2013

The Political Economy of U.S. Public Pension Plans and Their Unfunded Liabilities

Dashle Gunn Kelley
West Virginia University

Follow this and additional works at: <https://researchrepository.wvu.edu/etd>

Recommended Citation

Kelley, Dashle Gunn, "The Political Economy of U.S. Public Pension Plans and Their Unfunded Liabilities" (2013). *Graduate Theses, Dissertations, and Problem Reports*. 664.
<https://researchrepository.wvu.edu/etd/664>

This Dissertation is protected by copyright and/or related rights. It has been brought to you by the The Research Repository @ WVU with permission from the rights-holder(s). You are free to use this Dissertation in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you must obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This Dissertation has been accepted for inclusion in WVU Graduate Theses, Dissertations, and Problem Reports collection by an authorized administrator of The Research Repository @ WVU. For more information, please contact researchrepository@mail.wvu.edu.

The Political Economy of U.S. Public Pension Plans and Their Unfunded Liabilities

Dashle Gunn Kelley

**Dissertation Submitted to the
College of Business and Economics at
West Virginia University**

In partial fulfillment of the requirements for the degree of

**Doctor of Philosophy
in
Economics**

**Roger D. Congleton, Ph.D., Chair
Donald J. Lacombe, Ph.D.
William S. Reece, Ph.D.
William B. Riley, Ph.D.
Terry Rose, Ph.D.
Gary A. Wagner, Ph.D.**

Department of Economics

**Morgantown, West Virginia
2013**

Keywords: public pensions, state and local retirement systems, unfunded liabilities, median voter theorem, special interest group theory, pension reform, low cost information, constitutionalization, pension promises, pension benefit protections, constitutional protections, legal institutions

Copyright: Dashle Gunn Kelley

The Political Economy of U.S. Public Pension Plans and Their Unfunded Liabilities

Abstract

Chapter 1 applies a public choice approach to the problem of unfunded pension liabilities and adopts the methodology of Congleton and Shughart (1990) to model underfunding of state-level public pension plans using the median voter theorem, along with the theory of “capture” by special interest groups, and a combined model of the two. With panel data from 2001 to 2009, the paper finds that the combined model provides the strongest explanation for the current levels of unfunded liabilities; hence, both median voter preferences and special interest group influence are affecting political outcomes. The special interest group model slightly outperforms the median voter model in direct comparisons. (2) Public pension plans in the United States face unprecedented insolvency risk from unfunded liabilities. Reforming state-level public retirement systems requires legislative action in most states, exposing the process of pension reform to various political influences. Chapter 2 examines financial as well as political factors of public pension plans, comparing possible political motivations for pension reform. The empirical results suggest that pension reform decisions are largely independent from political biases and are primarily a response to pension underfunding. In addition, the paper examines a hypothesis that news media have an important role in the political process of pension reform by providing low cost information to pension stakeholders. Empirical evidence confirms that the dissemination of popular information on public pensions is a significant positive predictor of legislative reforms. (3) State and local public pension promises to government employees are binding governmental commitments in most states. Public pension benefits have multiple levels of protection, including both those associated with contract and constitutional law. The variety across states provides an unique opportunity to study the constitutionalization of government obligations. Chapter 3 describes the various legal interpretations of state and local public pension promises and uses statistical analysis to explore the implications of the various forms of benefit protections on pension funding as well as other plan characteristics.

Acknowledgements

This dissertation would not have been possible without the guidance of friends, family, mentors, and not-so-friendly individuals along my academic and life journeys. It is impossible for me to list everyone who has helped me along the way. Here are a few names—my apologies to the many exclusions—Jeff Westendorf, Tony Carilli, Jeremy Schwartz, Russell Sobel, Roger Congleton, Donald Lacombe, William Reece, Gary Wagner, Terry Rose, Bill Riley, George Crowley, Will McAndrew and Christa Court. Of course, I would like to express gratitude to my loving and supportive family (especially Dad, Mom, Buzz, and Odawg) who all have helped me reach this goal and many others. I became fascinated with economics on car trip to North Dakota with Dad in the early 2000s, listening to economic lectures by Timothy Taylor from the University of Minnesota. The obtainment of an economic doctorate, therefore, is truly the fulfilment of a lifelong dream. Thank you to everyone.

Table of Contents

Acknowledgements	ii
List of Figures	v
List of Tables	v
1 The Political Economy of Unfunded Public Pension Liabilities	
1.1 Introduction	1
1.2 Background on the Landscape and Use of Public Pensions	3
1.3 The Political Economy of Unfunded Pension Liabilities	6
1.3.1 Median Voter Theory	6
1.3.2 Special Interest Group Theory	9
1.3.3 Combined Model as a Convex Combination of Pure Models	12
1.4 Data	13
1.5 Estimates	17
1.6 Conclusion	23
2 The Political Economy of Public Pension Reform	
2.1 Public Pension Reforms	26
2.2 Background on State-Level Public Pensions in the U.S. 2.2.1 Characteristics of Public Plans	29
2.2.2 Public Pension Plan Funding	31
2.3 Politics of Pension Reform	33
2.3.1 Median Voter Theorem	34
2.3.2 Special Interest Group Theory	36
2.3.3 Benevolent Government Model	37
2.3.4 The Role of Information	38
2.4 Data and Methodology 2.4.1 Exogenous Variables	40
2.4.2 Estimation Specification and Dependent Variables	43
2.5 Empirical Results	45
2.6 Concluding Remarks	51
3 Constitutional Protections of Public Pension Promises	
3.1 The Public Pension Promise	53

3.2	Some Differences Between Public and Private Pension Plans	55
3.3	Legal Protections of Public Pension Benefits . . .	57
3.3.1	The Various Legal Interpretations of Public Pension Benefits . . .	58
3.3.2	Further Discussion of Benefit Protections .	61
3.3.3	Bankruptcy Solutions . . .	62
3.3.4	Litigation: Recent and Current . . .	63
3.4	Constitutionalized Government Promises . . .	65
3.5	Description of the Dataset	68
3.6	Empirical Results	70
3.7	Concluding Remarks	75
4	References	77

List of Figures

Figure 1: Pension Reforms	34
-------------------------------------	----

List of Tables

Table 1: Descriptive Statistics	17
Table 2: Regression Results for Median Voter and Interest Group Models	21
Table 3: Regression Results for the Combined Model	22
Table 4: Descriptive Statistics	42
Table 5: Index of Pension Reform	44
Table 6: Regression Results for Pew Data	46
Table 7: Regression Results for New Measure of Pension Reform	50
Table 8: State Constitutional Protections	60
Table 9: Legal Protections of Public Pension Benefits	69
Table 10: Summary Statistics	70
Table 11: Retirement Age	72
Table 12: Benefit Levels	73
Table 13: Funding Ratio	75

Chapter 1

The Political Economy of Unfunded Pension Liabilities

1.1 Introduction

Pensions, in effect, shift labor costs from the present into the future, which allows employees to save for retirement without the temptation of raiding their savings. Governments and other employers, by contrast, face the problem of contributing enough to their pension plans in order to pay their future commitments. Unfortunately, this proves to be difficult for most governments, which often have promised more pension benefits than they can easily fund out of current revenues. As a consequence, the promised streams of benefits have a larger present value than the amounts being put aside to pay for them.

