Niskanen (1968), organizations need resources to generate growth, incentivizing workers to organize to protect and expand salaries and benefits. Unions seem like an especially salient culprit today, as government officials in states like Wisconsin and Ohio try to curb collective bargaining. Indeed, government employees are much more likely to belong to unions than their private-sector counterparts: membership has grown from about 10% of all employees in the 1950s to about 38% today (Munnell et al., 2011a). In the private sector, however, membership has shrunk from about 35% in the 1950s to just seven percent in 2010.¹⁰ I use data from Hirsch and Macpherson (2003) on the percent of unionized employees in each state. In the sample in my data, just under 40% of public employees are unionized. A standard deviation of 17.6% suggests a great deal of variance, however.

The evidence seems mixed. It is hard to point to any one study and definitively say it delineates the causal impact of unions on employee compensation. Even if an individual study came close to doing so, there could be considerable heterogeneity in different employment environments. Any number of other unobserved factors might also explain variance seemingly associated with unions. I argue that unions want to protect or possibly raise benefits for employees, and therefore could pressure politicians into making their payments. Alternatively, unions might not need to actively push politicians into making payments, but simply be stronger in states with politicians who are more committed to public employees and their benefits.

I also consider whether employees receive Social Security (SS). At the time of their formation, state and local plans excluded their workers from SS. However, since the 1950s, coverage has expanded to a greater share of the public workforce. Still, as of 2011, about

¹⁰In the private sector, unions often translate to increased benefits for employees and higher prices, so competition tends to push against their influence. Further, new companies generally open as closed shops. Since private companies frequently go in and out of business, it follows that unions will continue to have diminishing influence in the that sector. That said, large, older firms are still more likely to have unions and DB pensions

6.4 million, or over a quarter of state and local employees are not eligible for SS, and pay no SS taxes on their salaries (Clark et al., 2009). About 77% of the observations of my data involve pension plans complemented by SS. There is a rather large standard deviation of 41.9%. Local and state employees that do not participate in Social Security tend to receive larger annual pension benefits (Almedia et al., 2009). Thus, I expect that state legislatures will have an easier time paying for smaller benefits, and therefore be more likely to make contributions into such plans.¹¹

I also account for specific categories of public employees, such as public-safety workers and teachers. There could be factors unique to jobs that shape politicians' willingness to make pension contributions. Oddly, there is not a great deal of literature that speaks to the relative level of commitment governments extend toward specific employee occupations. Nonetheless, I expect that legislatures will be especially committed to funds covering police and fire employees. These employees are necessary provide a fundamental public service, and typically enjoy high levels of support among voters and politicians of both parties.

3.3.2 Pension Plan and Economic Independent Variables

There are a large number of plan variables that could be included in studying making the ARC. Plans vary in the degree to which actuarial and management decisions are made by quasi-independent boards. Legislatures ultimately have power to rein in these agencies, though, and most still determine various aspects of pension policy. Thus, I argue that these variables are still political in nature.

In two of the specifications, I include a lagged measure of pension funding as an independent variable. That is, legislatures might be more or less likely to make their full contributions to plans if they are in better or worse shape. They may be more likely to make full payments to previously better-funded plans because they are more committed to those plans, and wish to keep them functioning well. Alternatively, they might be less likely to make contributions to those funds if they suspect the plan is doing 'well enough' to justify taking a pension holiday.

I also include a control for the discount rate, or the expected investment return. Plans with higher discount rates expect that their investment revenue will be greater in later years, which if true, means that plans can still be well-funded even if politicians skip their payments. Of course, the discount rate is just a prediction, and tends to be roughly twice as large as pensions' actual investment returns. Given the moral hazard temptations that pensions present to politicians, in which elected officials would rather keep taxes low, I expect to see higher discount rates justifying lesser employer contributions. In other words, when governments think that the economy will perform well, they will be less likely to make their full contributions.

Relatedly, I include investment performance as an independent variable. Much like the discount rate, I expect that greater investment performance will be associated with smaller

¹¹Interestingly, this is at odds with SS's effect on pension funding.

contributions, since politicians will be more likely to succumb to moral hazard in times of strong economic performance. In comparison, I include variables for the three kinds of investments (equities, real estate, and alternatives). These ought to have ambiguous relationships with making the ARC, given that I consider a time period of both relatively healthy and poor economic performance.

Another source of pension revenue comes from employee contributions. I examine the employee contribution rate as a fraction of total payroll, to understand expectations for employees. Much like with the discount rate, I expect that this variable will be negatively associated with employer contributions. States may feel less need to make their contributions when employees make larger payments into plans. Arguably, states asking employees to make greater commitments into plans, but failing to make their own required contributions are not especially committed to pensions or employees. In comparison, I examine the employer contribution rate as an independent variable. It is possible that greater employer contributions may be associated with less ability to make the ARC, since more generous plans are difficult to manage. Nonetheless, I do not have a strong theoretical prediction for this control.

I also include controls for whether plans utilize market valuation of liabilities (MVL) or Actuarial Accrued Liability (AAL). MVL equates the discount rate with the current market rate of a group of high-quality fixed income investments, which increases sensitivity to economic fluctuations.¹² In comparison, AAL's longer smoothing periods spread costs into the future. Most public plans use AAL (Gold and Latter, 2009).

Actuarial plan type is an additional control. My data contain four of six possible estimation methods. I include dummies for the Entry Age Normal (EAN) and Projected Unit Credit (PUC) methods, which comprise most of the sample.¹³ The amount of time plans have been on their current funding regimens might matter for funding. Older plans might be seen as larger commitments, or legislatures might be more used to making their contributions.

Finally, it also is important to control for economic characteristics in each state. I use Census data to produce a measure of the ratio of debt to Gross State Product (GSP) to measure state economic activity, which accounts for economic growth, as in (Munnell et al., 2008a,b). As with the discount rate, investment returns, and employee contributions, I suspect that governments will make smaller contributions in times of strong economic activity. This variable therefore should have a positive relationship with employer contributions, since higher ratios indicate that the state's economy is in worse shape.

3.4 Empirical Analysis

I now turn to analyzing variation in making the ARC using a similar approach as in the prior chapter, relying on panel data from 103 state plans between 2001-2011. I estimate

¹²See the Online Appendix for a more thorough discussion.

¹³See the Online Appendix for more discussion of these variables.

several different panel fixed effects regression models in order to uncover robust relationships between making the ARC and a number of independent controls. The three sets of controls include political, actuarial, and economic variables. The fixed effects models adjust for unobservable factors within states that could lead to variation in the outcome variables. Additionally, I lag all the independent variables by one year to allay post-treatment concerns.¹⁴

In the following, c_i represent non-random unobserved characteristics, i is the given plan, t is the year, $\beta_1 - \beta_3$ are vectors of the point estimates of the political, pension, and economic control variables, R'_i are the dummies representing states or years, depending on the model, and ϵ_{it} is the random part of the error:

$$Y_{it} = \beta_0 + \beta_1 Politics_{it} + \beta_2 Pensions_{it} + \beta_3 Economics_{it} + R'_i c + \epsilon_{it} \quad (3.1)$$

I report OLS results with robust standard errors, cluster standard errors at the state level, and include year, state, and state and year fixed effects. I also present alternate models with lagged plan funding as an additional regressor, in case plan-funded status from the prior year influences legislators' decision to make their full contributions in the current year.¹⁵

3.5 Results and Discussion

Figures 3.5-3.7 present the results of the above regressions. Taken together, they provide insight into the factors influencing elected officials' decisions to make their required contributions to funds. The different specifications provide distinct views of how pensions function, depending on the assumptions made in each. In the OLS and year-fixed effects models, I make comparisons across states. That is, the models compare a plan in California alongside a much smaller plan in Rhode Island. In the state fixed-effects models, I only look at variation within a given state, due to the concern that unobserved forces might influence the outcome variables. Despite these differences, each approach has something useful to say about the way that plans vary over time.

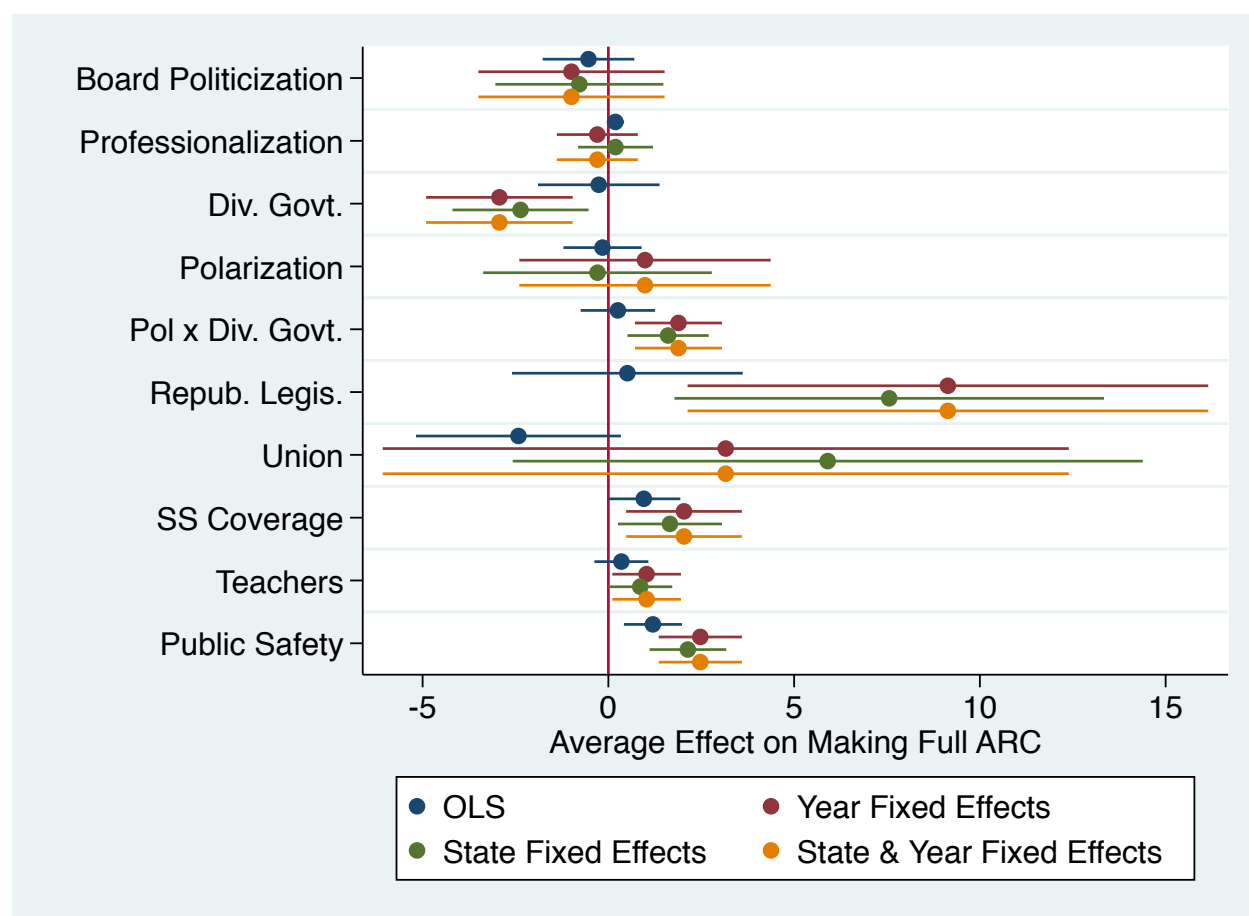
First, the only finding that is robust across *all* specifications is that plans covering public safety employees receive more contributions. Legislatures appear to want to demonstrate commitment to these special public employees, who typically enjoy bipartisan support in states. In other words, anti-government attitudes are less likely to affect perceptions of police and fire employees. Further, these employees perform important and necessary functions in all states, so elected officials may not wish to risk underfunding those pensions. This helps provide insight as to why Scott Walker exempted police and fire employees from his public-sector cuts in the state of Wisconsin (Scheiber, 2015).

¹⁴That is, if I instead included independent variables from the current fiscal year, it is possible that they could be determined after making the ARC, thereby meaning their values could not possibly influence the earlier decision to make required contributions. In other words, failing to lag provides biased estimates.

¹⁵See the Appendix for versions of all models without the actuarial variables. Excluding them does not change the estimates significantly.

In comparison, plans that cover teachers have modestly higher likelihoods of receiving the full ARC in the year and state fixed-effects models, suggesting that either legislators are more committed to teachers, or their unions are skilled at creating incentives for legislatures to make full payment. The direction is positive but only significant in the OLS and year-fixed effects specifications in the percent ARC models. Teachers perform a critical job in all states, but there is much more controversy regarding their benefits and rights to collective bargaining.

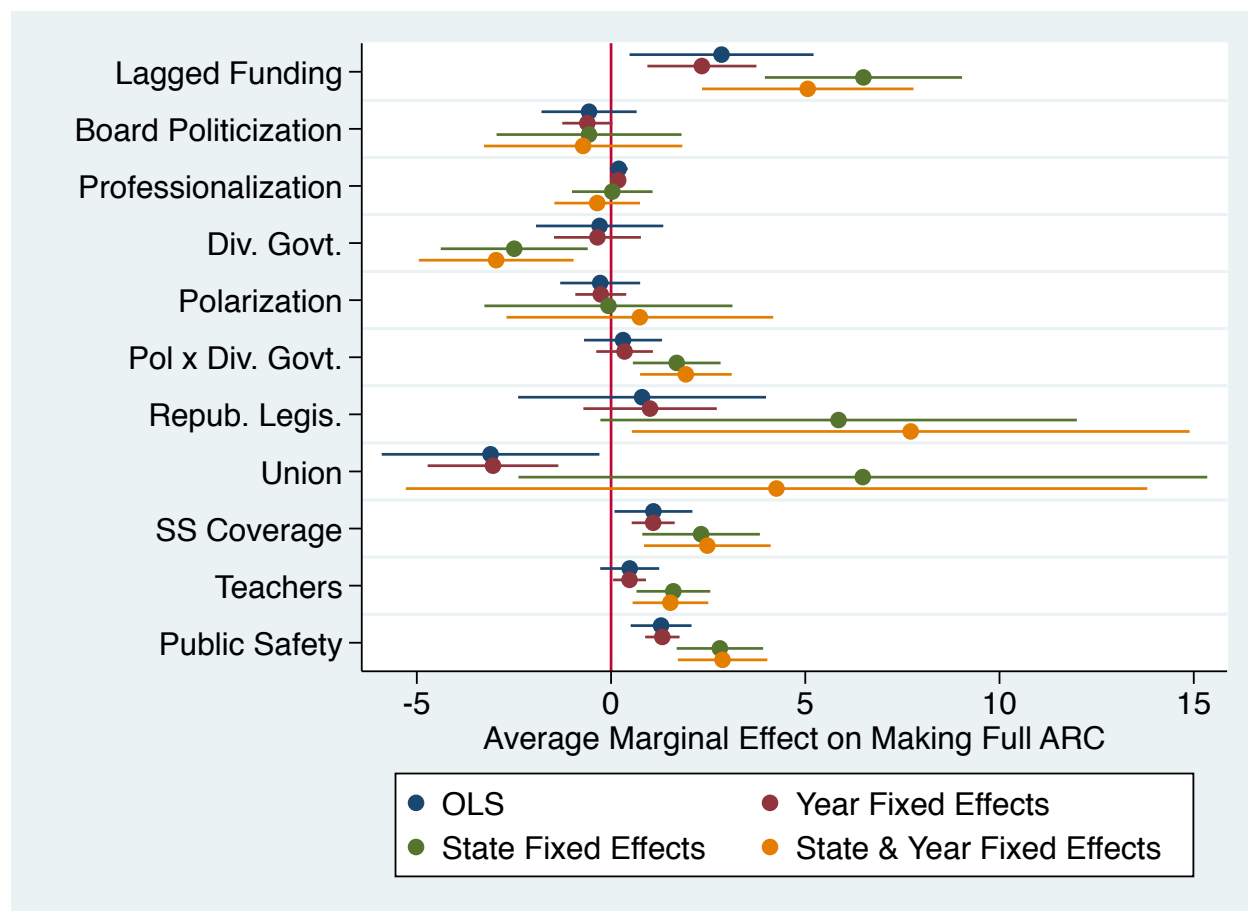
Figure 3.4: Political Factors Associated with Making Full ARC



The above presents the coefficients of using logistic regression to uncover the associations between making the Full ARC and the various regressors, which are all lagged by one year.

The board variable has a null relationship with making the full ARC in all specifications. It is only significant, and negatively associated with making a percent of the ARC at the five-percent level in the year fixed-effects models. Given that this variable does not change

Figure 3.5: Political Factors Associated with Making Full ARC

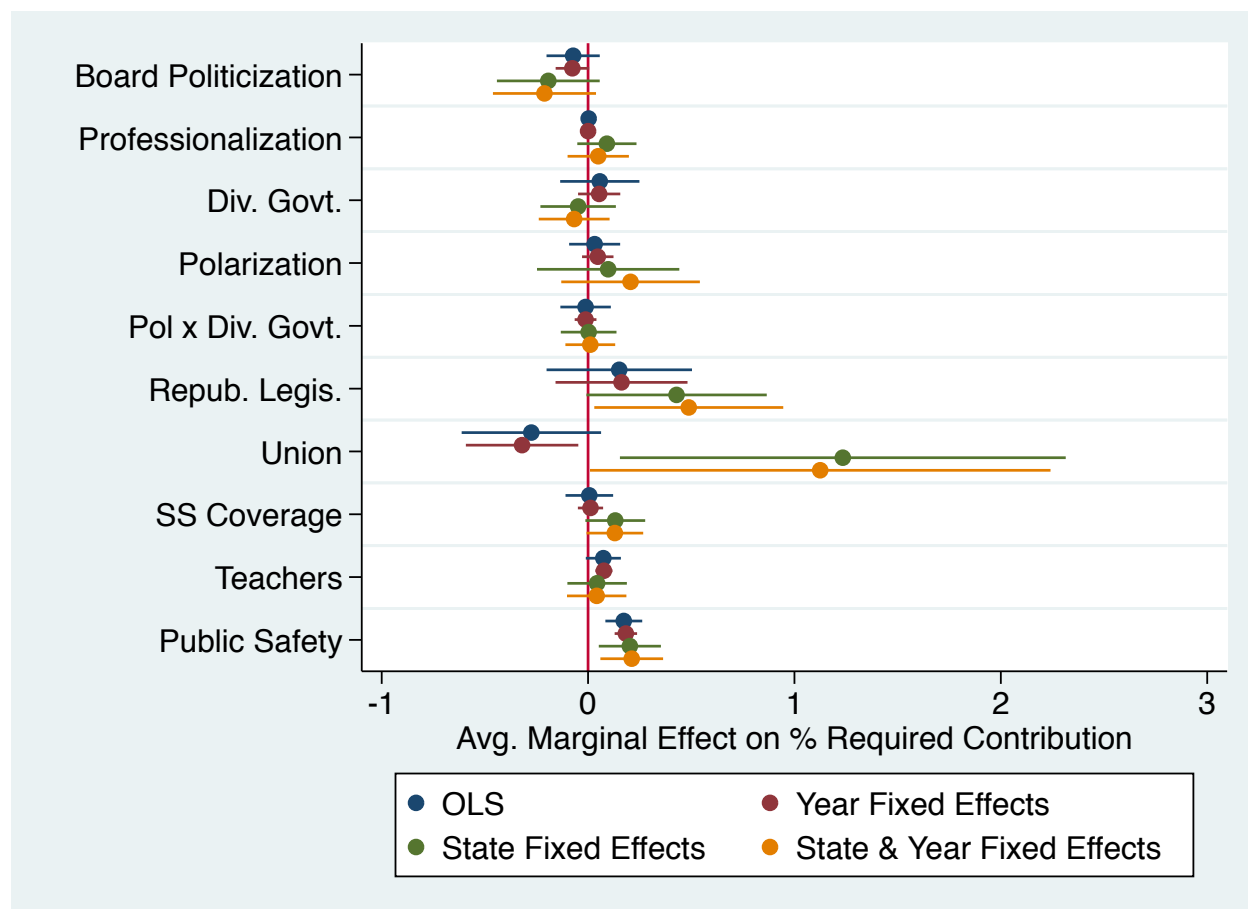


The above presents the coefficients of using logistic regression to uncover the associations between making the Full ARC and the various regressors, which are all lagged by one year.

a great deal within states over time, the year specification may in some sense be the most useful one to consider here. Overall, there is very little evidence that there is a great deal of coordination between legislatures and boards on designing targets that are easy to make. If anything, the relationship is in the opposite direction. This provides strong evidence that the legislature's decision is independent of the board's composition.