The magnitude of unfunded liabilities depends on the assumptions used in the estimating process—particularly, the discount rate. Taking the unfunded liability numbers as reported by the plans themselves, Wilshire Consulting (2012) calculates the unfunded liabilities of 102 public sector plans at around \$700 billion for 2011. With the asset levels that 116 of the largest state plans report for June 2009, Novy-Marx and Rauh (2011) estimate that unfunded liabilities are \$1.68 trillion when discounting at the municipal bond rate and \$2.49 trillion when discounting at the Treasury bill rate. Meredith Whitney, a financial analyst who gained notoriety for accurately predicting the housing

bust and subsequent financial crisis is predicting a similar series of events with public debt and public pension obligations, and Harvard economist Robert Barro (2011) shares her concern.

The financial crisis and the corresponding stock market decline and recession exposed the fragility of the U.S. state-level public pension systems. Funding levels and asset values dropped substantially. The increase in unfunded liabilities has attracted a great deal of attention from television to newspapers (The Economist 2010a, 2010b, 2011, 2012; Laing 2010). The unfunded liabilities within state and local pension plans have the potential to negatively impact the budgets of state governments, causing states to default and limiting future public borrowing. Thus, understanding how the current situation developed and the factors that explain the disparity between pension fund assets and liabilities may shed light on possible public policy solutions.

This paper uses a public choice approach to examine the determinants of unfunded liabilities in state-level public pension systems in the United States. In this context, state-level pension management is not simply a result of expert financial and actuarial advice but is influenced by a variety of political factors that affect the rate of pension investment, the level of employee contributions, and the actuarial assumptions adopted. To determine which, if any, of these political factors may account for the underfunding of pension funds, this paper uses an approach similar to that of Congleton and Shughart (1990) to explain why large levels of unfunded liabilities have materialized. The paper develops a median voter model, an interest group model, and a model that combines the two.

The Congleton and Shughart methodology previously has been used to explain national, state, and county expenditures. Social Security benefit levels were modeled in their original paper and state and county road expenditures in follow-on papers (Congleton and Bennett 1995; Ahmed and Greene 2000). One of the advantages of this methodology is that the correct model is not assumed beforehand, but rather the researcher develops and estimates three likely models—the

median voter model, the special interest group model, and a combined model. The best fitting of the three models provides the most complete public choice explanation for the political outcome.

Section 2 provides background on state-level public pension plans in the United States. A description of the political economy of public pension plans in the context of public choice economics is in Sect. 3. There is a brief explanation of the data in Sect. 4. The median voter model, special interest group model, and combined model are estimated in Sect. 5, with the combined model providing the most explanatory power and the special interest group model showing a slightly stronger result than the median voter model. The last section summarizes the results.

1.2 Background on the Landscape and Use of Public Pensions

States structure their public pension systems in variety of ways. Some states have a single retirement system that covers almost all of the state's public workers at most levels of government—state workers, local government workers, public school teachers, police officers, and firefighters. Other states have multiple pension systems for the different types of government employees. Participation in the state-level public pension system for local, municipal, city, and county governments is sometimes mandatory and sometimes optional depending on the state. All states also have smaller pension plans for state legislators and judges. (Federal employees are not members of the state pension systems, being covered by their own separate Federal plans.) About one-fourth of state and local government employees do not participate in Social Security (GAO 2005).¹ This discrepancy impacts average benefit levels since replacement ratios are somewhat comparable regardless of Social Security participation. The plans that are outside of the Social Security System tend to provide larger retirement benefits to make up the difference.

¹ The constitutionality of the application of the law to state and local government workers was in question when the law was created; some public sector employers chose not to participate after the constitutionality of the issue was clarified.

The Employee Retirement Income Security Act of 1974 (ERISA) governs and shapes the structure and operation of private plans, but there is not a similar governing law for the structure and operation of state and local public pension plans. The Governmental Accounting Standards Board (GASB) issues statements to guide and influence the management and financial reporting of public pension plans. Most large state-level pension plans comply with these nonbinding recommendations of the GASB. However, the guidelines of the GASB allow for broad variation in the assumptions adopted and the methods used by actuaries and pensions accountants; the variation from state to state consequently is large. On June of 2012, the GASB adopted two new statements that address the lack of comparability in the numbers of public pension plan reports and the overarching discount rate issue.²

During the 1980s, private sector companies began to shift from defined benefit plans—where pensioners are guaranteed a fixed benefit amount upon retirement—to defined contribution plans—where pensioners usually control contributions and manage their own retirement accounts, such as 401(k) plans. Although this shift has redefined pensions and retirement income in the private sector, a similar shift has not occurred in the public sector. As of 2011, two states—Alaska and Michigan—offer only defined contribution plans to new employees (Schieber 2012). Defined benefit plans are still the most common method for providing retirement income for public sector retirees, despite becoming a rarity in the private sector.

If the disparity between pension assets and liabilities grows large enough, the state must respond either by increasing contributions (most likely through higher payroll taxes) or reducing benefits. The latter option is less likely since public pension promises are contractual obligations in most states and are protected by civil law as well as by state constitutions in some instances (Monahan 2010).

² See Munnell et al. (forthcoming) for further reading on the new GASB guidelines.

In many states when a public worker begins employment, the benefit formula used to calculate retirement benefits cannot be altered if the change negatively affects the employee. When contract law is used to protect the prospective retirement benefits of all public workers, this precedent is known as the “California Rule” and is followed by 12 other states (Monahan 2012). Pensioners generally can expect to be treated more favorably than bondholders when governments default. Historically, courts have required pension benefit payments in bankruptcy proceedings when public entities have defaulted on their debt. Instances include the New York City bankruptcy in the 1970s and the bankruptcy of Orange County, California in the 1990s (Brown and Wilcox 2009).

The era of ironclad pension benefits may be coming to an end, however. Benefit reductions for current workers and retirees have been adopted in a few states, although they are being challenged by public sector unions, as in Rhode Island, San Jose, and San Diego (Cooper and Walsh 2012). The future viability of retroactive benefit reductions as a solution to addressing public pension shortfalls depends on the outcomes of these legal proceedings.

Much of the discussion of pension risk focuses on the downside scenario when not enough assets exist in a fund to pay the promised benefits. However, upside risks also are present in public pension plans. An overfunded pension plan creates a tempting surplus pool from which politicians can borrow or reallocate resources away to pay for other projects. Also, public sector workers can use their political power to gain benefit increases that are not actuarially or financially sound.

During the stock market boom of the late 1990s, some state legislatures increased benefits using the assumption that elevated asset prices at boom levels would generate annual returns around 8% ad infinitum; these actions caused larger unfunded liabilities when the financial markets corrected downward (Summers 2010). Near the peak of the dotcom bubble, California’s pension system was 128% funded according to actuarial reports (CGA 2007). In response, the state

legislature passed Senate Bill 400, which included large retroactive benefit increases to public employees and retirees. Since the bubble burst, California has yet to reach full funding.

Given the upside and downside risks of pension funding, the appropriate funding ratio is probably somewhere between zero and 150%. The Government Accountability Office (GAO) considers plans with funding ratios below 80% to be underfunded. Fitch Ratings considers plans with funding ratios above 70% to be adequately funded (Reuters 2012). Bohn (2011) argues that because taxpayers are debtors with intermediation costs and voters prefer balanced budgets, it is optimal for states not to fund their pension systems because the returns on pension assets are less than taxpayers' costs of borrowing; thus, the optimal funding ratio is zero—a PAYG pension system.

1.3 The Political Economy of Unfunded Pension Liabilities

Public pension plans and other forms of employee compensation represent a large and growing expenditure for state and local governments. Unfunded liabilities present a significant risk to retirees, current workers, and taxpayers; state policymakers should manage these risks going forward. By better understanding the political economy of public pension policymaking, one can better understand the political incentives and other factors that contribute to hazardous pension shortfalls. If the political process for determining the actual amount of unfunded liabilities works efficiently with perfect information and competitive elections, the realized retirement fund balance would be consistent with the preferences of the median voter. Alternatively, it is possible that special interest groups—public sector unions and other public employee organizations—strategically disrupt the political process to advance their own aims.

1.3.1 The Median Voter Theorem

Retirement benefits are a form of deferred compensation, and the median voter can use this mechanism to delay a portion of the payment for labor used to produce goods and services in the

public sector. However, the median voter's ability fully to achieve this intertemporal transfer of income is constrained by various factors. Ricardian equivalence implies that current voters will absorb more of these costs in the present if they have an interest in the financial wellbeing of future generations (in the state of interest). Since the opportunity cost of a public employee's job is likely foregoing employment in the private sector, a government employer may need to provide a significant portion of compensation in the form of wages to stay competitive in the labor market.³ Also, if the efficiency wage theory holds in the public sector to any extent—higher wages and retirement benefits for public workers correspond to increases in utility for taxpayers—public entities would compensate more generously.

This paper assumes that older citizens benefit from spending borrowed government money in the present period. Because the debt payments are dispersed across a considerable period of time and because of finite lives, the older generation does not incur the full cost of these debt obligations (Thompson 1967). However, Barro (1974) shows that finite lived voters may also fully take account of future tax obligations if generations are connected by a chain of operative intertemporal transfers, such as bequests. In such cases, households will adjust their private consumption and planned transfers accordingly to account for future as well as present taxes. Nonetheless, the finite lifespan of the median voter, her mobility, and information costs reduce the extent to which Ricardian equivalence is likely to characterize voter behavior.

Mobility is a significant hindrance to Ricardian equivalence at the state level because a citizen can avoid the future tax payments by moving to another state. Also, the altruistic link operating through the state and local public sector between generations is broken if the older generation's children and grandchildren have migrated to other states. Within the United States, moving between states is commonplace—especially for citizens located close to a state border. Since the supply of

³ For a survey of the public sector labor market literature, see Ehrenberg and Schwartz (1983).

land is inelastic, property values might capitalize the future property tax liabilities from the borrowing of the respective government entity (Daly 1969). For federal government structures, debt capitalization is an alternate equivalence mechanism—a non-altruistic current generation incurs the costs of state-level government borrowing through reduced property values in the present (Eichenberger and Stadelmann 2010). If we relax the unrealistic assumption that access to capital markets is the same for both individuals and the government, it may be optimal for rational individuals to utilize the government to borrow at more favorable rates (Banzhaf and Oates 2012). Unfunded liabilities may simply be another instrument through which voters borrow against future tax receipts.

Additionally, unfunded liabilities may be less intuitive for the citizenry to comprehend than a municipal bond. The reporting of unfunded liabilities in pension plans is typically more opaque than financial information on standard bond issues. Thus, it is a reasonable assumption that the median voter is not aware of the precise costs of the unfunded pension obligations of the government.

Information is a necessary condition for both equivalence mechanisms. If citizens are not sufficiently informed, they cannot fully offset the borrowing actions of the government through private intergenerational transfers or capitalization of state debt in property values. The median voter has little incentive to become informed of the true costs of unfunded liabilities because these costs include reading through the financial reports, understanding the actuarial assumptions behind the estimates, and gauging the various future uncertainties—financial, demographic, and economic. Thus, rational ignorance seems justified. Congleton (2001) shows that the presence of rational ignorance is sufficient to generate fiscal illusion.

Although fiscal illusion and debt capitalization as they relate to public pension liabilities are beyond the scope of this paper, it is necessary to make an assumption that the median voter believes that current public consumption costs can successfully be transferred to future generations. Mobility

between states and a lack of quality information about unfunded pension liabilities create justifications that neither debt capitalization in land values nor Ricardian equivalence occurs.

The simple model that follows illustrates the median voter's utility maximization problem. Because the median voter is earning a higher income now and expects to have a lower income in the future during retirement, creating unfunded liabilities may be consistent with maximizing utility, since the median voter will have a lighter future tax burden.

1.3.2 Special Interest Group Theory

The interest-group theory of government is the alternative public choice explanation for the unfunded liabilities of public pension plans. Special interest groups shift political outcomes away from those preferred by the median voter through persuasive advertising campaigns, contributions to political candidates, and direct negotiations with state legislatures. Steffen (2001) points out that public employees are a unique interest group in that they can also affect pension compensation through both the political process and collective bargaining.

Politicians all attempt to win office and need campaign contributions and votes to do so. Hence, the politician often faces tradeoffs between votes—from acting in ways that are consistent with the preferences of the median voter—and campaign money—from acting in the interest of lobbyists and special interest groups (Stigler 1971). If political markets are competitive and information is perfect, politicians have less demand for campaign contributions since voters are fully informed of politicians' positions.

Divergences from the preferences of the median voter may be in the form of subsidies, price controls, or favorable regulatory statutes, but ultimately, special interest group influence produces a government-mediated transfer of wealth to specific groups from other groups, including the citizenry in general (Peltzman 1976). Thus, organized groups can gain at the expense of unorganized consumers and taxpayers. The political equilibrium is reached through competition among a

multitude of political factions—with each individual belonging to a number of different groups distinguishable along the lines of age, occupation, region, and so on—depending on the net gain or loss of the group from taxes, subsidies, and other transfers (Becker 1983). The effectiveness of the groups' abilities to be on the “winning side” of these transfers is determined by the cost of organizing, the ability to use and manipulate information, and the political influence of the group.

The organization of a special interest group is a costly, but productive step for such groups. A well-organized group can devote resources to lobbying until the expected gain from additional lobbying is equal to the marginal costs of lobbying. Since in most states public workers are already organized for collective bargaining purposes, they are in a better position to extract rents from the government than other relatively large groups. The members have common interests with respect to wages and pensions that can be expected to affect their voting behavior and campaign contributions, and these normal political channels of influence may be “topped” up by strike threats in a manner few other groups can stage.