Union membership has somewhat mixed results on making the ARC. In the state fixed-effects models, it is only significant and positive in the percent specifications. That is, when looking at changes in union membership over time within a given state, a greater portion of the ARC is made. However, when comparing unionization levels *across* states, it seems that greater unionization is associated with less ability to make employer contributions. Thus, the

Figure 3.6: Political Factors Associated with Logged % Required Contributions



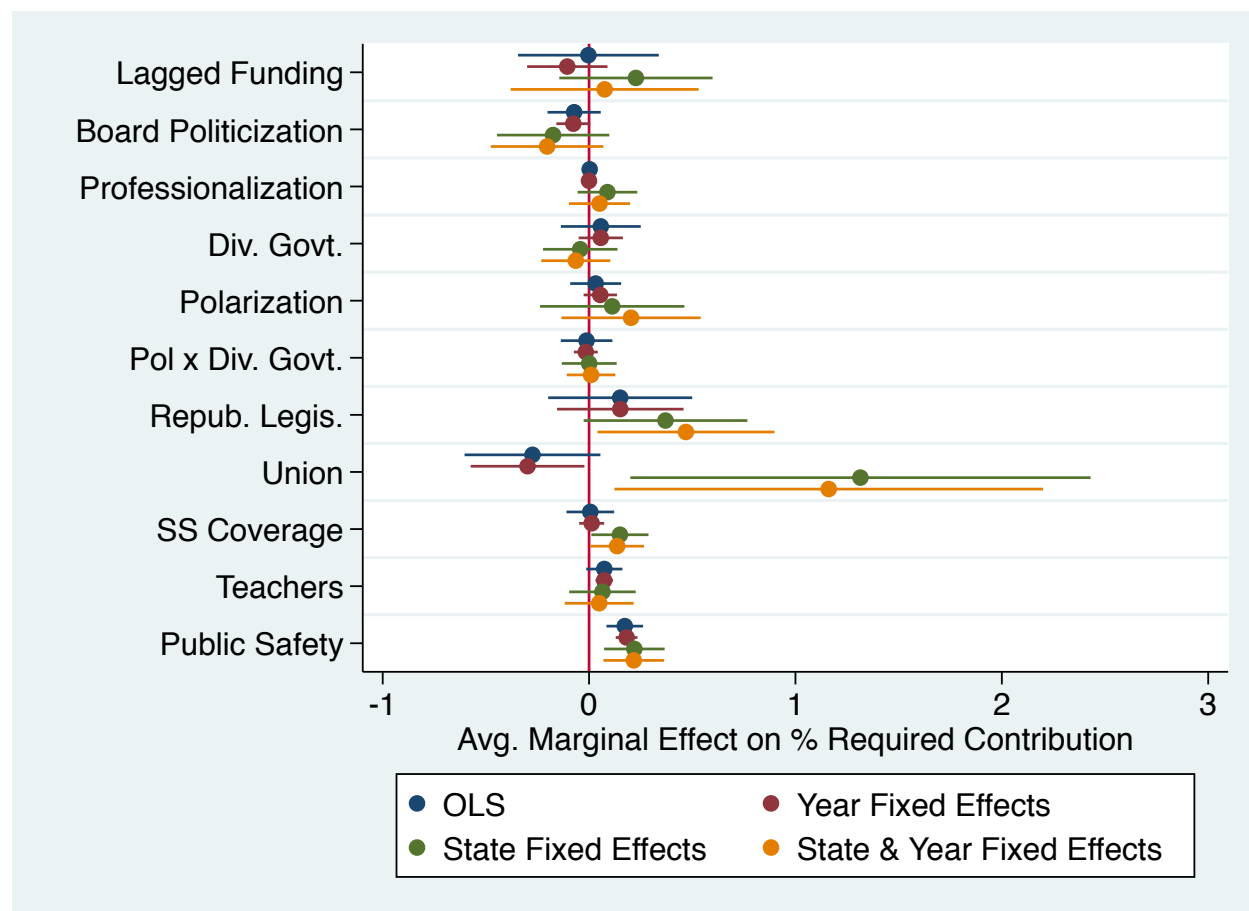
The above presents the coefficients and 95% confidence intervals of regressing logged percent contributions on the various regressors, which are all lagged by one year.

evidence is mixed, and depends on the assumptions one is willing to make about potential sources of unobserved variation.

Polarization and divided government also have unclear effects. Polarization by itself is not significant in any of the models. However, divided government is significant and negative in the full ARC models, while the interaction between divided government and polarization is significantly positive in the full ARC models. Thus, there is not especially clear evidence that gridlock has a predictable effect on making the employer contributions.

Republican legislatures associated with more likelihood of making full ARC in all of the year and state fixed-effects models. In the percent ARC models, they only appear more willing to make a greater percent in the state fixed-effects models. Thus, there is some evidence

Figure 3.7: Political Factors Associated with Logged % Required Contributions, Including Lagged Funding)



The above presents the coefficients and 95% confidence intervals of regressing logged percent contributions on the various regressors, which are all lagged by one year.

that Republican legislatures are somewhat more willing to make their full contributions to pensions than their Democratic counterparts. This potentially could indicate some degree of greater budgetary responsibility, at least in the domain of pensions, among more Republican legislatures.

Interestingly, longer-term minded politicians do not seem any more likely to make their full contributions. Professionalism has null relationships with the two different outcome variables. More professionalized legislators tend to serve longer and be more career-oriented, so while it is possible that they might care more about pensions over the long-term, they also likely actually feel the most pressure to keep taxes low, even at the expense of pension

performance.

Social Security is the only other variable that is significant and positive in all of the state-fixed effects specifications. Additionally, it is positive and significant in the OLS and year fixed-effects specifications for making the full ARC. Note that this finding is in distinct contrast to the one in Munnell et al. (2008b), in which ARCs are less likely to be made as plans are complemented by SS. Their reasoning is that employers are more likely to make their ARCs to such plans, since covered employees are entirely dependent on their pensions.

However, it is not very likely that individual legislators think that much about the livelihoods of public employees with regard to whether or not they have Social Security. Instead, the positive ARC effect reflects the fact that such plans tend to have smaller benefits and normal costs, thereby making it easier for legislatures to make their required contributions. In fact, there is a -.15 correlation between the size of the required contribution and plan members also receiving Social Security. Thus, it is not so much such governments are more committed to these plans, so much as that it is comparatively easy for them to make contributions in such cases.

The actuarial and economic variables, though technical in nature, still provide information about politicians and their decisions to commit to funds. Though the evidence is sometimes mixed, it generally appears that as more money comes in from solid investment returns or better economic performance, or as governments *assume* that investment returns will be higher via the discount rate, politicians make *smaller* contributions into funds. In other words, they rely more heavily on investment returns than employer contributions to fund pensions. When those streams dwindle, though, then they are more likely to make their contributions.

In terms of specific findings, the discount rate is significant and negative in the year and state and year fixed effects models. In the percent ARC model, it is negative and significant in all four specifications, without about a -10% effect in the state and year model. Thus, the evidence seems fairly consistent that as governments assume there will be better investment returns, they also feel less pressure to make their full contributions into plans.

At the same time, the results are a bit more mixed for the real indicators of state-economic performance. In the full ARC model, there is evidence that governments are more likely to make their full contributions when investment returns are lower in the OLS model. The variable is not significant in the other specifications, though. In the percent ARC model, the variable is negative and significant in both the OLS and state fixed-effects models, and insignificant in the other two. One implication of this is that if the discount rate is significantly higher than actual economic performance (which it always is), employer contributions will be especially lower than they ought to contribute to underfunding.

Similarly, the economic performance variable is associated with significant and positive contributions in the OLS model, indicating that looking across all the data without any of the fixed effects, that the full contribution is more likely to be made as the state economy does worse. However, the variable is negative and significant in the state fixed-effects model, and not significant in the other two. In the percent ARC model, though, the economic variable is positive in both the OLS and year specifications, but not the state ones. This

could be due to the fact that a state's economy is not as likely to change within a given state from year-to-year, but does vary much more so across states. Thus, there is some, if somewhat mixed evidence here that as the real economic performance is better, both in terms of debt/GSP and investment returns, politicians are less likely to make their contributions.

Of course, the other stream of revenue for pensions besides employer contributions and investment returns is employee contributions. In the full ARC models, greater employee contributions as a percent of payroll are associated with *less* probability of making the full ARC in all but the OLS models. Thus, states that ask more of their employees in terms of contributions are also less likely to meet their full required contributions. In the percent ARC specifications, the variable is significant and negative in the year fixed-effects models, but not significant in the others. Again, employee contributions tend not vary a great deal within states, so it makes sense that the variable is significant in the year fixed-effects model.

In comparison, lagged employer contributions as a percent of payroll are not significant in any of the specifications except for the OLS specification of making the percent ARC. Thus, it is not clear that larger actual employer contributions are generally associated with more or less ability to make required contributions in the following year, on average.

The only other actuarial variable that appears to have consistent and significant effects in both models is that older plans are associated with greater employer contributions. The size of the effect is small, though, but nevertheless, it may indeed be the case that politicians have an easier time sticking to their funding regimens for older and more established plans. The other actuarial variables appear to have mostly null or mixed relationships with the ARC in both sets of models.

The results here are based on an analysis of observational data over 2001-2011. As seen above, the different models provide different insights about plans and the politics that are associated with them. Some of the findings vary with the assumptions across the different models. However, the results do consistently indicate that politicians are less likely to make their full contributions when the economy is doing better. Further, they are more likely to make their contributions into police plans, likely demonstrating their importance to state governments, and a greater level of commitment. While it will be interesting to extend this analysis as more years of data are available into the future, this provides a useful and broad insight into when elected officials are able to commit to making their annual required contributions.

3.6 Conclusion

While management boards set ARCs, it is up to elected officials to pay them. The decision to make an ARC is essentially a decision to fund a pension. Politicians have the option to weigh making their pension payments against other public spending or priorities they might have. Pensions routinely rely on actuarial assumptions that justify deferring costs into the future. Many scholars have argued that these assumptions are not realistic (see Peng, 2004; Novy-Marx and Rauh, 2009, 2011).

One justification behind this approach is that unlike private companies, governments do not go out of business. If absolutely necessary, governments can use their coercive powers to raise money through taxes. However, the evidence shows that it not very easy to muster the political will to do so. As such, it is *increasingly* common for states not to make the full contributions into funds. These funds, on average, will perform worse overall, which could damage states' credit ratings, and the degree to which employees believe they will receive their full pension compensation. Given these concerns, I ask what factors are associated with making both the full contribution, and a greater percentage of the contribution.

This study makes an important contribution in providing robust evidence that police funds are most likely to receive their full contributions. Politicians have differential preferences for certain types of employees. For one, police and fire employees often enjoy bipartisan support, and are more exempt from anti-government attitudes than other sorts of employees. Namely, they are popular with voters. While Scott Walker exempted such employees from cuts in 2011, the Republican Governor of Ohio, John Kasich, did not do so in 2012. Eight months later, voters in that state overturned his signature law with a referendum. Other Republicans since then have not made the same mistake: Michigan and Illinois have exempted police and fire employees from subsequent benefit cuts affecting all other state employees.

It is also true that politicians are aware such employees are vital to the functioning of the state. Third, these jobs are dangerous and generally not especially well-paid. Part of their appeal to new recruits and current employees alike is the promise of a solid pension. Thus, many politicians are probably inherently reluctant to undermine pensions' personnel incentives in funds covering public-safety employees. Of course, I only examine one dimension of commitment in looking at this particular dependent variable. It is likely that politicians express preference for these types of employees in numerous other ways, as well, which future research should address.

The other key set of findings is that politicians prefer to make smaller contributions when the economy performs better, or merely when they think it will perform better, as expressed via the plan's discount rate. Additionally, plans with employees who are also eligible to receive Social Security seem to make more of their ARCs. These findings together suggest that politicians have many other priorities besides pensions, and tend to make their contributions when they are necessary (investment returns will not cover the gap), or when they are easy to make, as is the case when plans are complemented by Social Security and therefore less generous.

There is some evidence (i.e. only significant in one of the specifications) that unionization, teacher plans, and Republican legislatures increase making full contributions. Just as interesting are the factors that do *not* seem to influence making the ARC. Board politicization does not, which suggests that more politicization of the board does not shape legislative decision-making to make contributions. This also provides some evidence that management boards are institutionally distinct from legislatures. Divided government and polarization alone also do not seem to affect making contributions into funds. This provides some evidence that legislatures' institutional problems, namely gridlock, are not the root source of the policy problems associated with pensions. In fact, there is some mixed evidence that

greater gridlock is associated with greater contributions.

In summary, additional regulatory authority from the national government would likely help better manage pensions and mitigate the variation in making contributions. Pensions are currently underfunded en masse. There is no reason to expect higher-than-historical investment returns over a prolonged period of years in the future. Nonetheless, public plans consistently rely on such returns, based on the justification that they will not go out of business. However, this fails to take into account that states and funds' credit ratings have a number of real impacts, such as making it more expensive to borrow money to fund public programs in future years. Underperformance creates lingering costs that have to be paid off at some point.

In other words, in order to put themselves on solid fiscal ground, states might need to make pensions less generous to employees, either through raising the retirement age and increasing contributions. But in addition, states need to contribute more into funds as well. This requires that politicians resist moral hazard temptations or the pressure to direct pension money toward other more popular public programs. After all, prolonged pension troubles will have indirect effects on the provision of those public goods, which voters in the near future will not like either.

3.7 Appendix

3.7.1 Information about the Variables

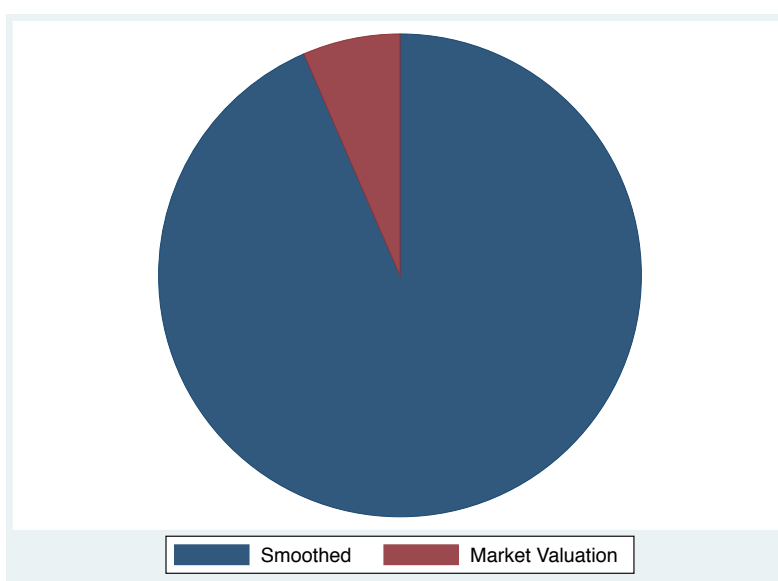
Table 3.1: Descriptive Statistics

	Observations	Mean	Std. Dev.	Min	Max
Full ARC	1133	.55	.5	0	1
Percent ARC	1133	1.03	3.22	0	107.57
Funding Ratio	1130	84	20	19	197
Political App.	1132	.67	.31	0	1
Divided Government	1132	.52	.5	0	1
House Polarization	1025	1.51	.52	.45	3.29
% Republican	1019	.47	.14	.08	.83
Legislative Professionalism	995	.47	1.88	-1.82	8.56
Per. Union Coverage	1132	.39	.18	.1	.75
Social Security	1133	.76	.43	0	1
Republican Control	1019	.47	.14	.08	.83
Employee Contribution	1079	.05	.03	0	.23
Employer Contribution	1056	.09	.08	-.06	1.79
Discount Rate	1072	.079	.004	.045	.09
Market Valuation	1133	.07	.25	0	1
Investment Return	1027	4.2	12.07	-29.63	28.83
Equities	1108	55.85	11.0	0	82
Real Estate	1090	5.34	4.65	0	22.08
Alternatives	1081	3.81	6.62	0	50.42
EAN	1111	.76	.43	0	1
PUC	1042	.15	.36	0	1
System Age	1133	58.37	17.35	1	100
Teachers	1132	.51	.5	0	1
Public Safety	1132	.46	.5	0	1
Lagged Debt to GSP	1132	.07	.04	.02	.23

3.7.2 Additional Background on Pension Actuarial Techniques

The plan sponsor chooses the discount rate, which is based on the yields from plan investments. Plans utilize either Market Valuation of Liabilities (MVL) or Actuarial Accrued Liability (AAL) to calculate discount rates. MVL involves equating the discount rate with the current market rate of a group of high-quality fixed income investments, which makes it more responsive to economic fluctuations. Specifically, it utilizes a portfolio of traded securities that matches employee benefits in amount, timing, and payment probability. The portfolio is independent of the expected return on investments, meaning that market performance does not affect funding simply due to using MVL. In comparison, AAL uses longer actuarial smoothing periods to spread costs into the future. The vast majority of public plans use AAL, as seen in Figure 3.8.