Differences in information costs also allow some special interest groups to extract more resources than others. Members of public sector labor unions clearly have incentives to become involved in the processes for determining wage and benefit levels and to be informed about the results of that process. Non-employee voters, in contrast, have little incentive to be well informed about the compensation packages of public employees. Moreover, the complexity of pension and other compensation plans and the opaqueness of benefit reporting increase the information costs for such voters. This lack of public knowledge reduces voter monitoring, which provides an opportunity for politicians to increase future retirement benefits for public employees without losing many votes from non-employee voters.

Special interest groups can also influence the information available both to voters and politicians. If special interest groups are able to present information in a self-interested way—

perhaps by highlighting certain points at certain times or by emphasizing favorable statistics or arguments—they can affect the policies formulated by the politicians.

Although public employees will be more informed than non-employee voters, they may not be perfectly informed. It is unlikely and probably irrational for an individual government worker to become fully informed about the complex mathematics and actuarial assumptions underlying the financial status of his or her pension plan. However, union leaders face a stronger incentive to acquire this information on behalf of their fellow union members. Their interests are not perfectly aligned with their members insofar as members reward highly visible “results” in the short term. If so, union leaders may attempt to maximize short-term workers’ compensation packages of wages and retirement benefits while overlooking the long-term sustainability of the pension system (Mitchell and Smith 1994).

It is assumed that public sector special interest groups attempt to maximize the present value of government employees’ compensation packages. Public worker compensation, Z , is equal to the sum of wages, W , and the discounted expected value of both funded and unfunded future benefits, where β is the discount factor. B_F represents the funds put aside for meeting these future pension obligations, and B_U represents the unfunded future benefits. As the ability of a government to pay these unfunded benefits declines, the expected value of these promises drops accordingly.

$$Z = W + E[\beta * B_F] + E[\beta * B_U] \quad (1)$$

Unfunded liabilities materialize when politicians do not set aside the actuarially required amount. The public workers’ lobby seeks to maximize wages and benefits; however, within the lobby group, the preferred level of unfunded liabilities most likely varies with the number of years remaining in public employment. Self-interested younger workers have a larger financial stake in the long-term sustainability of the pension fund because they have a longer time horizon. However, for retirees and workers near retirement, the threat of insolvency is less important because actuarially

unsound benefit increases take years to create problems within their respective plans. This slight variation in preferences should materialize in union elections and in the lobbying by public sector unions and other organizations.

Benefit packages should increase with the number of active members, the number of retirees, and union strength, while the effects of unfunded liabilities on retirees and active members go in opposite directions.

1.3.3 Combined Model as a Convex Combination of Pure Models

If elections restrict the ability of public employee unions to obtain more generous retirement benefits—and it is clear that they do at least within limits—then the effects of median voter and organized government employee groups need to be taken account of simultaneously. The simplest approach is the one developed in Congleton and Shughart (1990), which simply assumes that more complex model outcomes are convex combinations of the two pure models. In this case the key variables from the median voter model and the special interest group model both will affect pension levels and the extent of unfunded liabilities.

$$B_U = W_A * F(\bullet) + W_B * h(\bullet) \quad (2)$$

Estimates of the weights, W_i , tell us which political scenario, median voter preferences, special interest group influence, or the combined model better explains the actual outcome. The function f represents the median voter model; the function h represents the special interest group model. If W_A is equal to one and W_B is equal to zero, this is a situation in which the political process works efficiently and the preferences of the median voter determine the political actions of politicians. If the situation is reversed, W_A is zero and W_B is one, the political process does not work efficiently, and politicians are “captured” or at least strongly influenced by special interest groups. If both weights each equal unity, the effect of the two explanations is balanced on the actual result.

1.4 Data

Of course, the future is not entirely knowable, so no direct observation of the extent of unfunded pension liabilities exists. Unfunded pension liabilities instead are actuarial estimates, and their magnitudes depend somewhat on the actuarial methodology applied. Although demographic assumptions are more or less similar, the multiple acceptable actuarial practices reduce the comparability of state-level public pension data. The three main factors that contribute to this heterogeneity are the actuarial methods used to calculate pension outlays, the smoothing methods for calculating the actuarial valuation of pension fund assets, and the discount rates for future pension fund outlays, with the variation in the discount rate having the largest effect on estimates (Clark et al. 2011). Referring to the disagreements over the size of liabilities, Brown et al. (2011) write: “the core debate in this area is over the choice of the appropriate discount rate.”

The standard practice in public sector defined benefit pension accounting is to discount future pension liabilities at the expected rate of return, around 8 %. Given the current conditions of the economy and the financial markets, this rate is somewhat optimistic.⁴ This number reflects the long-run average returns on stocks during the postwar period.

Economists suggest that future public pension liabilities be discounted at a lower rate (possibly the risk-free rate) that reflects the legal commitments being made. Pensioners have strong contractual claims to their future benefits (Novy-Marx and Rauh 2009). Discounting at the risk-free rate may be inappropriate. Since states pay higher interest rates on bonds than does the federal government, investors view state debt as riskier than U.S. Treasury Bills—the closest thing to a risk-free asset (Anson 2011).

⁴ Wilshire Consulting (2011) projects that average long-term returns will be 6.5% annually for the median plan. Initial returns for the fiscal year ending in June 2012 are around 2%.

In instances in which local governments have defaulted on bonds, pensioners have so far continued to receive the promised benefits, although the bankruptcy of Stockton, California may change this current paradigm of municipal bankruptcy (Russ 2012). Due to the amortization component of the actuarial required contribution (ARC), a substantial lowering of the discount rate would lead to large increases in the contributions—amounts that most states would be unable to pay in full since state budgets remain strained by the recent recession (Munnell et al. 2011).

Discounting pension obligations at the expected rate of return creates perverse incentives.⁵ First, it encourages plan managers to invest in riskier assets in order to increase the discount rate and to reduce the present value of future liabilities. The additional risk from these higher return investments is not factored into the annual pension reporting. Second, the discrepancy between the discount rate and the rate at which a state can borrow money in the bond market creates a situation where states can borrow money at their muni rate (a rate much lower than the expected rate of return) and put it towards funding future liabilities discounted at 8 %, essentially creating money on the balance sheet. Referring primarily to local governments, Mumy (1978: 523) comments that the gap between the rate of return on investments and the borrowing rate is the chief benefit of running a government defined benefit pension plan.⁶ One of the weaknesses of using a funding ratio and unfunded liabilities estimates is that it ignores pension obligation bonds and the additional risks from borrowing money to manage unfunded liabilities.⁷

The pension data used in the present study are from the Public Pension Database (2010), which is sponsored by the Center for State and Local Government Excellence and the Center for Retirement Research at Boston College. The range of data is from 2001 to 2009, and the numbers

⁵ Cowen and Parfit (1992) present a philosophical argument against the standard practice of discounting the values of future government promises.

⁶ This has been a strategy of Illinois and California, both of which have opted to issue pension obligation bonds in an attempt to capitalize on the gap between borrowing rates and rates of return.