Figure 3.8: State Pension Plan Asset Valuation Type (2001-2011)

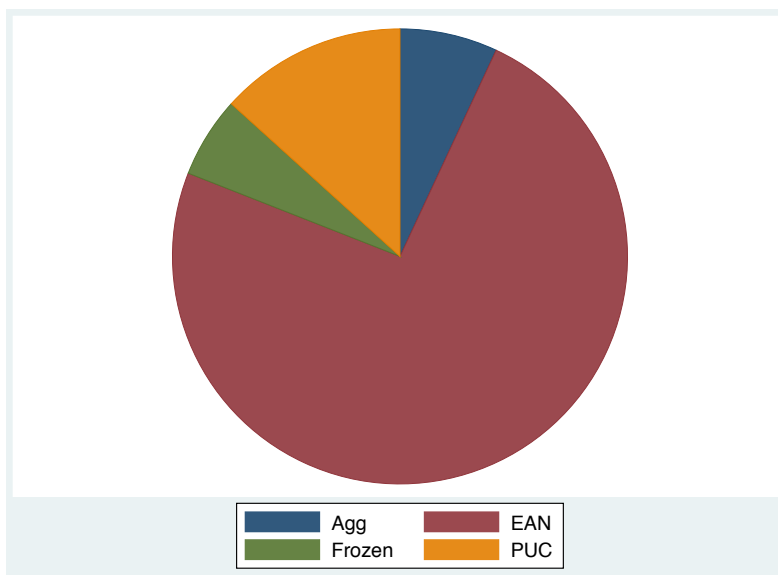


Source: Based on Data from Public Plans Database

Actuarial plan type is used in liability estimation. My data contain four of six possible cost-estimation methods, as seen in Figure 3.9.

I just include dummy variables for Entry Age Normal (EAN) or Projected Unit Credit (PUC) plans, since most plans use those methods. Generally, the PUC method estimates more liabilities. EAN plans allocate the present value of lifetime retirement benefits equally each year employees work, adding to the liability as employees remain in their jobs. In comparison, PUC estimates benefits as a function of the present value of additional lifetime

Figure 3.9: State Pension Plan Actuarial Cost Estimation Type (2001-2011)



Source: Based on Data from Public Plans Database

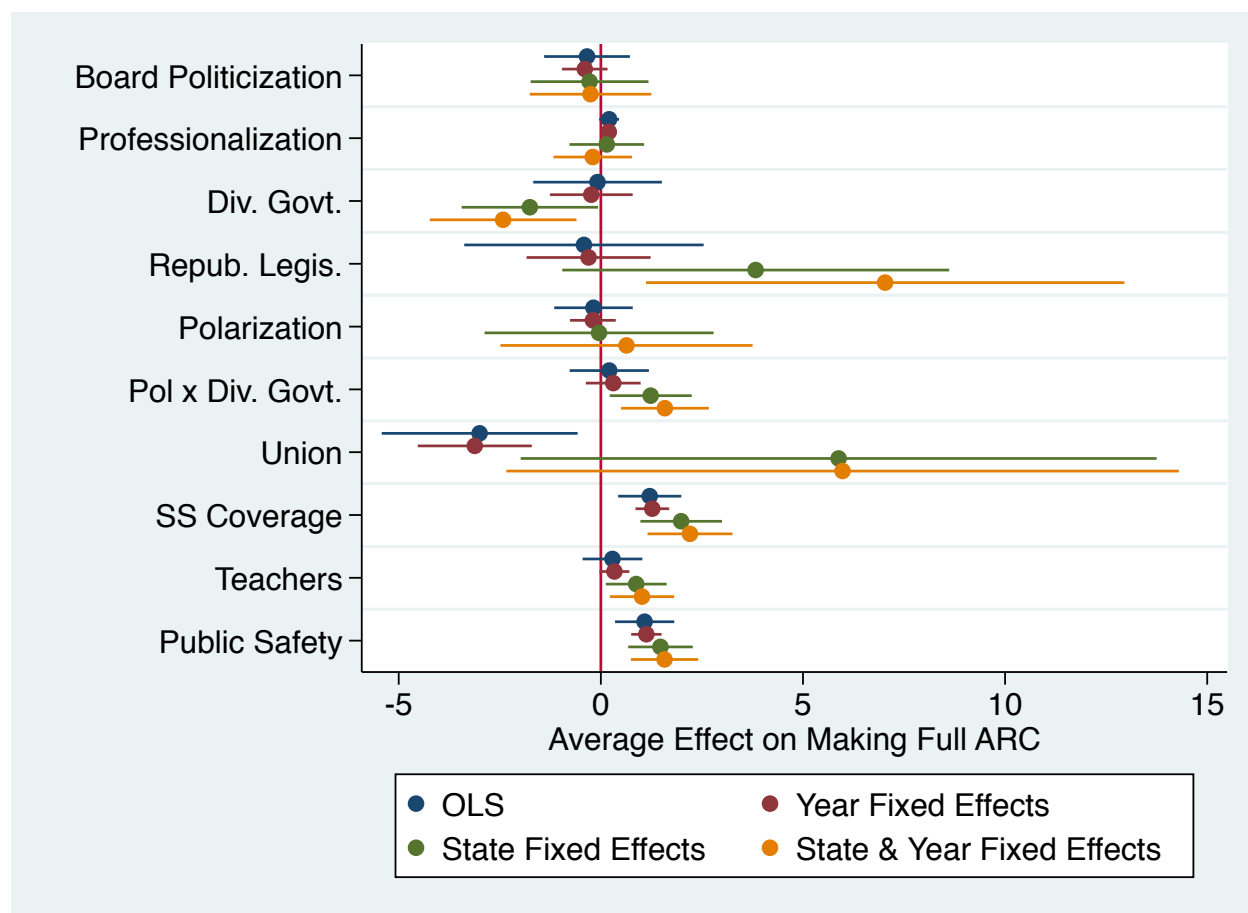
benefits employees expect by retirement. Given that employee-salaries typically increase with age, PUC calculates more liabilities.

Those and the Traditional Unit Credit Method all directly calculate liabilities at each evaluation date. In comparison, the Frozen Initial Liability and Attained Age Normal methods evaluate liabilities at one date, but do not update in the future, except to amortize liability funded by plan contributions. Lastly, the Aggregate Method does not determine any accrued liability and counts all liabilities as future normal costs, meaning plans appear 100% funded at all times. In the private sector, plans always utilize PUC. In the public sector, though, any plan type is considered acceptable. While some plans in my data use the aggregate method, I lump this with other approaches due to its small frequency.

3.7.3 Models without the Actuarial Controls

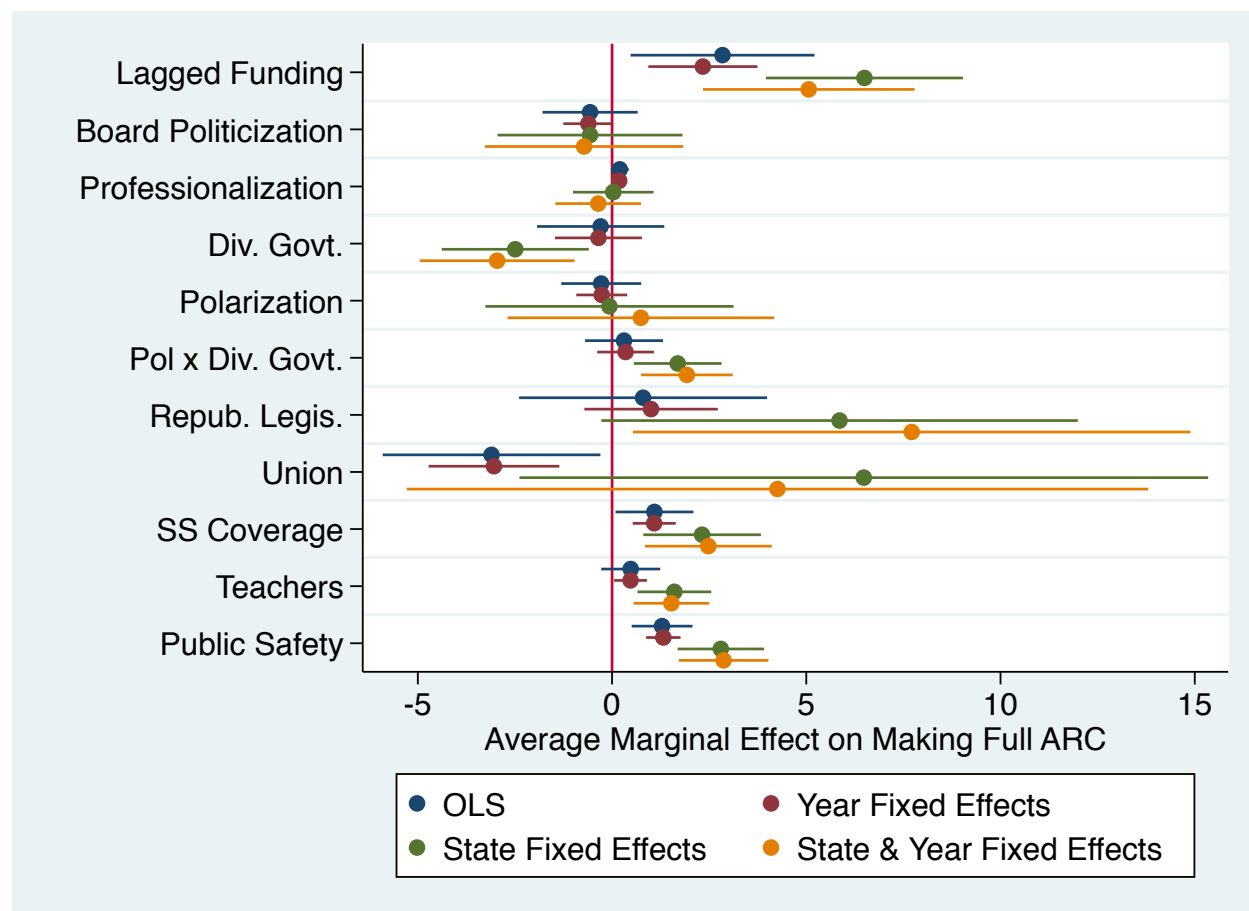
One concern with estimating any variable is that various regressors might be post-treatment. In the main paper, I mitigate this concern by lagging all of the independent variables by a year. However, it is possible that an actuarial variable in the prior year reflects an expectation of an upcoming change in the state's politics, and is thereby post-treatment. In case this is true, I run alternate specifications that simply leave out the actuarial variables, and present them in Figures 3.10-3.13.

Figure 3.10: Political Factors Associated with Making Full ARC, No Actuarial Controls



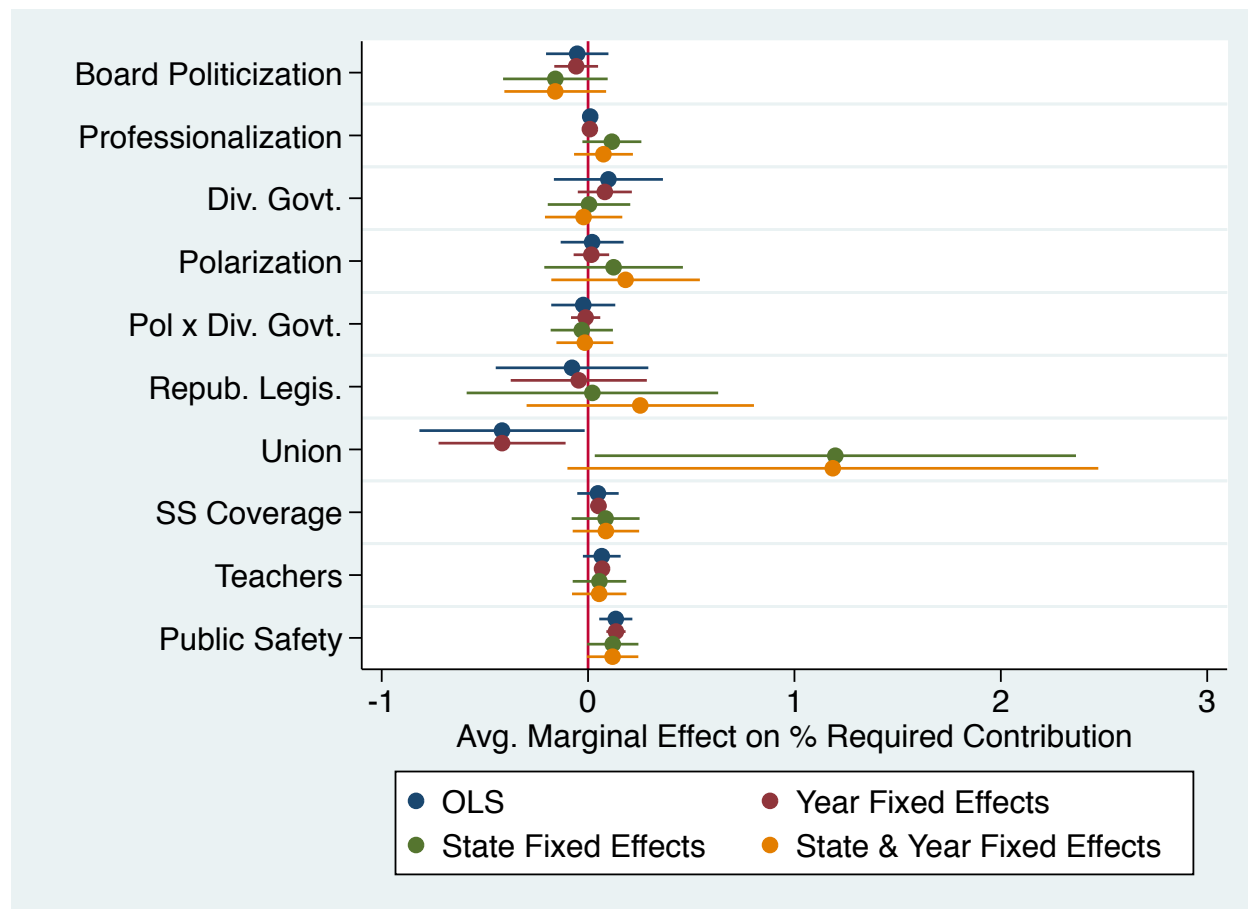
The above presents the coefficients and 95% confidence intervals of using logistic regression to uncover the associations between making the Full ARC and the various regressors.

Figure 3.11: Political Factors Associated with Making Full ARC, Including Lagged Funding and No Actuarial Controls



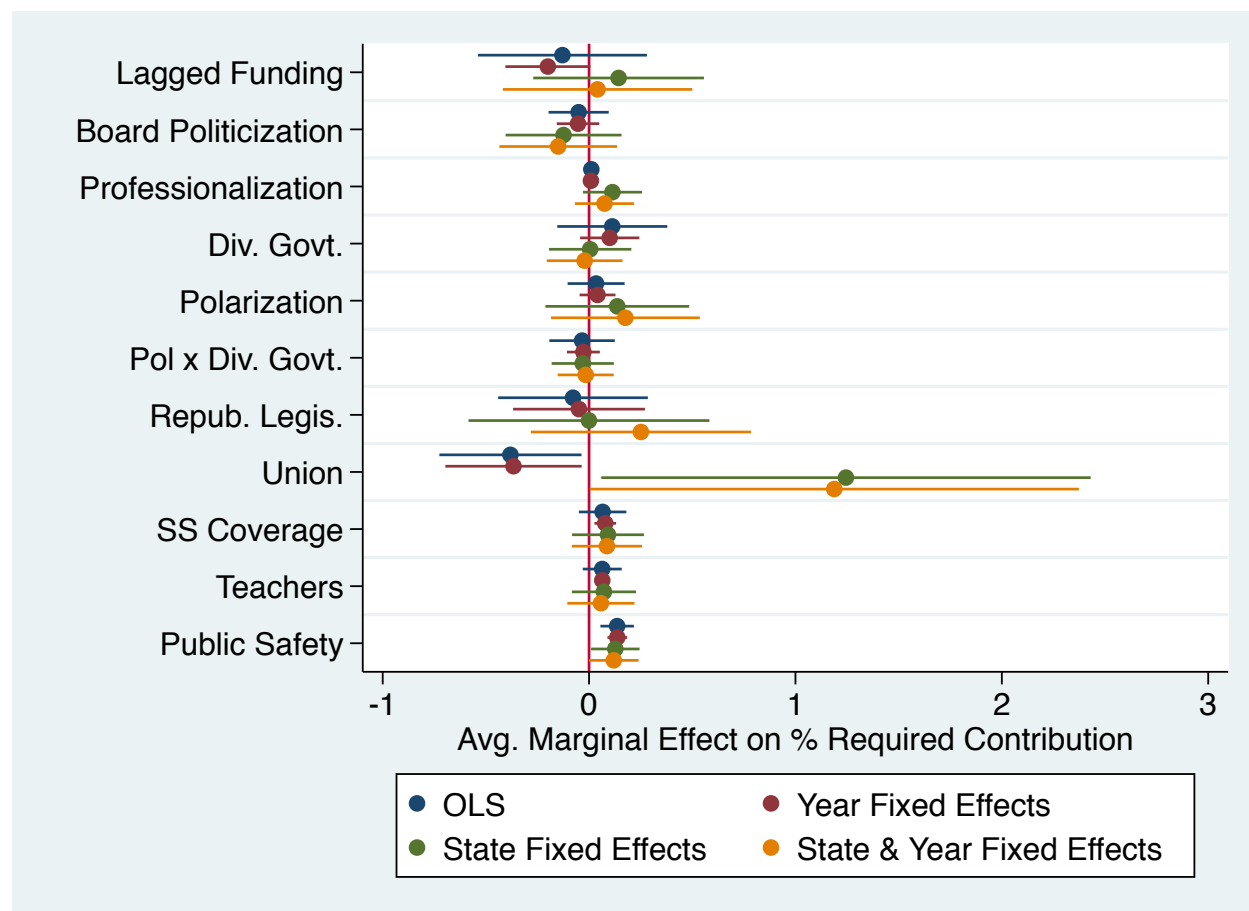
The above presents the coefficients and 95% confidence intervals of using logistic regression to uncover the associations between making the Full ARC and the various regressors.

Figure 3.12: Political Factors Associated with Making %ARC, No Actuarial Controls



The above presents the coefficients and 95% confidence intervals of using logistic regression to uncover the associations between making the %ARC and the various regressors (excluding any actuarial variables).

Figure 3.13: Political Factors Associated with Making %ARC, Including Lagged Funding and No Actuarial Controls



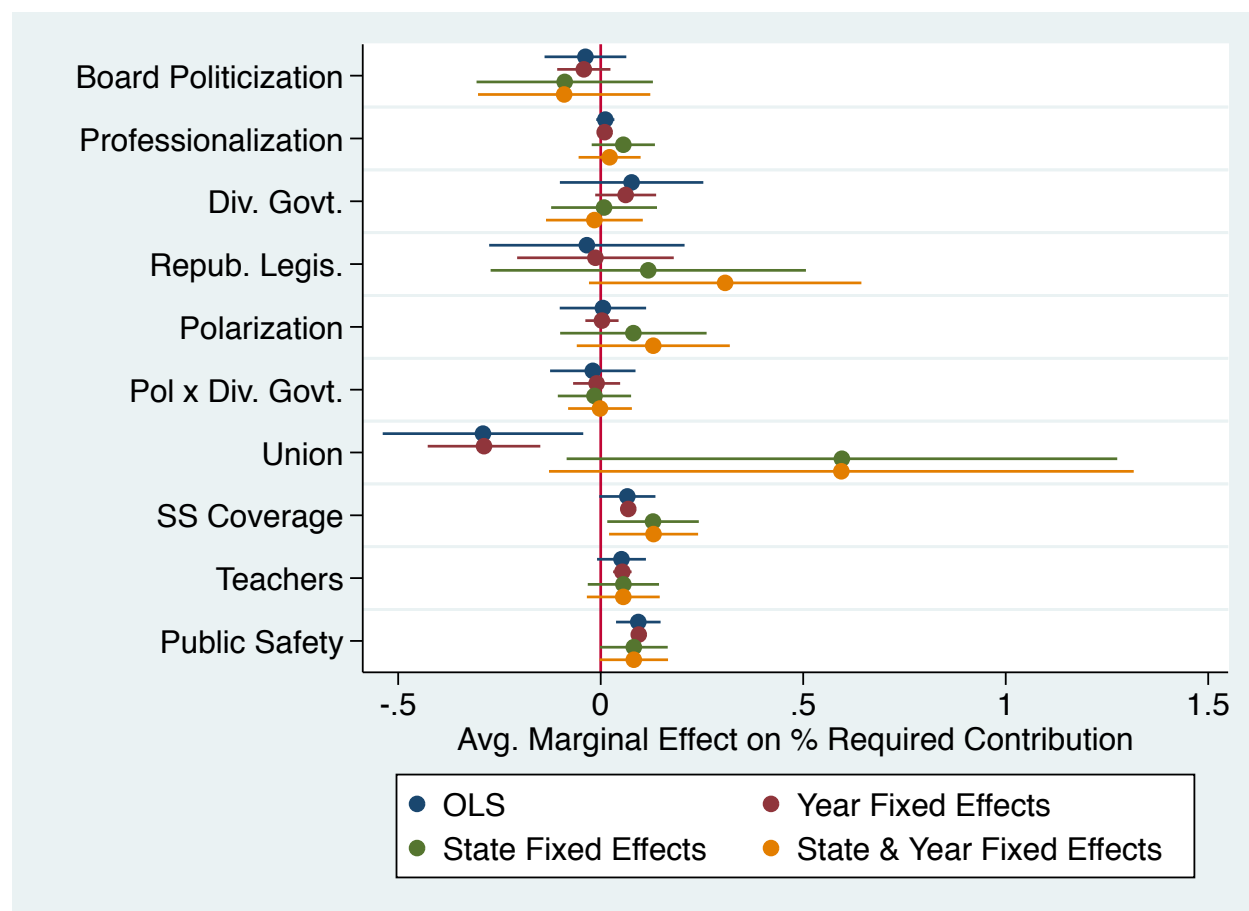
The above presents the coefficients and 95% confidence intervals of using logistic regression to uncover the associations between making the %ARC and the various regressors (excluding any actuarial variables).

As can be seen, the results do not deviate a great deal from the main paper. Neither boards nor legislative professionalism are significant. Teacher boards are associated with more contributions in the full ARC models, but only in the OLS and year-fixed effects specifications of the percent contributions models. Public-safety plans remain significant across all specifications, though.

3.7.4 Dropping Large Outliers

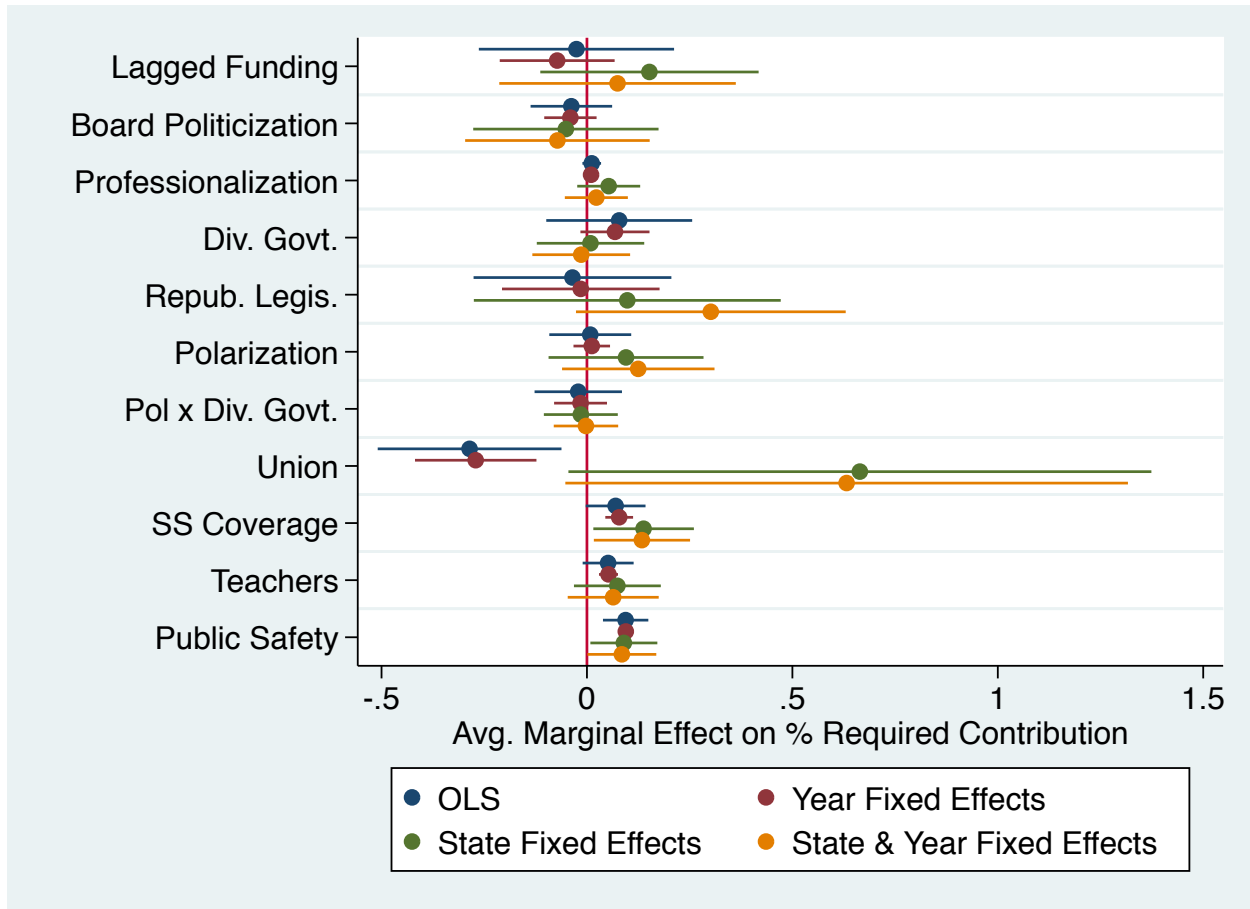
A concern with analyzing percent ARC that I address in the main paper is that poor performing plans sometimes make massively large contributions in a given year, to make up for prior years of smaller contributions. Such contributions arguably do not signify better financial planning. They also do not provide a great deal of information about how most states opt to manage their pensions. Thus, it is important to downplay the influence of these outliers in a broad quantitative analysis. In the main paper, I do this by logging the variable. Alternatively, I can simply drop observations where especially large ARCs are made: such as those over 200%. I present the results of doing so in Figures 3.14 and 3.15.

Figure 3.14: Political Factors Associated with Making %ARC (< 200% Specification)



The above presents the coefficients and 95% confidence intervals of regressing Percent ARC on the various regressors, excluding all observations making over 200%.

Figure 3.15: Political Factors Associated with Making %ARC, Including Lagged Funding (< 200% Specification)



The above presents the coefficients of regressing Percent ARC and the various regressors, and 95% confidence intervals excluding all observations making over 200%.

Once again, there is not a great deal of difference between this specification and the logged versions in the main paper. The unionization variable is a bit less significant in the state and year fixed effects model, however. Public safety plans, once again, seem especially likely to receive more payments.

From Pension Causes to Consequences

Both the first and second papers provide insight into how different variables related to pensions vary. The first is focused on an overall metric, and makes an important point about management boards. The second, in comparison, is focused on elected officials, who retain the ultimate control over pensions. The two most telling findings in the paper involve how politicians appear especially committed to public safety funds, and also how they tend to prefer to make *fewer* contributions into funds when they think they can get away with it. Such plans are also more likely to ask employees to commit more of their own incomes into pensions. This shows that politicians do indeed seem to act on their moral hazard temptations.

The third paper moves away from a direct analysis of the way that pensions vary, and instead focuses on a key consequence of that variation. As discussed in the Introduction, pensions ought to manage retirements, incentivizing employees to remain in their jobs for long-tenures, but also retire before they grow too old. However, little is known about exactly how and if pensions do this at all for government employees. A theoretical assumption in such work is that pensions are credible commitments.

My first two papers, however, include results calling that assumption into question. In particular, if more employees suddenly believe that they will not receive their promised payouts, or if governments slash benefits in a particular year, it is possible that more employees will exit their jobs in response. I include a simple theoretical model showing the conditions under which this could incentivize employees to exit, rather than remain in their jobs.

I then move to an empirical analysis, which allows me to test an implication of that theory. The dependent variable is a proxy for the retirement rate that I collected from plans' annual reports. No other work has examined the question of pensions' retirement effects across states through this particular variable, or even one like it. There is substantial variation in the retirement proxy both across states and within plans over time. I exploit this in order to empirically understand how pensions and their related politics shape employees' retirement decisions.

I find mixed results for two different metrics of funds' generosity. Larger employee contribution rates seem to increase retirements, while decreased generosity levels are associated with more exits. Further, the retirement rate proxy increases as boards are more politicized, suggesting that employees remain in their jobs when they have more voice or representation on boards. Finally, there also appears to be a feedback effect from pension

performance into retirements. That is, plans with poor funding experience more retirements in the following year. Employees do not stick around as long in worse-performing plans. Other political factors, including polarization, do not directly appear to encourage retirements.

Of course, one challenge for this work regards the degree to which employees think about pensions and politics in their everyday decision-making. In the paper, I carefully consider and respond to this argument. I maintain that even if many employees rarely consider such factors, enough do so in the aggregate to generate large-scale and statistically significant human capital effects. In other words, pension policies actually do affect broad trends in human capital, which matters for the provision of public goods. Pensions therefore play a key role in the public sector, and governments ought to take this into account as they consider reforms.

Chapter 4

Public-Pension Credibility and the Retirement Decision

Abstract

State-government pensions have experienced rising costs and declining performance in recent years. In theory, deferred income should stabilize retirement rates and encourage long careers. It is unknown if and how state pensions actually affect retirements. First, I demonstrate how declines in credibility could lead to increased exits. Then, I empirically assess how pensions and state politics affect retirement rates utilizing a new proxy variable collected from plan reports. The retirement seem influenced not just by the degree of benefit generosity, but also by the level of performance and the composition of the retirement board. This suggests that while pensions do affect retirements in the expected way, factors shaping their performance or perceived risk also seem to influence exits. Governments should keep these consequences in mind as they pursue pension reform.

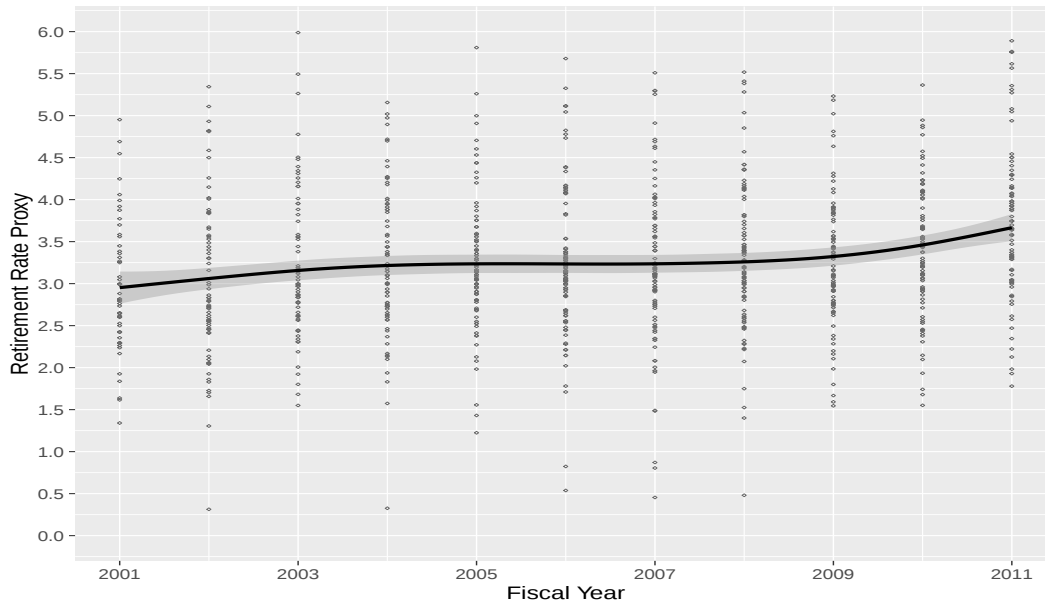
4.1 Introduction

Government employers face a central problem: how can they maintain the human capital required to produce the public goods and services demanded by voters? One particular concern is that large numbers of looming Baby Boomers retirements will reduce governments' labor pool. Indeed, looking at data from state governments, we see a significant increase in retirements between 2001 and 2011:¹

Once public employees in pension plans exit after reaching specified tenures, they begin collecting retirement income. Pensions are meant to structure retirements so employees work for long periods of time, but also exit before they grow too old. In a sense, pensions provide at least a partial solution to governments' human capital problems. A large body of work

¹The retirement rate proxy is an original variable that I collected and constructed from pension-plans comprehensive annual financial reports. I discuss it in more detail below.

Figure 4.1: Fraction of Employees Added to Rolls (2001-2011)



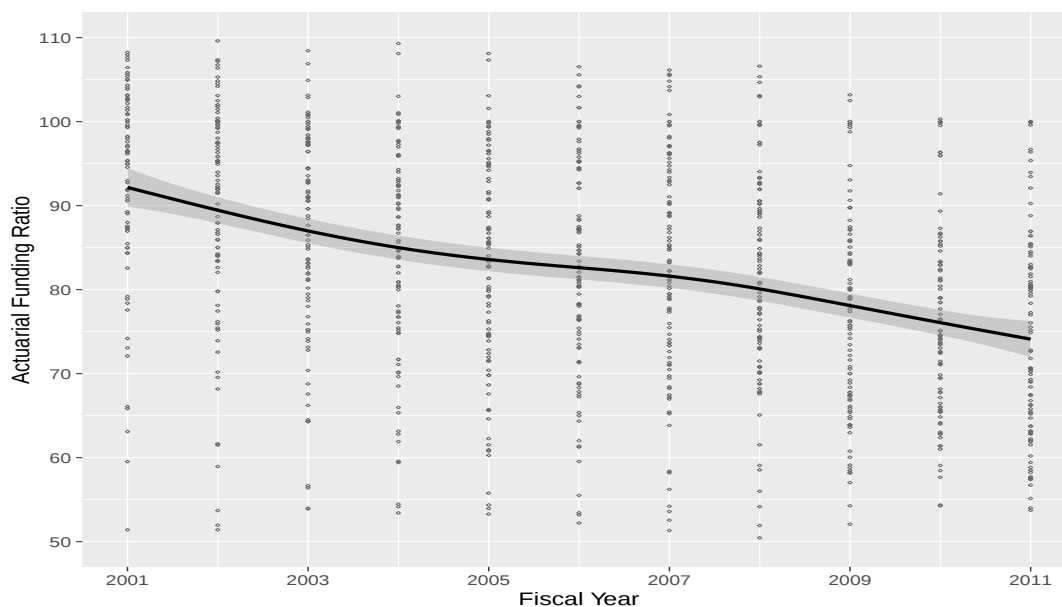
This plots the proxy for retirement rates in each fiscal year for all state-pension plans in my dataset. Specifically, it is a ratio of the number of new employees added to the retirement rolls each fiscal year divided by the number of active employees in the prior fiscal year (**Source:** Annual State Plan Reports).

has relied on formal models to specify the effects pensions should have on the workforce: deferred income should incentivize the recruitment of long-term minded employees who will remain in their jobs for a specified (and predictable) number of years (Lazear, 1979, 1982, 1983a,b; Clark et al., 2003).

If pensions can accomplish this, they putatively serve the public good. Arkansas' 2012 annual report, for example, states: "The retirement system benefits the entire state and all Arkansans, not just public employees." Supplemental pension income could be especially useful in the public sector, where there long has been concern talented employees either choose not to enter or leave due to comparatively small wages (Lewis, 1991; Perry and Wise, 1990).

An important assumption throughout this work, though, is that they represent credible commitments to employees, irrespective of politics or economic performance. This is a controversial or even potentially dubious assumption. In recent years, public pensions have entered the political 'problem stream,' due to growing costs and poor funding (Kingdon, 1995). Their funding has declined over 2001-2011, as seen in Figure 4.2. The 2008 economic recession exacerbated, but did not cause this drop.

Figure 4.2: Plan Funding (2001-2011)



Source: Based on Data from Public Plans Database

Though pension promises are ostensibly credible, it remains an open question if and how pensions actually structure public-employee retirements. Even state laws or constitutional amendments that forbid reductions in pension promises cannot provide failsafe guarantees. For example, a local plan in Prichard, Alabama in 2009 stopped sending pension checks to its 150 retired workers, in defiance of state law. Two years later, the retired employees still had not been paid, and 18 had passed away (Cooper and Walsh, 2011). While most state funds are not in such dire shape, many have begun processes of retrenchment. In turn, some employees have become concerned they may receive reduced pension benefits, or none at all.