⁷ Munnell et al.. (2010) find that state and local governments are more likely to issue pension obligation bonds when facing budgetary stress and when large outstanding debt levels already exist.

are the ones reported by the plans themselves, typically in their certified annual financial reports (CAFRs). Because public pension systems tend to adhere to the GASB guidelines, many of the reporting methods of the plans are similar, but these numbers are not perfectly comparable since the actuarial methods and assumptions vary somewhat among states.

The Public Pensions Database collects data from 126 of the largest state and local plans in the United States. The liabilities and assets for each state-level plan included in the survey are added together to provide aggregate values for each state in the year of interest. A state is dropped from the sample if one of its plans has insufficient data. The editing of the dataset is necessary because the present paper assumes that the net summations are the total unfunded pension liabilities for a state although other unfunded liabilities exist in other small plans that are absent from the survey. After making these adjustments, the dataset contains pension data from 42 states with 79 state-level pension plans for the years 2001–2009. The state-level public pension plan membership data also come from the Public Pension Database. These numbers are summed for each state for total members, active members, and retirees and are used to create percentages—of workers and of retirees in the plan—to be used in the special interest group regressions.

The population data are the annual estimates of resident population from the U.S. Census Bureau. The median statistics for a state are used to approximate the characteristics of the median voter. Median household income estimates come from the Current Population Survey of the United States Census Bureau and are in current dollars, which corresponds to the values from the pension data that are not inflation-adjusted. The debt-to-income ratio is the net tax-supported debt as a percentage of personal income from Moody's (2010). Similar to the pension analysis of Splinter (2011), the union data come from the Union Membership and Coverage Database (Hirsch and Macpherson 2010). The percentage of public workers and the percentage of total workers that are members of a union both are included in the special interest group regressions.

Median voter age is estimated using voter participation data by age and state from the U.S. Census Bureau. The dataset provides an estimate of the number of voters in certain age categories—18 to 24, 25 to 44, 45 to 64, and 65 plus. Assuming a uniform distribution within these ranges and using a life expectancy number for 65 year olds from the Society of Actuaries simple life expectancy calculator online (12.6 for someone 75 years old), the age of the median voter in the 42 states in the sample is estimated. The dataset does not include 2006 and different age categories were used for some of the smaller states.⁸ The numbers are estimated for presidential election years and congressional elections years, and an average is taken for years in which no congressional elections were held and for 2006.⁹ Data from 2000 to 2010 are used to estimate the median voter age for the years at the ends of the range of the panel, the years 2001 and 2009.

Table 1 provides some descriptive statistics for the variables used in the model estimations. The average state has about \$1,280 in unfunded liabilities per capita with its plan's cumulative funding ratio around 85 % for the years 2001 to 2009. Most plans are underfunded, but there are a few instances of pension overfunding. For most states, about 60% of plan members are active workers, about 25% of plan members are retired, and the number of retired members of the plan equals about 2% of the state population. There is considerable variation in the percentages of the public sector employees and of the total workforce that belong to a union. The public sector union membership data do not differentiate between local, state, and federal level workers; thus, states with large unionized federal workforces bias the data. The typical median voter for each state is someone who is about 50 years old with a household income of about \$45,000 dollars per year. The Gross State Product per capita averages around \$40,000. The public debt-to-income ratio is given in

⁸ Life expectancy is 20.4 years for someone 65 years of age according to the Society of Actuaries Simple Life Expectancy Calculator.

⁹ The observation for 2006 is an average of 2004 and 2008; 2005 and 2007 are calculated the same way using the estimated values for 2006.

percentage terms, so the average state debt is about 2.75 % of state income. The average cost per capita for operating the states' pension systems is low and runs about \$5 per person.

Table #1 Descriptive Statistics							
Variable	Units	Description	Mean	Median	Minimum	Maximum	Standard Deviation
Unfunded Liabilities	Dollar per capita	Unfunded Liabilities to State Population	1280	967	-6675	15967	2019
Funding Ratio	Ratio	Assets to Liabilities	0.85	0.86	0.39	1.19	0.15
Percent Active	Percent	Active Members to Total Members	58	58.8	37.3	84.6	7.9
Percent Retired	Percent	Beneficiaries to Total Members	27.1	26.6	16	43.5	5.4
Public Union	Percent	Ratio of Public Sector Workers who are Members of a Union	31.8	27	5.2	72.4	17.6
Total Union	Percent	Ratio of Workers who are Members of a Union	11.2	10.1	2.3	26.7	5.7
Retirees to Population	Ratio	Ratio of Beneficiaries to State Population	2.1	2	0.6	5.6	0.7
Median Voter Age	Years	Estimated Median Age of Voting Public	50.3	50.3	45.7	54.9	1.7
Median Voter Income	Dollars	Median Household Income	46516	45810	30161	68059	7511
Admin. Expenses	Dollars per capita	Administrative Expenses to State Population	5.3	4.1	0.8	45.3	4.8
Debt to Income	Percent	Public Debt to State Income	2.8	2.3	0	12.1	2
GSP	Dollars	Nominal GSP to State Population	40715	39114	22876	78293	9682
Social Security	Dummy	1 if one of the state's plans is not covered	0.86	1	0	1	0.35
Right-to-Work	Dummy	1 if state is right-to-work	0.48	0	0	1	0.5

The public pension landscape provides a large laboratory in which each state conducts a separate experiment. The fully funded programs show what works in the public retirement planning environment and the unfunded ones show what fails. However, what fails is often politics, rather than the pension programs themselves, which share many features.

1.5 Estimates

The panel dataset from 2001 to 2009 of 42 states allows one to estimate the median voter model, the special interest group model, and the combined model. The Congleton and Shughart (1990) methodology uses explanatory power to determine which model is the appropriate one for

the policy area of interest, here pension underfunding. The models are estimated using a pooled OLS regression model, a fixed effects panel model, and a weighted least squares (WLS) panel model, with weighting by per unit variance.

Table 2 reports the results for the median voter and interest group models with t-statistics of point estimates in parentheses. Joint significance tests on the pooled OLS models suggest inadequacy, and Hausman tests suggest that fixed effect models should be used for estimation. The fixed effects substantially improve the explanatory power of the models, while the point estimates remain statistically and economically significant.

The fixed effect OLS estimation for the median voter model is presented in columns 1 and 2. The model assumes that independent variables, such as the estimated age of the median voter and the median household income, represent the characteristics of the median voter. Since the point estimate for median income is positive, this suggests that as the median voter becomes richer she increases her use of the unfunded liability mechanism. For every dollar of additional income the median voter earns, per capita unfunded liabilities increase by pennies. The median voter's share of the costs of operating a pension plan should influence the funding decisions of the plan. Interestingly, a dollar of administrative costs per capita corresponds to about \$68 of unfunded liabilities per capita. Thus, some of the costs of operating pension systems appear to be transferred to future taxpayers through the unfunded liability mechanism or, perhaps, better managed plans with fewer unfunded liabilities are more efficient at minimizing administrative costs.

Column 2 presents the estimates of the model when controlling for the sizes of states' public debts. The level of public debt of a state affects the median voter's decision regarding unfunded liabilities. The debt-to-income ratio has a significant and positive relationship with the dependent variable suggesting that median voters who prefer large public debts also have a greater tolerance for unfunded liabilities.