If pensions are seen as risky, they might not do much to encourage retention or recruitment. A 2011 *New York Times* article, for example, argued furloughs and changes in employee contribution rates had left workers demoralized and distrustful of state governments. Bob McLinn, a 63 year old employee in the Wisconsin Department of Corrections, and labor union president stated: “You start to feel like, ‘What will they do next?’” McLinn left his job in March 2011, earlier than he had planned. He cited political developments in his state as motivating his reasoning, as leaders pressed to cut workers’ benefits and collective bargaining rights (Davey, 2011). The article suggested cuts in generosity might undermine credibility, leading to unusually high retirements.

Implicit in these theories is that retirement rates should change as pension policies change. However, there has not been a great deal of work that has empirically assessed that rela-

tionship. Alongside changes in generosity, changes in pension performance, management, and politics also could plausibly shape retirements. I address this question by presenting a simple theoretical model showing how smaller or less credible retirement payments could push more public employees out of work.

I then analyze how variation in state-plan characteristics and politics affects retirement rates. In doing so, I utilize an original dataset of additions to retirement rolls collected from hundreds of plan reports. The covariates include a number of political, pension, and economic variables that might influence employees' retirement decisions. This is the first effort to empirically assess how pensions map onto the decision to retirement rates across government employees covered by state plans.

I find that pensions do in fact shape employee exits: higher employee contribution rates are associated with more retirements. Employee contributions are visible and easy for workers to understand, since they are regular paycheck deductions. Additionally, retirements increase as the the average employee benefit size increases. Further, politics also seem to create some effects on retirements. More political appointments on boards are associated with increased retirements. Finally, poorer funding performance is associated with more retirements, again suggesting employees might not wish to keep working in jobs that require them to contribute more into poor-performing funds. In other words, plan credibility matters to employees. Assuming that governments wish to avoid retirement waves, pension reforms should focus on improving financial performance without resorting to drastic changes. They should also recognize that poor pension performance could have deleterious personnel effects.

4.2 The Political Allure of DB Pensions

Pensions are deferred income provided to employees who have achieved some pre-defined level of tenure and decide to retire. Defined benefit (DB) pensions place risk with plan sponsors, and pay beneficiaries predetermined amounts at fixed intervals. The amount is based on a formula taking into account factors like the employee's years of service, age, and salary. Pension' assets come from contributions from employees and employers, as well investment returns. Importantly, the level of returns does not affect the timing or payment of defined benefits to retirees.

In comparison, defined contribution (DC) pensions also are are funded by pre-determined contributions from employees, employers, and returns on investments.² However, employees bear the risk (GAO, 2008). They do not know the size of the payments they will receive, as they depend on investment performance. Although there are exceptions, the public sector tends to utilize DB plans (Hacker, 2002; Schneider and Damanpour, 2002), which I focus on in this analysis.³

²A common example of a DC plan is a 401k.

³Just three states have entirely DC systems, and only a handful more utilize hybrid approaches. Even in these states, many employees are grandfathered in under DB plans. While most states offer supplementary DC plans, employees only use them at modest rates (GAO, 2008).

Historically, public-employee pensions started to expand in the early 20th century. It is not coincidental that their growth happened soon after the transition from the spoils to the merit system (Johnson and Libecap, 1994; Clark et al., 2003). Reformers believed pensions would induce more motivation in the workforce, attract employees to government work, and help encourage older employers to retire, rather than work until the end of their lives, which increasingly happened with the implementation of civil service protections. In the 1960s and 70s, many larger plans enveloped smaller ones, and plans became more generous. Governments also expanded staffing, adding to obligations.

In addition to potentially managing the workforce, pensions are attractive for political reasons. They provide a mechanism for governments to resolve seemingly inconsistent public demands for more benefits and lower taxes (Converse, 1964). Complicated actuarial rules and payment automaticity help reduce visibility and insulate politicians from blame (Weaver, 1986; Moe, 1990; Arnold, 1992).

Specifically, DB pensions allow governments to spread costs into the future. Each plan has a *normal cost*, which is the portion of the projected benefits allocated in the current fiscal year. The employer's normal cost is the total plan cost less all employee contributions. Most plans utilize some form of accrual accounting, which allows managers to charge a percentage of the normal cost in each payroll period, spreading the rest to future employees and taxpayers. In comparison, governments must cover increases in salaries in the current fiscal period, which has a more immediate and clear impact on taxpayers.

Though pensions require that employees give up portions of their compensation in the short-term, deferred income helps them to smooth consumption over their life-cycles. Pensions are a form of insurance for beneficiaries who cannot know how long they will live, and whether they will be healthy enough to work. DB pensions also signal long-term interest from employers to workers, especially as employers shoulder risk. Blinder (1981), Wise (1985), and many other authors have argued pensions should represent efficient *ex ante* contracts between employers and employees, establishing long-term relationships.

4.3 The Personnel Effects of Pensions

That said, workers weakly prefer receiving money now than in the future, due to both time and risk. A dollar is more valuable today than in a year, and similarly is more valuable one year from now than in two years. Individuals vary in how much they discount future money. Personal discount rates account for people's subjective preferences. High discounters place little value on future income (see Blake, 2006).

In theory, pensions should be most attractive to low-discounters who value long-term security. Governments tend to prefer these employees, since civil service protections mean workers often remain in their jobs for long durations. Training costs are also high in the public sector, due to extensive or specialized required skills and security clearances, making it costly for governments to lose employees (Clark et al., 2003). Pensions should help prevent under-performers from ever entering government work: there should be more zealots than

slackers (see Gailmard and Patty, 2007). If so, pensions could help state governments as they increasingly compete for talented workers (Ingraham et al., 2000).

Pensions also should incentivize remaining on the job, rather than exiting. A great deal of pension economics work has focused on the decision to retire (Lazear, 1982, 1983a,b; Lazear and Moore, 1988; Mitchell and Fields, 1984; Chan and Stevens, 2004). If pensions effectively accomplish that goal, they would be especially useful in the public sector, where pressure for low taxes restricts salaries, and talented employees often face temptations to retire early and earn more in private industry. Indeed, a great deal of work links low pay with turnover (Blau and Kahn, 1981; Powell et al., 1994; Leonard and Jacobson, 1990; Lewis, 1991; Park et al., 1994; Shaw et al., 1998; Utgoff, 1983).

Less work, though, considers retirements by eligible employees, which pensions are meant to directly influence. Vested employees have remained in their jobs for a sufficient number of years to secure deferred income. Generally, the vesting point occurs once employers have recovered their training costs. Even so, employers usually want to retain employees for some time beyond that point. More experienced employees have specialized knowledge, and keeping them around is usually cheaper than hiring and training new workers. It is not surprising annual pension income is smaller than salary pay: employers wish to reward working over not working.

Of course, while governments want to retain employees for a while, they also do not want them to work forever. The optimal retirement rate is not zero. Governments are better off bringing in new talent at a certain point when older workers are no longer as productive. New talent can spur innovation and reform, potentially enhancing performance (Kellough and Osuna, 1995; Meier and Hicklin, 2008). On average, public-sector employees are older than their private-sector counterparts (Goodsell, 2004).

In the private sector, some companies impose mandatory retirement at some specified age to keep the workforce from growing too old (Lazear, 1979). Pensions present an alternate solution to imposing mandatory retirement by levying an implicit tax on continued work. By remaining in their jobs, vested workers forego payments they could receive by doing nothing. Assuming employees place some positive value on leisure, a sufficiently large pension pushes the net value of working under the employee's reservation wage, or the minimum income required to induce work (Clark et al., 2003). Pensions thereby lower the cost of leisure, which is known as the income effect. However, plans also ratchet up payouts as employees work longer, incentivizing lengthier employment. Economists call this a substitution effect, since employees substitute-in work for increasingly expensive leisure (Ippolito, 1987; Clark et al., 2003). Benefits cease increasing when workers reach the retirement age.

Ideally, the tension between these two incentives helps stabilize retirement rates. However, it is possible either the income or substitution effect may dominate. Some empirical work has examined pensions and retirements. A few separate studies have used data from the United Kingdom to conclude pensions make employees work for more years, but also retire younger on average (Disney et al., 1994; Meghir and Whitehouse, 1997). In other words, the income effect dominates the substitution effect. Blake (2004) similarly finds a 1% raise in aggregate wealth is associated with a 0.5% reduction in workforce participation.

4.4 Credibility and The Retirement-Decision

It is less clear whether public employees actually factor pensions into their decision-making, however. Given potentially questionable credibility, even employees who are aware of pensions may not feel much confidence they will receive their full promised benefits on time. Pensions expose workers to risk that varies for political and economic reasons, thanks in part to a lack of federal regulation (GAO, 2008; Hacker, 2002; Schneider and Damanpour, 2002; Munnell et al., 2008a).⁴ Managers also have increasingly relied on risky investments to fund pensions, which has led to variability in returns (Blake, 2006). While state governments have managed to pay employees on time so far, there is no guarantee they will be able to do so into the future.

Pensions should shape employees' expectations and behaviors by rewarding long tenure and creating a sense of desert and trust. Hall and Soskice (2001) argue trust in governmental institutions is key to developing human capital and core public competencies. However, workers who fear benefits will be small, or not paid out at all may not pay much attention to pensions in their decision-making. If so, both pensions' income and substitution effects could shrink or disappear entirely. It also is not clear the two incentives would diminish at the same rates.

On the one hand, diminished credibility might mean employees remain longer in their jobs, since they can continue to collect wages. On the other hand, workers might think less credible pensions signal declining long-term interest from employers. They then could decide to look for work elsewhere, especially if they have the option of locking in at least some pension income from their current jobs. Given the public sector's unique nature, where skilled workers tend to receive smaller wages than their private-sector counterparts, I suspect declining credibility will tend to push in this direction, inducing retirements, and undermining the retention employees and the provision of public goods.

More formally, I identify conditions under which reduced pension credibility can make retiring in the current term appear more attractive. In a simplified world, a worker receives a wage, W , which is all of her income so far, plus a one-time pension payment P received after working. She also has some preference for leisure, L . As workers age, the marginal utility derived from working often declines relative to leisure.

I do not include a term for other benefits, like healthcare, since employees receive the same coverage whether they work or retire. In a simplified model, a single bureaucrat makes a decision to work or remain employed another year, e , or retire, r . By assumption, $W_e > W_r$, $L_r > L_e$, and $P_r > P_e$. That is, employees receive compensation for an extra year of work, but doing so costs them leisure time, or potentially additional income in a subsequent job.

⁴The justification for loose top-down regulation is two-fold. First, under the traditional federalist argument, states have the ability to tailor plans to their local preferences and economies. Second, public organizations cannot go out of business and can use their coercive powers to raise revenue. Private companies, in comparison, can go bankrupt, which while potentially making retirement come earlier, usually means employees will have less money saved up for it. Regulation of private DB pensions thus plays a social welfare role in limiting employee risk, which is ostensibly less necessary in the public sector.

Further, retiring now means employees receive more pension income, although the size of the difference will depend on the extent to which employers want to punish or reward extra work. An employee will work another year if and only if:

$$W_e + P_e + L_e \geq W_r + P_r + L_r \quad (4.1)$$

I include any potential post-exit outside-income in the term L_r , for the sake of simplicity. Rearranging,

$$P_e \geq (W_r - W_e) + (L_r - L_e) + P_r \quad (4.2)$$

The first term in parentheses on the right hand side will always be negative, by construction, while the difference in leisure values will be positive. Larger pensions from working another year also should push against attrition due to alluring later-career exit options for employees. Finally, legislative wage freezes might constrain how much greater W_e is than W_r . As such, pensions have the potential to play a major role in the decision-making of employees eligible for retirement. A pension that looks more handsome in the current term decreases the utility of working another year. In comparison, a larger pension earned by working another year increases the utility of remaining on the job.

However, if employees think governments only will be able to pay out pensions for a few more years, they might think retiring now will maximize their received benefits. Similarly, if they fear legislators will cut benefits, they may choose to retire now, locking in higher pensions. Cuts in generosity undermine credibility, making the decision calculus turn more on wages and leisure. I argue declines in credibility have a time element. That is, both P_e and P_r shrink in the employees' decision calculus, but they do so asymmetrically. If the plan does not appear in great shape, loss-averse employees should believe their retirement income will be in as bad or worse shape later. Formally, I introduce C_e and C_r , which respectively are the credibility of the working and retiring pensions. Further, in the case of weakly declining credibility, $C_r \geq C_e$. Employees then work another year if and only if:

$$C_e \times P_e \geq (W_r - W_e) + (L_r - L_e) + C_r \times P_r \quad (4.3)$$

If credibility shrinks over time, it is less likely the left hand side will be greater than the right, incentivizing retiring in the present year. This incentive is especially strong if L_r is much greater than L_e . Employees who retire now at least receive a pension for a few years, or more optimistically lock in higher payments until they die. If legislators make cuts in pension benefits, this model predicts retirements will spike. Employees have little reason to substitute in another year of work costing them pension payments, making the income effect dominate. Of course, there might then be a different kind of substitution effect, where employees go to work elsewhere.

4.5 Data and Hypotheses

First and foremost, I ask how pensions and politics affect retirements. This involves the creation of a new dependent variable, which is a proxy for the retirement rate, and comes from original data collected from individual plan CAFRs from 2001 to 2011. It is a ratio of the number of employees added to benefit rolls in the current fiscal year to the number of active employees from the previous FY.⁵ This accounts for the relative size of the plan over time and in relation to other plans. For example, 5,000 employees retiring in New York is very different from 5,000 retirements in South Dakota.⁶ The mean rate is 3.54%, but with a standard deviation of 1.6%. As shown at the beginning of the paper in Figure 4.1, retirements have increased between 2001 and 2011.

Of course, this increase could be due to any number of factors, such as expected Baby Boomer retirements. However, I posit that decreased pension credibility should increase retirements. I do not operationalize credibility directly, but instead consider a number of political and pension variables that clearly speak to plan credibility. Additionally, I control for state economic performance, since that is likely to also structure retirements. In doing so, I present the first research exploring how state pensions shape employees' retirement decisions.

Much of the actuarial information comes from Boston College's *Public Plans Database*, which compiles data from reports and surveys of plan administrators. In total, the data contains 103 DB plans from 2001-2011 across all 50 states. The economic and demographic controls come from the U.S. Census Bureau, and labor union information comes from the Public Sector Collective Bargaining Law website. Information on divided government and legislative control comes from the National Conference for State Legislatures. Finally, state legislative polarization data comes from path-breaking work by Shor and McCarty (2011).

4.5.1 Political Independent Variables

Given the publicness of these pensions, and their increasing salience to voters, it is important to examine political factors that could shape retirements. With the possible exception of unionization, none of these matter for private pensions.⁷

First, I include a variable for the fraction of political appointments on boards. Such members include state politicians, their appointees, and ex-officio members, who are usually career politicians. Roughly 66.6% of the board-members in the data are politically appointed, though there is a sizable standard deviation of 30%. Pension recipients typically elect or appoint other board members. At first, it appears that this variable does not change much over time, given its fairly consistent average each fiscal year.

⁵Note that this measure includes not only retirements, but also disabilities and survivors. However, the vast majority of members added are service retirees, making this a reasonable proxy for retirements, which only a few plans provide.

⁶An alternate measure would be percent change from the previous year.

⁷The low labor participation in the private sector renders this point somewhat moot, anyway.

A closer examination, though, highlights that this variable does in fact vary. First, it varies across different plans within the same state. Specifically, 17 states feature multiple plans with distinct allocations of political seats on boards. Additionally, a substantial minority of plans (24 out of 103) experience variation in this variable at one or more points between 2001 and 2011. This latter sort of variation either originates from deliberate statutory changes to plans, or alternatively simply due to failures by politicians or public employees to replace members who are no longer on the board. My models exploit this variation to allow me to assess whether board composition affects retirements.

I hypothesize increased board politicization will be positively associated with retirements. First, bureaucrats have more voice on boards where they choose their own representatives (Hirschman, 1970). Prior work has shown that more politicized personnel systems experience greater turnover (Ban and Ingraham, 1990; Heclo, 1977). However, a fair criticism of this argument is that many employees are probably not aware of the specific composition of the board in making their retirement decisions. Despite this possibility, I still expect to see a positive relationship here.

First, employees near retirement are the ones most likely to know specifics about their pensions and the level of representation that they have on boards. Second, even if their knowledge is imperfect or unevenly distributed, it would be likely to diffuse either from labor unions, between workers, or in communications administered by boards. That is, a less-informed employee may not know the exact ratio of representation, but still have a pretty reasonable sense of the representation they have on plans' pension boards.

Third, plans with less political control might be better run, further adding to employees' perceptions of credibility. That is, board composition might shape performance. I expect more committed states run pensions with a more 'arm's length' approach, exercising less political control over boards. Bureaucratic employees staff such boards. There are many reasons to think insulation might enhance credibility. A substantial amount of literature, typically focused on personnel appointments in the bureaucracy, supports this expectation (see Heclo, 1975; Snyder and Weingast, 2000; Gilmour and Lewis, 2006; Lewis, 2007).

While politicians probably want plans to perform well, they have other goals that could undermine commitment to employees, thereby encouraging exits. For instance, political members might be more vulnerable to moral hazard problems, pushing costs into the future, raiding funds, or targeting investments to deliver political rents instead of maximized returns. Such board members may also have limited financial acumen. Thus, employees should be more confident in less politicized boards, increasing their willingness to remain in their jobs.

State legislative conditions also might shape credibility and employees' retirement decisions. I include variables for divided government, legislative polarization, and Republican control of the legislature.⁸ One might suspect polarization demoralizes public employees and encourages exits. Interestingly, the bivariate relationship challenges that expectation: ignor-

⁸Note that some of these plans do cover local employees, In the Online Appendix, I run an alternate specification dropping all of the plans that cover local and state employees. There is no major difference in the results, though.

ing any confounders, states with more polarized legislatures appear to have slightly fewer retirements. While demoralization might occur, perhaps polarization generates legislative gridlock, granting bureaucrats more autonomy and making them less likely to quit.⁹ The degree to which average employees base their retirement decisions on polarization also is debatable. Further, given both parties have pursued similar pension strategies, at least until 2008 Anzia and Moe (forthcoming), it is not clear the distance between the parties will have a straightforward or significant relationship with retirements, even when controlling for other variables.

Divided government could similarly generate gridlock, granting bureaucrats more leeway and making remaining in their jobs more attractive. Alternatively, employees may feel divided governments poorly manage pensions, encouraging exits. However, it is once again questionable how aware employees will be of divided government when they make their retirement decisions. Thus, I expect divided government also will have a null or mixed relationship with retirements.

The legislature's partisan ideology also might influence pensions and commitments to employees. One hypothesis is there will be more retirements in states with conservative legislatures. Such legislatures might be prone to passing legislation that is tough on public employees and pensions. Alternatively, no partisan effect should exist if red and blue states have comparable interests in staffing the bureaucracy.

Unions are an additional political force that could influence retirement decisions. Many plan specifics are determined through collective bargaining. Under the sorts of arguments made by Downs (1967) and Niskanen (1968), unions protect employees and push for expanded compensation.¹⁰ Unions might be better at advocating for conditions employees want, encouraging them to remain in their jobs longer (Cotton and Tuttle, 1986; Park et al., 1994). They might also provide employees with a sense of representation or voice (Hirschman, 1970). Mitchell (1989) finds unions are associated with employment systems supporting seniority, giving employees additional incentives to remain in their jobs. Kellough and Osuna (1995) find the opposite, though: more unionized federal agencies have higher quit rates.¹¹ I examine the percent of unionized public employees in each state using data from Hirsch and Macpherson (2003). I expect increased union representation will be associated with lower retirement rates.

Additionally, I consider whether plan employees receive Social Security (SS) in addition to their pension payouts. Local and state employees who do not participate in the SS program tend to receive larger annual benefits (Almedia et al., 2009). Pension income increases in size as employees work longer, up until the retirement age. In comparison, SS income is

⁹Possibly this effect could push against demoralization. It is an open question whether and under what conditions either would dominate.

¹⁰A number of studies have found competing effects unions might have on the size of compensation, such as Freeman and Valletta (1988), Lewis (1986), Jarrell and Stanley (1990), DiNardo and Lee (2004), ?, and Anzia and Moe (2015).

¹¹However, they point out federal unions are "notoriously weak," and have limited ability to engage in bargaining. At the state level, there is much more heterogeneity in union strength.

independent of the total years worked, and therefore should not create any kind of substitution effect. Thus, I anticipate plans supplemented with SS will tend to experience an income effect, resulting in more retirements.

4.5.2 Pension and Economic Plan Variables

Given my interest in understanding how pensions structure retirement decisions, I consider a number of pertinent plan characteristics. State legislatures influence these policies, either directly, or indirectly through boards. Thus, I argue they are at least partially political in nature. Again, as foreshadowed in Davey (2011), the primary theoretical expectation here is that reductions in generosity will make employees view their pensions as less credible, and retire at higher rates. That said, pensions are complicated, and employees likely suffer from bounded rationality (Simon, 1955). Most cannot even identify their own pensions as DB or DC. We cannot take as empirically granted that all or any of these plan specifics will shape retirements.

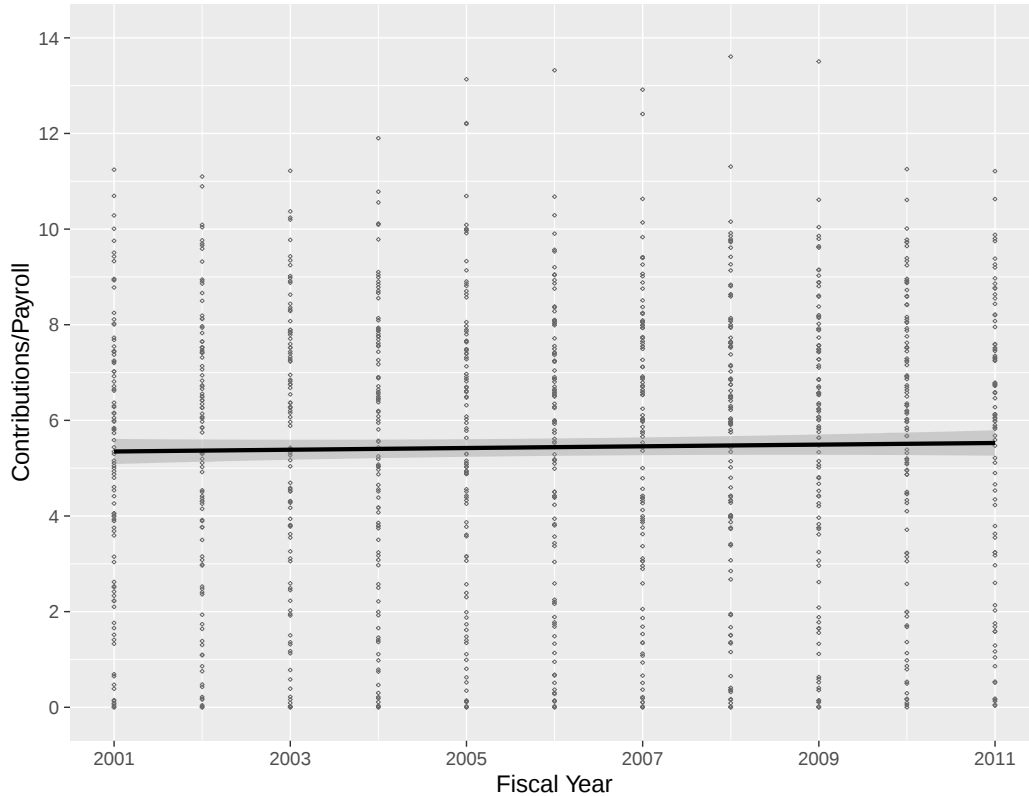
However, I argue most *are* aware of their own contributions, which they see as regular deductions from their paychecks. The employee contribution rate, as a portion of total pay, effectively acts a salient heuristic workers use to understand their pensions.¹² Lupia (1994) argues heuristics can perform quite well in helping individuals make decisions as though they were informed. Further, people tend to make more rational decisions when they have a well-defined sense of their self-interest, as with money (Citrin and Green, 1990; Chong et al., 2001). Contributions constantly remind employees of pensions' costs.

If employees have concerns about the security of their pensions, they are likely to think their contributions expose them to risk. Workers might not be especially excited about staying in jobs when contribution rates increase when they can separate and receive retirement income right away. They also might be able to find additional or even better-paid work elsewhere. Indeed, in the public sector, employees do not need to work *too* long before they begin receiving their retirement income. Thus, I hypothesize declining generosity, as seen through increased employee contributions, will be associated with increased retirements. As seen in Figure 4.3, elected officials have been extremely reluctant to ask employees to contribute more to their pensions over time:

A separate indicator of generosity is the employer contribution as a fraction of total payroll. A 'matching' employer contributes the same amount of money as the employee. In the data here, however, the average employer rate is about 9.5%. Thus, on average, employers contribute a little less than twice as much as employees to pensions. Additional generosity in the current term could be subject to both income and substitution effects. Further, employer contributions are not consistently primed to employees, making them less visible than employee contributions. Thus, it is not theoretically clear what kind of relationship there will be between employer contributions and retirements.

¹²The average employee contribution rate here is 5.5% with a standard deviation of 3.13%.

Figure 4.3: State-Plan Employee Contributions as a Percent of Payroll (2001-2011)



This is a time trend presenting all employee contributions divided by the total payroll in each year. As can be seen, it has remained fairly flat over time (Based on Data from Public Plans Database).

A third indicator of generosity of the average benefit size. As before, it is not entirely clear what relationship will exist between average benefit size and retirements, but given eligible employees' proximity to retirement, it seems possible that the income effect could dominate for this variable.

A separate theoretical expectation is that plan performance could influence employees' perceptions of credibility or risk, thereby shaping retirements. Much like with the board ratio, while it may be unlikely that many employees know the exact funding level of their plans, they likely do have a sense of when their plan is underfunded, especially as pensions have become so salient. Specifically, the lack of regulation by the national government makes these public pensions quite unique, and varied in performance, which I leverage here. Note that the prior labor economics models of pensions do *not* make any prediction regarding how fund performance could feed back into pensions' personnel effects. In comparison, I provide

theoretical reasons why we might see such an effect when public pensions are implemented in the real world.

Separately, I include a number of actuarial controls, such as the discount rate and actuarial assumptions. I do not expect these controls to shape retirements, as they do not directly shape generosity or the perception of credibility to average employees. The discount rate refers to the expected investment return. Lower discount rates reflect more liabilities. The discount rates here range between 4.5% and 9%, with a mean just below 8%. Relatedly, I control for the actual investment return. Given the actual return rate is 4.2%, most plans fall well below expectations. This has generated some controversy, particularly as private-sector plans tend to use lower rates (Bogle, 2012; Disalvo, 2013).

I also include controls for whether plans utilize market valuation of liabilities (MVL) or Actuarial Accrued Liability (AAL). MVL equates the discount rate with the current market rate of a group of high-quality fixed income investments, which increases sensitivity to economic fluctuations.¹³ In comparison, AAL's longer smoothing periods spread costs into the future. Most public plans use AAL, and would decline in funding-performance if they switched to MVL (Gold and Latter, 2009).

Actuarial plan type is an additional control. My data contain four of six possible estimation methods. I include dummies for the Entry Age Normal (EAN) and Projected Unit Credit (PUC) methods, which comprise most of the sample.¹⁴ Though actuarially important, most employees are unlikely to know their plans' type. As such, I do not expect this variable to have a significant effect on retirements.

A further consideration is different occupations might be associated with higher or lower retirement rates. I include dummy variables for whether plans cover public-safety workers or teachers. For example, it might be the case that public safety workers have greater retirement rates, due to the strenuous nature of their jobs.

Aside from those plan characteristics, I control for states' ratios of debt to Gross State Product (GSP), which is a standard metric of economic performance. The measure is lagged by a year to avoid controlling for a potentially post-treatment covariate. Lastly, I include a control for the percentage of the population over 65 in the entire state, since it is possible states with older populations could have higher-than-average retirements. This variable also helps control for generational effects over time, such as more Baby Boomer employees retiring.

4.6 Empirical Analysis

I exploit variation in state-level funds to analyze how pensions and state politics influence retirement rates over time. I utilize panel data from 2001-2011, which saw a marked increase in pensions' costs and decrease in overall performance. I regress the retirement proxy on the independent variables from the previous year, given the possibility that retiring employees

¹³See the online appendix for a more thorough discussion.

¹⁴See the online appendix for more discussion of these variables.

may only have that information available in making their decisions.¹⁵ My general approach is similar to Krause et al. (2006), who employ fixed effects to control for variation across states.¹⁶ States differ in important and unobserved ways. There also might be unobserved factors that matter over time, such as poor plan management. I label these unobserved characteristics c_i . The following regression expresses this symbolically, and includes vectors of point estimates of the politics, pension, and economic variables. The i term represents the given plan, t represents the year, and ϵ_{it} is the random part of the error term:

$$Y_{it} = \beta_0 + \beta_1 Politics_{it} + \beta_2 Pensions_{it} + \beta_3 Economics_{it} + c_i + \epsilon_{it} \quad (4.4)$$

Much of the literature on pensions simply regresses plan variables like funding on other plan factors using Ordinary Least Squares (OLS). However, doing so assumes the c_i terms are uncorrelated with the explanatory variables. If that is not true, OLS generates biased standard errors. That said, I report OLS results for comparison's sake, and adjust for some of the potential endogeneity by using Eicker-Huber-White 'robust' standard errors. Further, I cluster standard errors at the state level to account for commonalities within states. In particular, given there are multiple plans within many of the states, legislatures simultaneously determine various plan aspects. Plans are not independent of each other within states, making it essential to cluster standard errors at that level.

Fixed effects allows for modeling the correlation between these unobserved characteristics and the observed covariates. It assumes the ϵ_{it} are independent of the observables after conditioning on the individual effects. It estimates an additional set of dummy variables, R'_i , to account for different states or years, depending on the model:

$$Y_{it} = \beta_0 + \beta_1 Politics_{it} + \beta_2 Pensions_{it} + \beta_3 Economics_{it} + R'_i c + \epsilon_{it} \quad (4.5)$$

Thus, I include an OLS model with robust clustered standard errors, and fixed effects models controlling for year, state, and state and year fixed effects, as is standard in much empirical work.

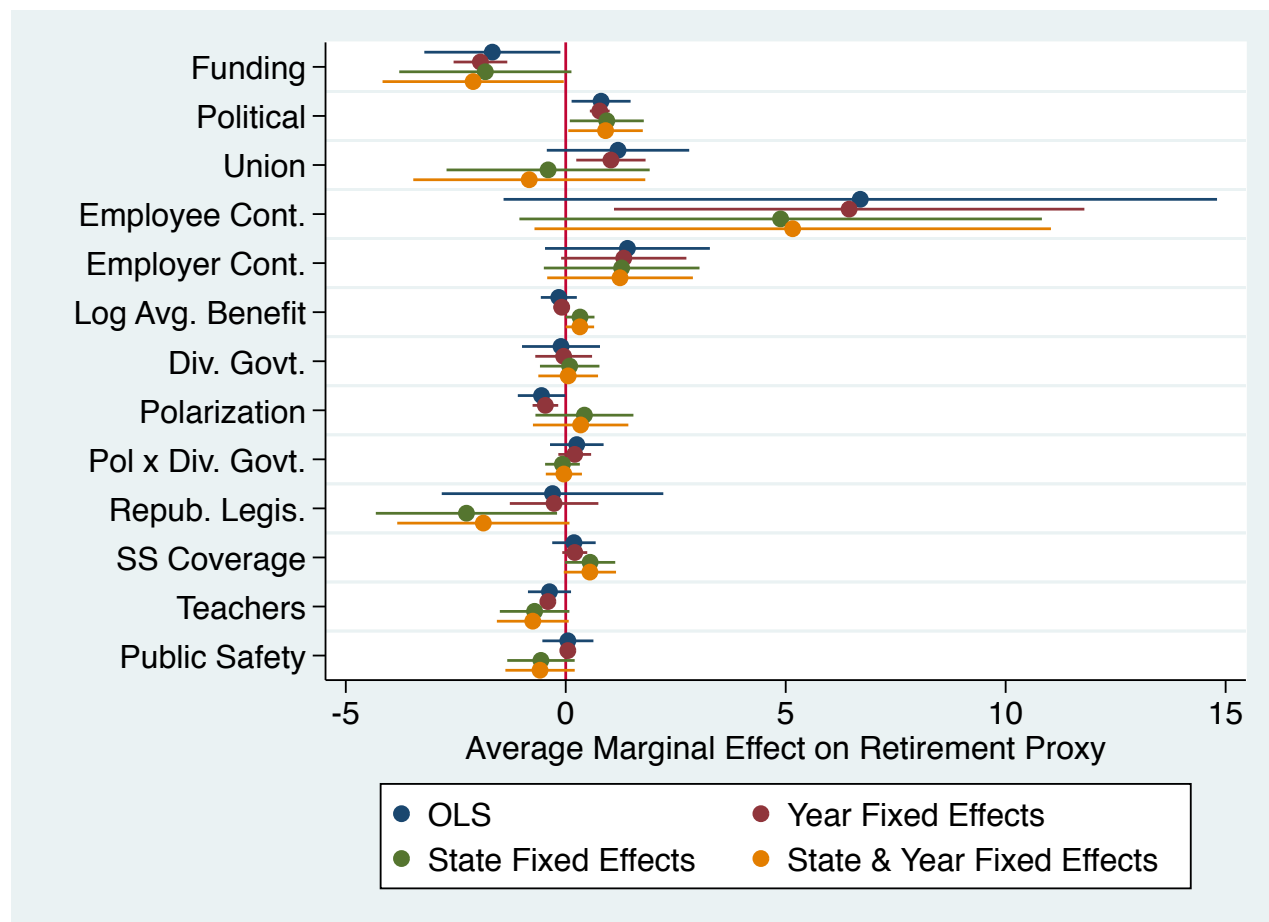
4.7 Results and Discussion

My fundamental research question concerns how pensions structure employees' retirement decisions, given variation in their political and economic environments. Those factors could constrain pensions' credibility. Including them in an analysis might drive pensions' effects to zero, or even push retirement rates in unintended directions.

¹⁵For example, an employee might retire at the beginning of the fiscal year, but one of the political variables might occur later in the year, making the use of a non-lagged version post-treatment

¹⁶In particular, they analyze how combinations of political and civil service appointments affect bureaucratic competence, defined in terms of fiscal projection accuracy. Given data constraints, there is no way to know when in the fiscal year a given employee retired, so the appropriate approach is to use lagged independent variables.

Figure 4.4: Variables Associated with More Retirements in the Following Year



The above presents point estimates and 95% confidence intervals of regressing the retirement rate proxy on the lagged independent variables.

Figure 4.4 presents the results of my analysis. As expected, several of the plan variables appear to shape retirement rates. However, the direction of the results is not always as expected. Again, the income effect tends to predict more retirements as pensions become more generous, while the substitution effect predicts fewer retirements. It is somewhat surprising that different metrics of generosity in the same data appear to push in different directions.

Namely, as employee contributions increase, there is some evidence of additional retirements. One explanation of this is that employees do not appreciate paying more into their pension funds, which they see as potentially risky. Another is that these employee contributions help finance larger pension benefits. However, by including the average benefit in the

model, we see that it is associated with more retirements, indicating the dominance of an income effect. In comparison, though, as the employee contribution size decreases, pensions become more generous, and retirements *decrease*, seemingly indicating the dominance of a substitution effect. Another metric of generosity, the employer contribution rate, does not appear significant.

Income and substitution effects, as it turns out, might not be the best way to think about public pensions' retirement incentives. That is, it is possible to explain these seemingly contradictory findings coherently. For one, an employee who contributes a lot of money into a pension today, but is promised a better retirement package in the future, may be more likely to leave. However, an employee who contributes very little, but also has a small pension benefit might be perfectly happy to keep working, rather than suffer the relative poverty of retirement. As for the employer contribution rate, it might just be the case that average employees are not that aware of it. The other actuarial variables do not appear to have significant relationships with retirements, as predicted.

Moreover, those incentives do not consider the fact that other plan and political variables that are not explicitly about generosity also could affect retirements. Better funding performance is associated with fewer retirements, meaning that poorer performance is associated with more. I argue that this is a clear way in which fund performance shapes credibility. It seems that consistent with my theoretical model, employees in less credible pension systems may be more likely to retire, rather than less. This sort of prediction is not found in traditional formal models of pensions.

Likewise, board composition is conceptually distinct from pension performance, and one of the ways in which political forces are likely to have the most impact on funds. The political-appointments ratio is associated with about a 0.9% increase in the retirement rate. In other words, on a 10 person board, an additional political appointment is associated with just under an 0.1% increase in retirements. Given many plans have thousands of employees, this could make a substantial difference. Employees might view less-politicized funds more favorably, due to their enhanced voice or representation, which then could encourage them to remain in their jobs.