Columns 5 and 6 present estimation results for the special interest group model. The most significant result is shown in column 5: the ratio of the number of retirees in the state's pension systems to the total population has a large, positive coefficient and a t-statistic above 15. If special interest group strength is positively correlated with the proportion of retirees in a population, this provides evidence that "capture" by the public employee unions is influencing unfunded liability levels.

The model in column 6 shows the effect of different time horizons of the members of a public pension system and the differing effects of public and total workforce unionization. The percentage of active workers in a state's pension system has a negative coefficient, but the percentage of retirees has a positive point estimate.

A concern of the models presented so far is efficiency of the point estimates because of possible heteroscedasticity. Although the OLS point estimates are unbiased and consistent, heteroscedasticity causes inefficiency and biases the standard errors and the t-statistics. Wald Tests reveal that heteroscedasticity is present in the fixed effect OLS models. Weighting each coefficient by per unit variance, a WLS model estimates the median voter model and the special interest group model with and without fixed effects, as shown in columns 3 and 4 and columns 7 and 8. The WLS models also substantially improve the explanatory power over their OLS counterparts, increasing the coefficients of multiple determination.

WLS allows for the inclusion of time invariant dummy variables that are incompatible with the state fixed effects dummies. A negative point estimate for the Social Security dummy variable indicates that states that do participate in Social Security have fewer unfunded liabilities per capita. If pension replacement ratios are somewhat comparable across states regardless of participation in Social Security, this negative coefficient may reflect that nonparticipating states have larger obligations to retirees. Alternatively, participating states may be more prudent.

Interestingly, the coefficient of the median voter age variable changes signs from negative to positive. If the coefficient is negative, this suggests that an older median voter cares more about the financial wellbeing of future generations. A negative coefficient reflects the shorter time horizon of older individuals (and an older median voter), since problems from pension underfunding take many years to materialize. In column 7, all of the independent variables for the special interest group model are included. These variables have their expected signs and are significant except for the percentage of retired workers, which loses significance (probably because of the inclusion of the retirees to population ratio).

The unionization variables for the public sector and the total workforce have different effects; greater total workforce unionization has a positive effect on unfunded liabilities, but unionization of the public sector has a negative relationship. One explanation is that stronger contractual rights to pension benefits for public sector workers exist in states with more union members as a percentage of the total workforce. Greater levels of public sector unionization in a state may be an indication that the public sector unions are better at representing the interests of the public workers, perhaps by becoming more involved in the political processes and more knowledgeable of the complex actuarial methods of their pension plans. The right-to-work variable is negative, suggesting that these laws do influence unfunded liabilities.

The time invariant dummies and retirees to population ratio variable are removed to estimate WLS models with fixed effects in columns 4 and 8. All of the point estimates are economically and statistically significant with their expected signs. The estimation results appear to support both the median voter and the special interest group “capture” narratives.

Table #2								
Regression Results for Median Voter and Interest Group Models								
	1	2	3	4	5	6	7	8
	OLS	OLS	WLS	WLS	OLS	OLS	WLS	WLS
	Fixed Effects	Fixed Effects		Fixed Effects	Fixed Effects	Fixed Effects		Fixed Effects
Constant	-13724*** (-4.16)	-15453*** (-4.64)	2832** (2.15)	-7124*** (-4.97)	-4482*** (-11.65)	3041* (1.74)	1875*** (5.34)	3090*** (4.86)
Age	132** (2.2)	156.45*** (2.6)	-59.19** (-2.36)	66.92*** (2.65)				
Income	0.172*** (9.95)	0.163*** (9.3)	0.026*** (5.59)	0.105*** (13.01)				
Admin Expense	68.49*** (2.77)	62.1** (2.53)	83.69*** (5.06)	79.51*** (3.86)				
Social Security			-980.5*** (-8.57)				-533.53*** (-5.78)	
Public Debt		349*** (2.7)	182.8*** (7.07)	284.14*** (3.53)				
% Workers						-134.91*** (-7.29)	-16.31*** (-3.59)	-113.5*** (-15.88)
% Retired						190.85*** (5.78)	9.84 (1.14)	186.58*** (14.00)
% Public Union						-21.57 (-0.63)	-59.22*** (-12.79)	-21.56* (-1.87)
% Total Union						140.93 (1.45)	74.75*** (4.87)	104.68*** (3.24)
% Public Retirees					278136*** (15.13)		101416*** (11.88)	
Right-to-Work							-985.61*** (-10.03)	
R-squared	0.708	0.714	0.501	0.824	0.762	0.71	0.652	0.882
F-stat	18.353	18.447	74.805	34.46	25.482	18.027	98.904	55.137
Note: The dependent variable is unfunded liabilities per capita. t-statistics are in parentheses; asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels on a two tailed test.								

The estimation results for the combined model are shown in Table 3. The ratio of retirees to state population is significant above the 99 % level when state fixed effects are included or excluded in columns 3 and 4. All of the special interest group variables are statistically and economically significant in column 1, but the unionization variables lose significance when state fixed effects are added in column 2. The median voter variables are significant in the fixed effects model of column 2 with their expected signs. When all of the dependent variables in the median voter and special interest group models are included in a pooled OLS model in column 3, the estimates suggest that both median voter variables and special interest group variables influence the level of unfunded

Given the significance of the variables from both the special interest group model and the median voter model—particularly, retirees to population and median income—the combined model appears to be the best explanation for the current level of unfunded pension liabilities. The results are a mixed bag as to whether the median voter model or special interest group theory provides a better explanation for the unfunded liabilities of state public pension plans. Paired Student t-tests, sign tests, and Wilcoxon signed rank tests are performed on the residuals and squared residuals of the median voter and special interest group models to gauge which model is stronger. Although many of the residual distributions were indistinguishable from one another, the special interest group model does outperform the median voter model in some of the comparisons, particularly with respect to the squared residuals, suggesting that the special interest group model is slightly preferred.

With the opaqueness of public pension reporting, it is intuitively unlikely that the median voter in any state is actually aware of her share of the unfunded liabilities from state pension plans. The strength and robustness of the retirees-to-population ratio suggests that groups representing the formers' interests have “captured” politicians and that retirees are receiving concentrated benefits with the costs being dispersed across the entire tax base. Politicians may overlook actuarial unsoundness and other pension risks for the purpose of providing immediate benefits to these supporting special interest groups. However, public pension underfunding should be expected whether or not the median voter's preferences are successful in explaining the current funding levels. Thus, both the median voter characteristics and the special interest group variables explain the variation in unfunded liabilities across states.

1.6 Conclusion

The purpose of this paper is to determine whether political factors systematically affect the extent of unfunded pension liabilities. Three alternative public choice explanations were subjected to statistical tests using the methodology of Congleton and Shughart (1990). The pure special interest

group model slightly outperforms the pure median voter model within the dataset used here (panel data from 2001 to 2009 for 42 states). However, the preferences of the median voter are not disregarded entirely by policymakers. Both special interest group factors and median voter preferences appear to affect the extent of unfunded pension liabilities for the period studied.

The strongest determinant of unfunded liabilities is the proportion of retired public pension plan members to total state population. In the combined model, this ratio remains a positive estimator of unfunded liabilities when fixed effects and other factors are included in the regression; it has by far the most explanatory power insofar as it returns the largest coefficient of determination across univariate regressions on all of the independent variables taken one at a time. Since retirees have shorter time horizons, they face less of the risk of pension underfunding. Conversely, a larger percentage of younger participants in a system reduces unfunded liabilities because younger workers will incur the negative consequences of poor pension management in the future.

In many states, unfunded liabilities present a considerable risk to future taxpayers, especially if investment performance fails to meet the expectations of the actuaries. The negative consequences of pension insolvency include higher taxes, lower benefits, state default, larger borrowing costs, and major budget realignments. Due to their potential to create fiscal crises, it is important to better understand the factors that have significant positive and negative impacts on unfunded liabilities.

The results suggest that the pure special interest group model is more successful in explaining the current scenario than the pure median voter model. However, it seems clear that both electoral and interest group factors affect the size of unfunded liabilities. If these results accurately depict reality, the political process is not working efficiently, and special interest groups are able to influence political outcomes with respect to pension benefits, contributions, and unfunded liabilities. Even if public employee unions do not directly determine pension levels and funding, it seems clear that they shade the results away from those favored by the median voter.

Public pensions are very complex financial instruments with opaque reporting methods that rely on multiple projections and actuarial assumptions that are specific to each plan. Therefore, it is unreasonable to expect a typical constituent (whether a public employee or private citizen) to know anything about the long-term solvency of a pension plan; at most, an individual may know the funding ratio. Thus, it is optimal for citizens to be rationally ignorant of the public pension systems in their state. However, the fact that median voter interests appear to affect the extent of unfunded pension liabilities suggests that elections are aggregating information in more or less the manner hypothesized by Congleton (2007).

Clearly, the optimal level of unfunded liabilities for the median voter is not zero. Facing constraints, the median voter desires to push some portion of the cost of current public consumption into the future, creating unfunded liabilities. Also, given the possibilities of upside as well as downside risk, super-optimal funding has disadvantages. Thus, the paper does not suggest that in the absence of special interest group influences the amount of unfunded liabilities would be zero, but rather that the actual level of unfunded liabilities is greater than that sought by the median voter.

Given the increase in legislative activity regarding pension underfunding, the political sources of these future burdens are relevant to reforms. According this paper, special interest groups (specifically those that do not have a direct long-term interest in the payment of the promised benefits) and preferences of the median voter (to delay payment for current public consumption) are the main drivers of pension funding levels. This knowledge may be helpful as states look for solutions and as awareness of the problem is brought to the electorate.

Chapter 2

The Political Economy of Public Pension Reform

2.1 Public Pension Reforms

Unfunded public pension liabilities increase the probability and severity of potential fiscal crises for sponsoring governments as well as their current and future beneficiaries. In several states the current imbalance is large enough to pose major funding and budgetary problems. Munnell (2012, 8) deduces that major unfunded liability problems are largely the consequence of inadequate contributions to the states' pension funds. Moreover, Novy-Marx and Rauh (2009) suggest that public pension accounting methods considerably understate the “true” levels of unfunded liabilities, given the overly optimistic assumptions on the pension portfolios' expected rates of return (somewhat synonymous with discount rates in public pension accounting).¹⁰

Novy-Marx and Rauh (2011) estimate unfunded liabilities at \$2.49 trillion when discounting future benefit promises at the Treasury bill rate and using the actuarial asset values of the plans for June 2009. Nonetheless, estimates of state-level unfunded pension liabilities tend to be in the range of \$700 billion to \$1 trillion when using plan discount rates and plan accounting numbers (CBO 2011 and Wilshire 2012). Most pension researchers agree that the risks of a pension crisis are state specific (Mitchell 2012; Munnell 2012), although analysts disagree in their assessments of the risks

¹⁰ The calculation of the present value of a future lump sum requires a discount rate that is positively correlated with the riskiness of the future payment. Riskier investments, such as junk bonds, necessitate larger discount rates and consequently command larger required returns.

confronted. Given that the total annual budgetary expenditure for all states is around \$1,650 billion, current unfunded liabilities present a considerable risk for taxpayers and state budgets.

Responding to these fiscal troubles, state legislatures have enacted a variety of public pension reforms, which either reduce promised payments or increase contributions from employees, employers, or other areas of the budget. These legislative decisions regarding pension reform, therefore, reflect both state fiscal conditions as well as state politics, in addition to the standard influences of pension management. This paper analyzes the relative importance of these factors as determinants of state-level public pension reforms.

This paper examines four possible political explanations for state-level pension reforms—the median voter theorem, special interest group theory, a benevolent government (or technocrat) model, and a combined model of the three. If the pure median voter model holds true for legislative pension reforms, taxpayer preferences as well as fiscal variables—such as income, age, mobility, life expectancy, etc.—determine the timing and magnitude of the reforms. In the case of the pure special interest group model, public sector unions seek to maximize compensation—a strategy that might include supporting pension reforms in certain funding scenarios. Moreover, public worker special interest groups have an incentive to become informed for the purpose of altering political outcomes in their favor. Alternatively, public pension reform legislation could be solely determined by pension financials. In a pure technocrat (or benevolent government) model, legislative pension reform decisions are independent from the influences of the median voter or the political manipulations of special interest groups, and the determinants of reform include pension contributions, expected retirement rates, and the demographics of the pension system. Of course, the origins of legislative pension reform are in reality quite dynamic. In instances of pension crises, factors from all three models might synthesize to encourage reform and discourage pension insolvency.

The three alternative explanations are subjected to statistical analysis using data that includes 47 states from 2001 to 2010. Tennessee and Connecticut are excluded because of biannual reporting, and the retirement systems of the State of Washington are excluded because of their complexity and numerous tiers. A bivariate probit estimation strategy is used given that the two initial dependent variables are binary dummies that indicate employee contribution increases and pension benefit reductions as was shown on the Pew Research Center website. To capture the magnitude of pension reforms, a new pension reform variable is created using the annual legislative reports of Snell (multiple years). The new measure is used as the dependent variables in count data analysis. The empirical analysis provides credence to the technocrat model, since the funding ratio is the strongest predictor.

Although neglected in most studies, it bears noting that information has an integral function in the political process for legislative pension reforms. Politicians, voters, and the public workforce use information to form preferences on pension issues as well as to maneuver and strategize within the political process. In addition, information is essential for detecting potential crises and shaping pension reform legislation. Low cost information should have a greater influence on special interest groups, the median voter, and politicians, since pension practitioners are likely aware of problems before the media. The substantial and recent public pension reforms are largely a response to the widespread perception of considerable pension underfunding and consequent insolvency risks. The somewhat steady increase in media focus on public pension issues during the sample period perhaps stems from greater risks, more awareness of present risks, or simply hysteria. Glaeser and Ponzetto (2013) create a political economy model of public worker pension compensation in which the “true” value of pension promises are “shrouded”—meaning that voters are unaware of the true costs.