Increased unionization, however, is not associated with the retirement rate. It makes some theoretical sense that this variable would not have such a strong effect, given that if union presence is correlated with more generous compensation, then more unionization could induce countervailing income and substitution effects.

Many of the other political variables do not have significant or consistent relationships with retirement, though. While they might shape plan management, they are too removed from employees' minds to influence retirement decisions. Legislative deadlock from high polarization and divided government actually could empower bureaucrats by leaving them with more *de facto* discretion, encouraging them to stay in their jobs. At the very least, the results contradict the expectation polarization leads to exits from public-sector employment. Further, while Republicans may support smaller governments in their rhetoric, there is no evidence here their increased presence in state legislatures encourages retirements. In fact, it appears that public employees are *less* likely in states with more Republican legislatures,

though the variable is only significant at the 10 percent level.

Interestingly, the SS covariate also has a small but positive relationship with retirements, which is significant at the 10% level. Unlike DB pensions, the size of SS income is not dependent on the number of years employees have worked. Thus, the income effect appears to dominate the substitution effect in plans offering SS, encouraging more retirements. Finally, there is some evidence of fewer retirements in teachers plans, possibility indicating that these plans are fairly credible, or perhaps simply that teachers are more reluctant to retire than other types of public employees.

Overall, these results provide new insight into how pensions affect the behaviors of state-government employees. While any empirical analysis has limitations, the methods I use here are superior to much past literature on pensions, which primarily relies on OLS or case studies. Of course, it is impossible to rerun history or vary policies or politics for any individual plan to generate true counterfactuals. The inferences from observational data are unlikely to be as good as those made under random assignment. Nonetheless, the results here provide insight into how pensions and their state political environments shape public-sector retirements in a robust manner.

4.8 Conclusion

Rising pension costs might hurt taxpayers and public employees alike. The national government largely has opted not to regulate state funds, facilitating variation in their rules and performance reflecting local politics. While governments theoretically can coerce taxes, they are reluctant to do so, challenging pensions' sustainability. Several local governments, such as Prichard, Alabama, and Stockton and Vallejo, California, have failed to make good on their promises. Some state governments, such as Illinois, also have received downgraded credit ratings. Such occurrences could undermine employees' faith in their pensions.

The tension between paying for goods and services and keeping taxes low is unique to the public sector. Politicians benefit from pensions, which allow them to reward employees and keep unions happy, while also avoiding blame and pushing costs into the future. Government employees obviously also benefit. Pensions' popularity with bureaucrats, unions, and politicians of both parties has made them incredibly durable Anzia and Moe (forthcoming). Over time, employees have come to expect their pension payments, much as citizens have come to expect the provision of public goods.

In order to be of use to taxpayers, though, pensions must aid in the production of public goods. Government-employee pensions expanded significantly in the early 20th century to *indirectly* bolster recruitment by increasing compensation, while also incentivizing predictable retirements (Clark et al., 2003). Similarly, labor economics research predicts deferred income should play a role in regularizing retirement, through a combination of substitution and income effects (Lazear, 1979; Clark et al., 2003; Blake, 2006).

However, that literature largely assumes away the role of politics, and takes pension promises as credible. I relax that assumption to show how reduced credibility could lead to

increased exits. I then examine whether state pensions shape retirement rates, while also considering political and economic forces that also could matter. My findings show pension generosity *does* indeed influence retirements, indicating that pensions live up to their goal of structuring retirement decisions.

However, this does not happen in a straightforward or theoretically neat way. Different aspects of pensions seem to push in opposite directions. I argue that this likely happens because employees are risk averse when it comes to their money, and will act in the aggregate to maximize their access to real dollars over their lifetimes. For example, employee contributions are reductions from salaries that essentially expose employees to more political and economic risk. Employees may decide to opt out of this risk by retiring, taking whatever pension money they can, and searching for work somewhere else.

Earlier formal work on pensions also only considers plan policies that are meant to directly shape retirements. I posit that there is good reason to believe other plan factors also could influence retirements. Namely, poor funding performance increases exits in the following year, independent of plan generosity. Further, the composition of the board also seems to influence exits. Political environments that provide employees with greater voice might encourage employees to remain in their jobs, rather than exit (Hirschman, 1970). Further, more knowledgeable workers, elected by government employees themselves, might be more interested in maximizing returns and ensuring commitment credibility. Political appointees have other interests in mind, which could hurt management and make employees feel unrepresented. Fund managers have to contend with elected officeholders, interest groups, unions, companies in which the plan has invested, plan recipients, taxpayers, and more. These pressures do not exist for private pensions.

The fact that either of these influence decision-making might surprise some, given that they do not exist in traditional models of pensions, and also might seem somewhat remote to many employees. To the first, I argue that a theoretical model is a self-contained way of thinking about something, and may not necessarily bear on empirical realities. Further, much of that literature comes from a time when pensions were consistently well-funded. It was easy to look at pensions in the 1970s and think about them as credible and efficient contracts. That theory largely followed from the empirical reality.

However, times have changed since then, and there is little reason to take pensions as entirely efficient, even if we take the payment of owed benefits to employees as entirely credible. Pensions are large and complex government undertakings. Their policies and formulas result from different decisions made by various actors at different times. There is little reason to assume pensions will operate in simple or consistent ways that are neatly predicted by older and more constrained theories.

To the second concern, I maintain that it is not necessary that all employees know the specifics of their plans. The literature on aggregate rationality shows that shifts in small but well-informed pluralities of employees generally enough can induce ‘rational’ and statistically significant shifts in a macro-analysis like this. Less informed individuals may make more ‘erratic’ decisions, but those tend to cancel each other out.

Further, many employees might have some knowledge about the plans by listening to

their well-informed co-workers or union organizations. Employees need not know every single detail to have a sense of plan credibility, thanks to the use of such heuristics. For these reasons, it is very plausible that pension funding and employee representation on boards could play just as important roles in aggregate retirement trends as the size or scope of pension generosity.

Despite the ways that pensions have changed, pensions still seem to shape retirements via their generosity levels. In this regard, they can help attracting and maintaining the workforce required to create the public value citizens expect (Converse, 1964; Hall and Soskice, 2001). Given skilled public-sector jobs often pay less than comparable private-sector work, pensions might be especially valuable. Of course, some might argue large retirements or reductions in employees might serve a useful purpose of controlling costs and the growth of government, especially as government employees are often older than their private-sector counterparts, and are difficult to fire. There also often is a generalized anti-government sentiment public employees are not efficient. As to that claim, the evidence is mixed, to say the least (for a discussion, see Goodsell, 2004).

Moreover, there is no evidence having an unexpected number of retirements would *improve* service provision. There often is an irreplaceable loss of institutional knowledge when experienced employees retire. Taken to the extreme, there would be unimaginable institutional damage if all eligible government employees simply retired at once. Additionally, payouts to retired employees and subsequent training costs for new hires would be immense. Of course, it is true people must stop working at some point, and may be less effective as they grow older. Pensions should help regulate this process, while also providing a form of collective insurance to employees who cannot possibly know how long they will be healthy and able to work.

Future research should examine how pensions shape other outcomes, such as recruitment and performance. Additional work might utilize surveys of employees, retirees, and potential hires to understand how employees perceive think about their own pensions. More qualitative analysis of relevant legislation also could provide insight into how specific pensions shape the behaviors of smaller sets of employees. Similarly, scholars should continue to scrutinize unions, especially as they negotiate over pension policies.

In summary, pensions shape employees' retirement decisions, but in ways employees readily understand. It is not surprising legislators have been reluctant to raise employee contribution rates, even as pension costs have increased. Managers should consider the potential ramifications of making changes to pensions. Overly politicizing management boards or shrinking plan generosity could lead to an exodus of employees. If costs continue to rise, and future economic events place stress on funds while retired employees continue to live longer, pensions' problems will not go away. As governments pursue reform, they should keep in mind pensions are indirect tools to manage the workforce.

4.9 Appendix

4.9.1 Informations on the Variables

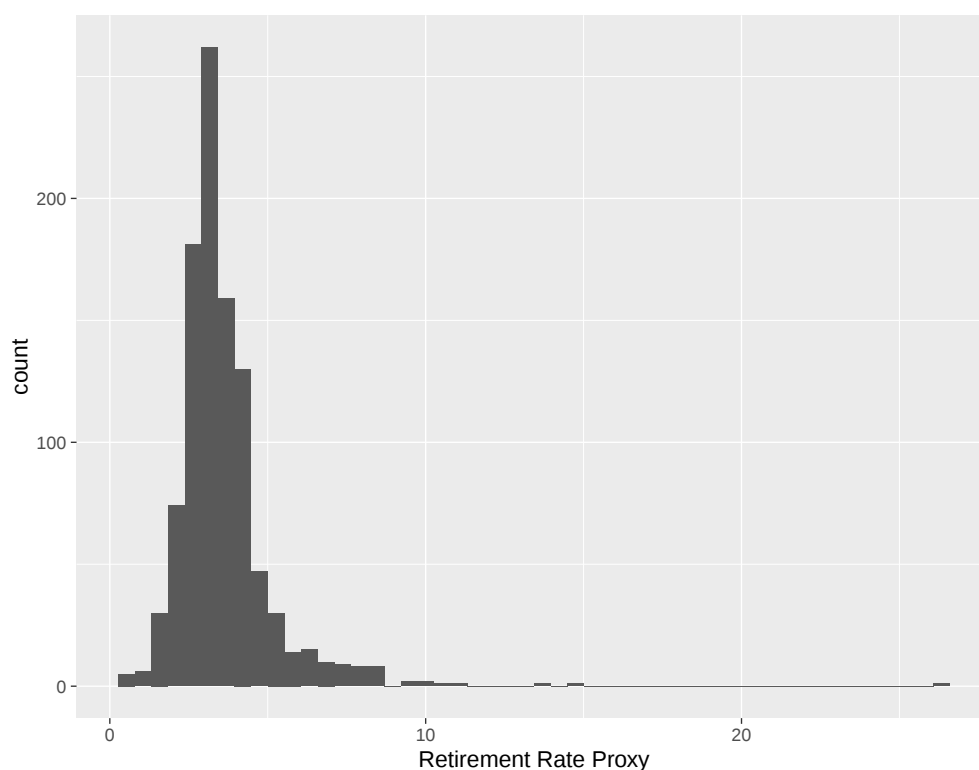
Table 4.1: Descriptive Statistics

	Observations	Mean	Std. Dev.	Min	Max
Percent Added to Rolls	926	3.56	1.61	.31	26.12
Political App.	1132	.67	.31	0	1
Funding Ratio	1130	.84	.2	.19	1.97
Divided Government	1132	.52	.5	0	1
House Polarization	1025	1.51	.52	.45	3.29
% Republican	1019	.47	.14	.08	.83
Per. Union Coverage	1132	.39	.18	.1	.75
Social Security	1133	.76	.43	0	1
Employee Contribution	1079	.05	.03	0	.23
Employer Contribution	1056	.09	.08	-.06	1.79
Average Benefit	1130	19.08	8.48	1.13	49.52
Discount Rate	1072	.079	.004	.045	.09
Market Valuation	1133	.07	.25	0	1
Real Estate	1090	5.34	4.65	0	22.08
EAN	1111	.76	.43	0	1
PUC	1042	.15	.36	0	1
Teachers	1132	.51	.5	0	1
Public Safety	1132	.46	.5	0	1
% Over 65	1132	.13	.02	.06	.18
Lagged Debt to GSP	1132	.07	.04	.02	.23

4.9.2 Retirement Rate Variable Information

Figure 4.5 displays a histogram of the retirement rate proxy, which has a largely normal, though right-skewed distribution. Given the normality, though, there is no need to transform this variable for the purposes of regression.

Figure 4.5: Distribution of Fraction of Employees Added to Rolls (2001-2011)



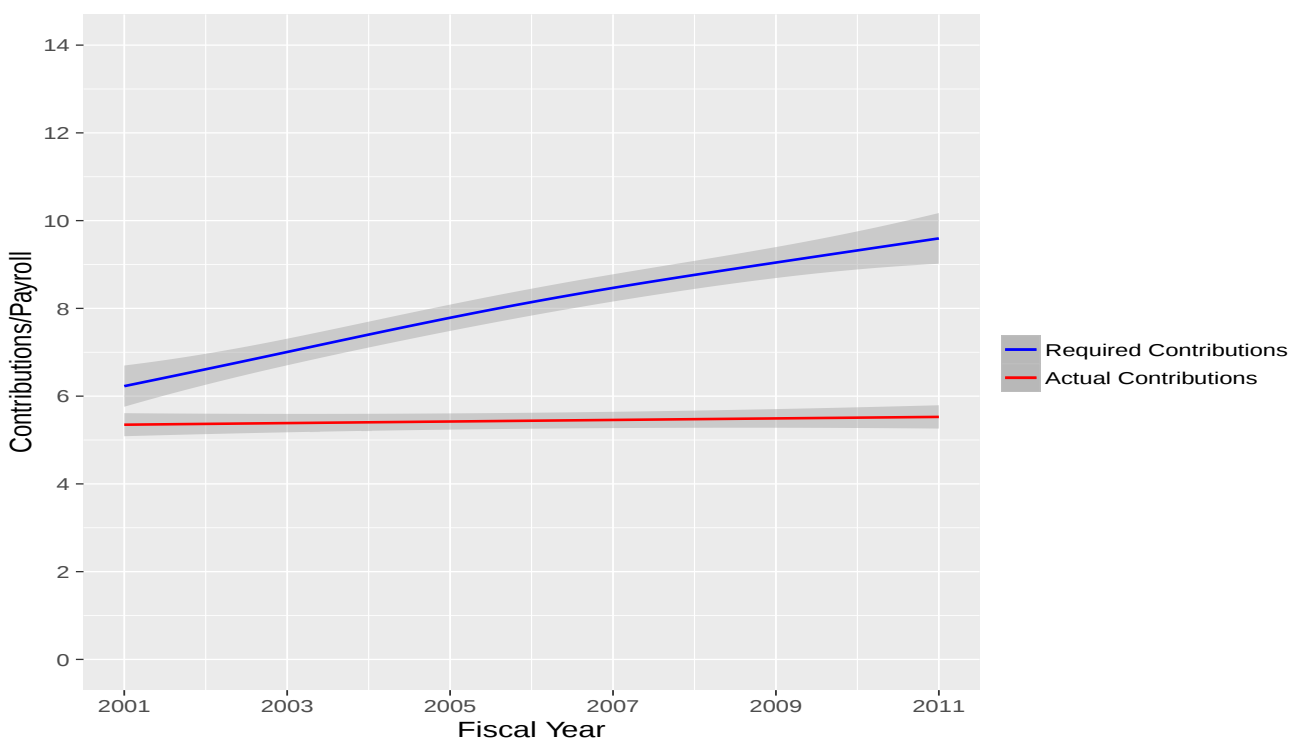
This shows the distribution of the retirement rate proxy, which is 100 multiplied by number of employees added to the roll in the current year divided by the number of active employees in the prior fiscal year (Source: Based on Information from Plans' Annual Reports).

4.9.3 Contribution Rates and Investment Returns

There is a great deal of evidence that governments have allowed their plans to take on more risk over the years. When combined with long-term accounting practices, doing so allows governments to maintain or expand the size of employee benefits without having to increase taxes. Aside from not wishing to raise taxes on constituents, managers appear to maintain plan generosity by not raising employee contribution rates. As seen in the main

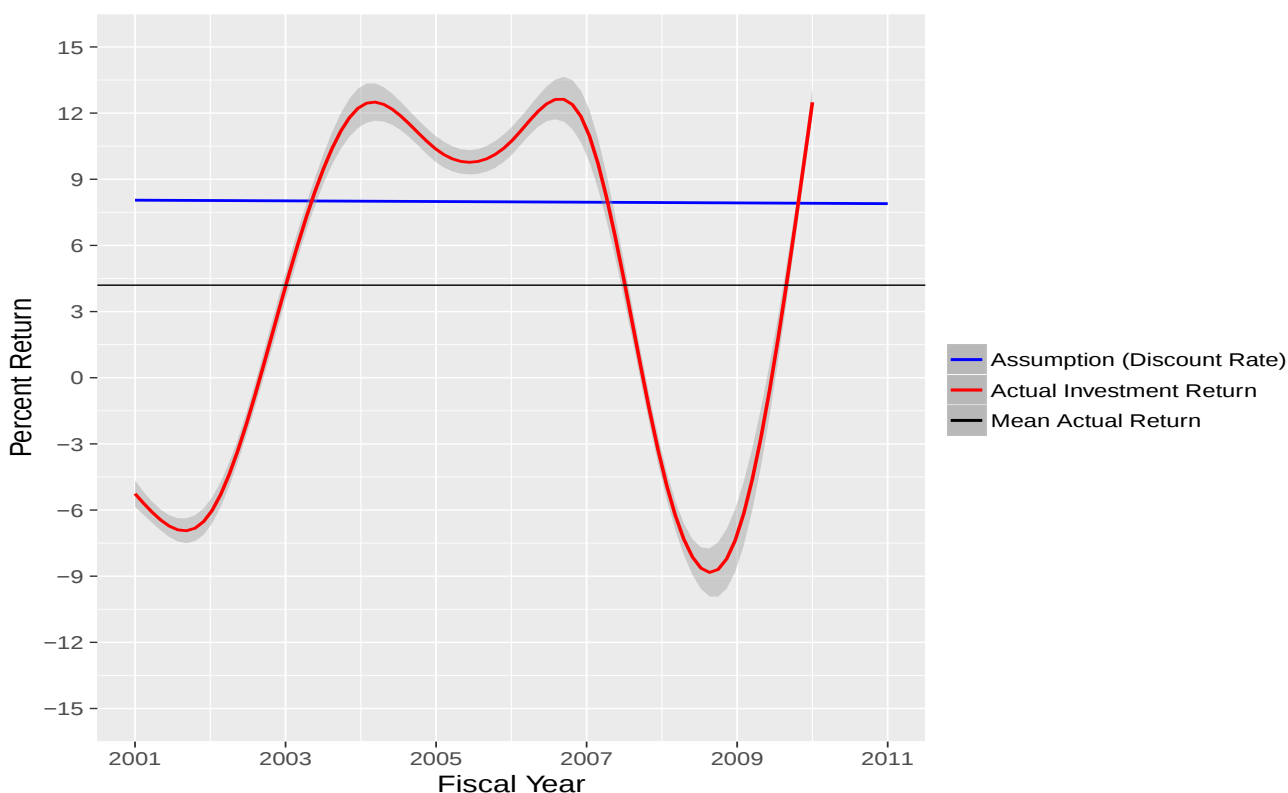
paper, employee contributions have remained quite flat from 2001-2011. At the same time, employer contributions have increased (Figure 4.6), likely in an attempt to cover increasing costs. However, governments' average actual contributions have consistently fallen short of required contributions. If investment performance remains constant, this can only generate funding shortfalls.

Figure 4.6: Actual vs. Required Employer Contributions as a Percent of Payroll (2001-2011)



The above figure presents two smoothed time trends representing required vs. actual contribution rates for all plan-year observations in my data. As can be seen, the former increases in time, reflecting growing plan costs. The actual contributions, though, remain largely flat (Source: Based on information from the Public Plans Database).

Figure 4.7: State Pension Plan Investment Returns (2001-2011)



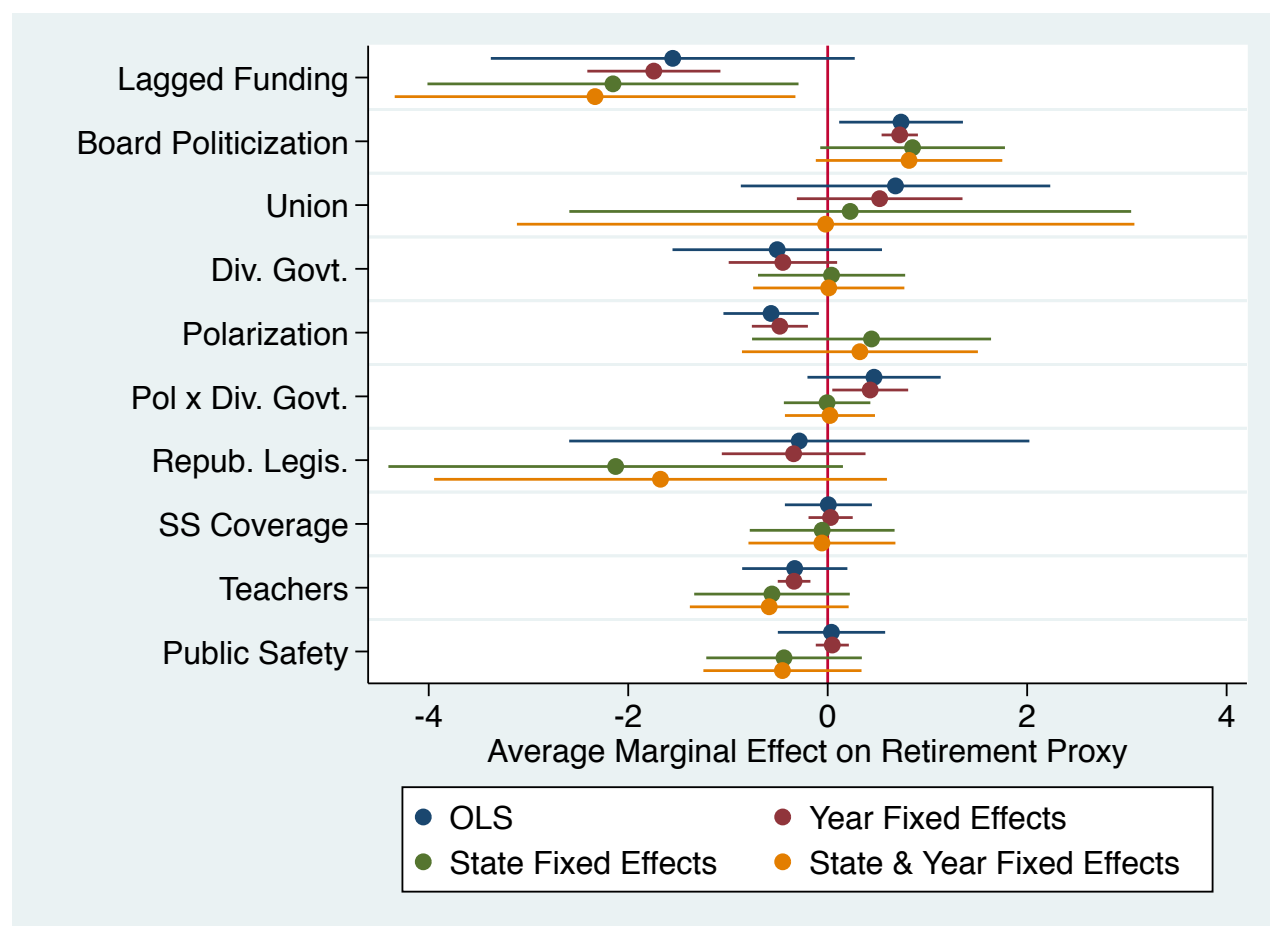
The above figure plots the actual and mean investment returns against the expected returns, otherwise known as the discount rate. As can be seen, the actual returns fluctuate a great deal each year, but average significantly below the actuarially expected returns (Source: Based on information from the Public Plans Database).

Governments, however, have decided to rely increasingly on risk, and assess plans in part on the assumption that investments will deliver enough returns to keep plans well-funded. Unsurprisingly, this is one of the most controversial practices plans have engaged in in recent years. The discount rate simply means the expected investment return. Figure 4.7 shows how the discount rate is much higher than the actual rate of return. In terms of the specific investments plans make, equities refer to shares of stock, which grants holder voting rights. Alternatives, in comparison, refer to investments that are not in stocks, bonds, or cash. Usually, these are investments in tangible goods like metals, alcohol, coins, antiques, and so on. They also include investments in hedge funds, venture capital, carbon credits, and so on. Plans also have made a number of other kinds of investments, in things like real estate, or other properties, including even golf courses. So far, there has been no clear study

indicating that any of these different kinds of investments are more or less likely to pay off. Additionally, alternative investments often come with higher fees, which might make them a particularly fruitless strategy.

4.9.4 Models Without Actuarial Controls

Figure 4.8: Variables Associated with More Retirements - No Actuarial Controls



The above presents the point estimates and 95% confidence intervals of regressing the retirement proxy variable on all of the independent variables, excluding all actuarial variables. This is an alternate specification in case those variables are post-treatment.

As discussed in footnotes in the main paper, there is a potential concern that plans' actuarial characteristics are chosen in part by political factors or concerns. If this is true, then we might be concerned that these variables are post-treatment, and therefore should

not be included in the right hand side of a regression model along with the key political variables of interest. I therefore estimate a model without these, the results of which I present in Figure 4.8. The exclusion of these variables does not change the direction of the board variable, but in the two state fixed-effects models, it is now significant at the 10 percent level, rather than five. In the OLS and year fixed-effects specifications, though, it is more significant. However, Social Security coverage and the Republican legislature variables are no longer significant in the state fixed-effect models.

Chapter 5

Conclusion: Pensions as Semi-Credible Commitments

Pensions undoubtedly have entered the problem stream of the political process. My papers point to various ways that pensions vary at the hands of politicians and quasi-autonomous management boards, and also to the effects pensions have on bureaucratic employees' retirement decisions. The findings highlight inherent tensions in management: it often is not in politicians' best interest to commit to well-funded pensions. In the long term, however, future generations have to pay for those outstanding obligations. Increasingly, this makes budgeting for pensions non-discretionary, and crowds out other kinds of spending.

Given this, and the considerable variation in plans' performance and politics, pensions might have feedback effects. They could shape employees' expectations and potentially behaviors, creating a sense of desert, and hopefully, trust and commitment (Hall and Soskice, 2001). Ideally, these bargains should develop the core competencies of the state, namely by maintaining an effective workforce. However, in order for pensions to work as intended, they need to be efficient and completely *credible* contracts. That is, employees can expect to receive back any money they forego, plus the additional amounts promised by the employers, which are funded by employer contributions and investment returns.

More generally, credibility refers to the degree to which each party in a deal can rely on the others party to follow through on their promises. In real-life versions of such games, like prisoner's dilemmas or divide-the-dollar scenarios, the empirical reality does not always match the theory. There are numerous factors that could impede the subjective calculations made by players. Broadly, though, decision-making turns on trust and commitment. The labor economics literature simply assumes that pensions are efficient and entirely credible contracts.

Given the concerns raised in my own work and in the literature discussed in the Introduction, that assumption seems rather questionable. As costs continue to rise and pensions receive more press, managers might be less able to raise future taxes. The perception of a crisis could feed back into the problem, exacerbating funding and hurting credibility. In other words, factors related to pensions, such as their performance, could affect human cap-

ital outcomes directly, and in ways not predicted the earlier literature. If so, it is far from straightforward to conceptualize the exact nature of these relationships.

Second, numerous factors can affect the pensions' performance. These include various actuarial calculations, politics, and the performance of the economy and investments. Adjusting any of these individually could have mixed effects on credibility. For example, making new employees contribute more into funds might improve funding performance, thereby bolstering the perception of credibility. At the same time, employees might not like paying more into their funds, and see reductions in generosity as signs of bad faith. Such considerations complicate pension reform.

Thinking about credibility in this context is inherently political. The government, and ultimately taxpayers, sponsor public plans. Governments also coerce taxes from their citizens, while companies depend on voluntary transactions in economic markets. As public organizations, pensions have numerous stakeholders to consider, and potentially other ends besides simply maximizing investment returns. Numerous authors have detailed such differences between public and private organizations (see Hall and Soskice, 2001; Bozeman, 1987; Murray, 1975; Simon, 1991, 1998).

Even the actuarial side of public pensions is still indirectly political. No management board is purely autonomous, and state legislatures or governors frequently pass policies affecting funds. Further, state plans operate under loose national guidelines, which itself represents a choice by the federal government not to regulate. While this flexibility allows plans to tailor themselves to local conditions, it allows for variation in management quality, funding, and credibility.

While many employees may not know a great deal about their pensions, reductions in credibility, however defined, could affect their decision-making in the aggregate, thereby shaping the production of public goods. Whether or not employees are aware, pensions are huge financial undertakings, and speak to the ability of governments to follow through on promises to employees and citizens.

5.1 Making Sense of the Results

In all three papers, I utilize the same dataset on 103 state plans from 2001-2011, which includes a battery of political, actuarial, and economic independent variables. The evidence provides a broad sense of how pensions work across all fifty states. Though the results largely corroborate my expectations, there are some surprising conclusions that differ across the three papers, which warrants discussion here.

In the first paper, I centrally argue that as elected officials control more seats on pensions' boards, the worse funding appears. Pensions seem fairly immune to other political forces, though there is some evidence that plans complemented with Social Security perform less well. Further, I do not find a great deal of evidence that board personnel changes in response to funding. There is some evidence, however, that stronger unions are associated with less politicized boards in the following year. There is no or mixed evidence of any occupational

effects on funding or board composition. The actuarial variables are not as critical, with the important exception that plans with higher discount rates tend to have worse funding, after controlling for other factors.

In the second paper, I look at a related concept to funding, which is employer contributions. I argue that a decision to make a required contribution is essentially a decision to fund a pension. However, employer contributions are just one of the three sources of pensions' assets. While the two variables are correlated and endogenous, they are conceptually quite distinct. Funding provides an overall assessment of performance, while employer contributions refers to the behaviors of elected officials.

A major difference between the two is that the board variable is not significant here. A significant relationship would suggest some degree of coordination between more politicized boards and elected officials. Instead, the results indicate that board composition does not shape legislators' contributions, one way or the other. Stated differently, there is neither clear evidence of coordination to systematically under or over-fund pensions.

Finally, in the third paper, I look at retirement rates among pension-holders in state governments. It is largely an open empirical question if and how pensions affect the behaviors of their intended targets. The board variable is once again significant here, which suggests that as employees have more say in their retirement policies, they are more likely to remain in their jobs. Even if many employees do not know what their exact level of representation on a board is, it is likely that at least some of them do. Secondly, pension funding in the prior year seems to shape retirements: the proxy is lower as funding improves. This provides evidence of a feedback performance effect into employees' decision-making. In other words, employees feel better about working longer in their jobs as pensions are better funded.

Of course, given the concern that better-funded pensions might also be less generous, it is critical to control for generosity. Otherwise, the funding variable might simply indicate that employees are less inclined to take severe pay cuts by retiring. As employees contribute more into their funds, they are more likely to exit. In comparison, as pensions provide larger benefits, workers remain in their jobs. These two different metrics of plan generosity seem to push in different directions, which is initially surprising. However, an employee who contributes more into a pension today, but also is promised a better retirement package in the future, may be more likely to leave. In comparison, an employee who contributes very little, but also has a small pension benefit might be perfectly happy to keep working, rather than suffer the relative poverty of retirement. As for the employer contribution rate, it might just be the case that average employees are not that aware of it.

Boards oversee or shape many plan policies, such as investments and required employer contribution rates. In doing so, they affect plans' overall performance, and also employees' willingness to remain in their jobs. However, these boards do not seem to affect politicians' decisions to fund pensions. This highlights the fact that these boards are indeed understudied quasi-autonomous agencies with real influence over an increasingly significant area of government spending. Thus, given that elected officials determine employees' contribution rates, boards' must then shape funding primarily through investment decisions and the use of actuarial assumptions that affect liability estimation. Jointly, these three papers provide

novel and broad insight into the politics and mechanics of state-employee DB pensions.

5.2 Future Extensions

There are many additional projects that future work should consider. Here, I suggest just a few that have not been adequately covered in political science or other literature on pensions. First, there is room for a more detailed history of the politics and organizational development of pensions in the United States, especially as funds expanded in generosity and merged to take advantage of scales of economy. It would be useful to understand what forces drove the timing and choices of different plans. Relatedly, there is more we could know about how unions and collective bargaining influence pensions, especially given that the rules vary so much both by and within states.

Third, it is often unclear exactly what kinds of choices are made by boards, in comparison to which are made by state governments. Relatedly, some states seem to give more power to governors, while others cede that power primarily within the legislature. It would be useful to have some way to delineate these different institutional choices and examine the consequences for funding. There also is more we could know about how the organizational structures of boards affect their decision-making and overall pension performance. For example, does funding improve with additional non-decision making support staff? What political factors are associated with disparities in the size of boards? Also, it could be useful to assess the professionalization or capacity of management boards, so as to understand how that affects pensions.

There also is more to know about how and when litigation is used to improve funding. Given pensions' problems and heightened salience, it is likely that the SEC, public employees, unions, or even private businesses will take government sponsors to court to improve funding and more accurately and publicly present their risks. It would be useful to know how successful these efforts are, both in the short and long-terms. In other words, litigation might not be the best-suited institutional corrective to pensions' policy problems. Alternatively, it might actually improve the performances of the worst-performers. While some authors have speculated on this point, none have addressed it head on.

Relating to risk, it would be useful to more explicitly examine plans' discount rate assumptions, and consider how and why they differ from actual investment returns. I briefly do this in the Appendix to my first paper, but it is something that I would like to expand into a future paper. Given the concerns voiced by Novy-Marx and Rauh (2009, 2011) and others, the discount rate is arguably the most critical actuarial assumption that plans make, and does seem to be fairly divorced from economic realities to a degree that is frankly unnerving.

There also is much more that we could know about how both employees and the public think about pensions. Surveys of bureaucrats who collect pensions would be useful to gauge the degree to which employees think about their pensions, how much they know about them, and if they are worried or confident that they will receive their pension promises. Relatedly, survey experiments of citizens could provide understanding of how people think

about pensions, and provide useful information to the degree to which pensions really are on the public's radar, and also if there are any interesting partisan differences in the ways that people think about them.

Further, as discussed in my third paper, there are numerous potential extensions examining the policy consequences of pensions. For example, it would be useful to know if pensions help encourage the recruitment of slackers or zealots into government work. That is, perhaps pensions recruit long-term minded employees. Alternatively, they could encourage lazy and poor-performing workers into government work, especially when combined with civil service protections. Despite theoretical research arguing that pensions ought to do the former, the empirical reality is an open question.

Additionally, scholars should push for larger-scale datasets on individual state employees. For example, it would be useful to have information on employees' educational backgrounds, ages of entry, years worked, ages retired, ages eligible to retire, whether or not they worked elsewhere in retirement, the size of their pension benefits relative to their salaries, and so on. Currently, data like this does not exist across states. While collecting even one new variable, as I did in my third paper, can be very time-intensive, it would be more than worthwhile to be able to address these kinds of questions.

Lastly, work should explore how and if pensions structure government performance via the production of public goods. For example, some observers have argued that increased crime rates in Stockton, California have been tied to slashed pension benefits. Stockton argued in court that they could not continue to function as a city if their pensions were impaired (Megerian and Petersen, 2014). Thus, future work could examine how and whether crime rates, student test scores, graduation rates, etc. vary as dependent variables in response to pensions. Along with additional work on pensions' human capital effects, this would help provide understanding of what tax payers receive for their pension dollars.

5.3 The Road to Reform

Given pensions' funding shortfalls and importance for human capital, reform is necessary. However, there is little reason to think that the national government will step in to regulate funds, or only do so in exceptional circumstances. Thus, it will be up to state governments to recognize pensions' challenges and pursue reform. Are they up to the task?

Politicians are unlikely to be held seriously accountable for pensions' successes or failures. There is probably little retroactive voting over fluctuations in pension performance. Further, politicians can fairly credibly avoid blame for generations of building pension costs. If anything, voters might be more likely to blame public employees themselves. While separate management boards might enhance funding, they also provide politicians with another out by which they can avoid blame for costs. As long as politicians do not have to pay for pensions' costs in the current fiscal term, they have limited incentives to fix pensions' long-term problems.

To truly implement well-tailored reform, politicians would need to learn a great deal about pensions. Many of them would have to put aside their anti-government ideologies and take a nuanced approach to reform. Pressure for this kind of behavior would have to come from the voters, interest groups, unions, or employees themselves. Elected officials and management boards then would need to hear those demands and choose to honor them, instead of ignoring them and pushing costs down the road. Passing even partial reforms will be difficult. It is easier to do nothing.

Thus, costs will continue to grow, making pensions one of the fundamental policy challenges of the 21st Century. At the same time, there is little evidence that pensions have drifted afield from their original purposes of rewarding employees and shaping the workforce (Hacker and Pierson, 2010). Plans do seem to influence retirements, and they very well could affect other human capital and performance variables. As such, the city of Stockton probably was onto something when it claimed that it would not be able to function without pensions.

In summary, additional regulatory authority from the national government could help better manage pensions and mitigate the wide variation in funding and policies. While there is probably some benefit to tailoring to local circumstances, growing costs and heterogeneity in performance justify additional regulation. As for reforming pensions, managers should weigh the potential fallout on public personnel. Further, governments should consider granting more authority to competent management committees.

I do not propose a one-size-fits all solution, as pensions are indirect tools to manage the workforce, and have numerous moving parts. Indeed, they likely have heterogenous effects in different times and places. Until plans can adjust to become more financially stable, though, their credibility will remain in question, constraining the production of public value.

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