The next section of the paper provides background information on pension plans for state and local public workers in the United States, focusing on funding concepts and the standard

characteristics of the public defined benefit plans. Section 3 explores in greater detail the different political scenarios that offer explanations for public pension reforms (the median voter, special interest group influence, and a fiscally responsible government) in addition to examining the integral role of information distribution by the news media. A detailed discussion of the data is presented in Section 4 along with a presentation of the bivariate probit and negative binomial models. The empirical results are shown in Section 5, and Section 6 concludes.

2.2 Background on State-Level Public Pensions in the U.S.

2.2.1 Characteristics of Public Plans

State and local public sector workers in the United States are primarily covered by traditional defined benefit pension plans. Defined benefit plans guarantee the employee a specified amount upon retirement typically either in the form of a lump-sum payment or a life annuity. The benefit level usually derives from the standard benefit formula, which is the product of the number of years of service, the final salary, and the benefit multiplier.¹¹ Defined contribution plans, the main alternative, have individual accounts for each employee, and individual plan members usually control the investment decisions of their own personal accounts. Given that future defined benefit pension payments to public sector workers and retirees have strong legal protections in most states, state governments and taxpayers retain most of the risk in a defined benefit system. The sponsoring government, if need be, is responsible for any shortfalls—either through taxation or budget reallocation.

Pension challenges such as unfavorable demographics and unexpectedly low market returns are universal to both public and private sector plans. Beginning in the 1980s, private companies began to transition from defined benefit retirement schemes to defined contribution plans, effectively transferring retirement risk from the employer to the employee. Employees with defined

¹¹ For example, with a salary of final salary of \$60,000, a work-tenure of thirty years before retiring, and a benefit multiplier of 2%, a public employee would receive an annual retirement benefit of \$36,000.

contribution plans incur the full consequences of inadequate savings and poor portfolio management. After the dot-com bust, private sector plans were criticized for inadequate pension funding and overly optimistic investment expectations (Wiedman and Goldberg 2002). In turn, companies, aided by government regulators, reformed some private pension methods. It bears noting that public sector employees have much stronger legal claims to their pension benefits than private sector employees. As a consequence, private sector pension plan sponsors command greater leeway when addressing pension underfunding. For example, many private sector sponsors implemented pension freezes during the recent financial crisis. Pension freezes, which guarantee pension benefits that are already accrued but stop further accumulation, are infeasible for most public sector pension systems because prospective benefits are legally protected in many states.

The Employee Retirement Income Security Act of 1974 (ERISA), the guiding force for private sector retirement plans, is practically inapplicable to government sponsored pension plans.¹² Henceforth, state legislatures have considerable liberty with the structuring of their pension systems. Some states have one universal pension system that covers all state and local government employees; other states have separate pension systems for each type of worker—one for state employees, one for teachers, one for firefighters, etc.—or for combinations of these. Pension programs for state legislators and judges are smaller with different benefit formulas, since employees tend to enter these positions later in their careers. Some state and local public workers do not participate in Social Security because the original law did not apply to non-federal government workers; however, compensation for non-participatory workers tends to be comparable to participatory workers, if not slightly more generous.¹³

¹² The government plans were excluded from ERISA because there was little available information on public plans at the time of the law.

¹³ Due to concerns about the constitutionality of Social Security for state and local public employees, state and local government employees were excluded from the original law. When the constitutional uncertainty was clarified later, public workers at the state and local levels of government were allowed to participate; some public retirement systems,

Although there is no ERISA equivalent for public sector plans, the Governmental Accounting and Standards Board (GASB) issues nonbinding statements to guide management and reporting of public pension plans. Most large plans follow the GASB guidelines, and some state legislatures require compliancy. The GASB does not advocate a single actuarial method, but instead provides multiple acceptable options. The large degree of accounting flexibility reduces the comparability of pension reporting across states. Novy-Marx (2013) criticizes the current GASB methodology for encouraging riskier pension portfolio investment strategies—in particular for favoring equities over cash. The GASB issued new statements in 2012 to address the lack of comparability across plans and the discount rate issue; however, Munnell et. al. (forthcoming) argue that these changes will be ineffectual.

2.2.2 Public Pension Plan Funding

The estimates of unfunded public pension liabilities largely depend on the chosen discount rates (Brown, Clark, and Rauh 2011). Pension practitioners discount future pension liabilities at the expected long-run rate of return on the plans' portfolio (around 8%)—a rate that most economists argue is too high because it reflects neither the low-risk nature of public pension promises, nor the recent declines in expectations of long-term market returns (Brown and Wilcox 2009). Brainard (2010) and most practitioners, however, contend that discounting at the historical rate of return is appropriate, since state and local governments are ongoing entities with low risks of default.

The standard measure of pension funding is the funding ratio—the actuarial value of the pension portfolio's assets to the present value of projected pension obligations. It bears noting that the actuarial value differs from the market value. The actuarial value, which typically uses a 5 year smoothing method to reduce the volatility, is a determinant of the actuarial required contribution (ARC)—the GASB's suggested contribution amount.

however, have remained independent from the U.S. Social Security System. See Munnell (2012, 24-27) for further reading.

Public defined benefit pension funds are rarely ever fully funded in practice, despite the fact that public plans tend to be compared to the 100% funded ideal. Pension underfunding creates additional risks, increasing the probability of a pension crisis as well as increasing the urgency and severity of public pension reforms. States with substantially underfunded pension systems can theoretically transition to pay-as-you-go (PAYG) systems with current contributions financing current benefits. However, PAYG systems are costly; Schieber (2012, 229) suggests that budgetary costs would increase 33% for Illinois or Louisiana (two states with largely underfunded pension plans) if they were to switch to a PAYG system. Bohn (2011) shows that unfunded pension (PAYG) systems are optimal, for taxpayers (the majority of whom are debtors) generally receive a greater benefit from reducing their debt levels rather than contributing to pension funds that earn the market rate of return.

Upside risks are present in public pension funding, although the downside risks (funding crises) receive considerably more attention from media sources and policymakers. An overfunded governmental fund might tempt state legislators to transfer resources towards other areas of the budget. In scenarios of pension overfunding, public sector special interest groups might shortsightedly lobby for benefit increases. If previous fund surpluses were diverted to other areas or were used as a basis for larger benefit promises, a public pension may have insufficient funds when the time comes to pay beneficiaries. Most state-level pension funds were overfunded in the dot-com boom of the late 1990s, and many state legislatures increased benefits on the premise that fund portfolios would continue to generate 8% annual returns.¹⁴ Snell (2001) finds that many states were continuing to increase pension benefits in their 2001 legislative sessions. To capture the reality that full funding is probably neither optimal nor necessary, Fitch Ratings and the Government

¹⁴ California Senate Bill 400 in 1999 exemplifies these benefit increases; on the premise of the 128% funding ratio of CALPERS, the legislature enacted retroactive pension benefit increases for members and retirees, leading to considerable underfunding after the dot-com bust.

Accountability Office consider plans with funding ratios of 70% and 80% adequately funded, respectively.

2.3 Politics of Pension Reform

The legislative decision-making process for public pension reforms can be understood as a dynamic process of political interaction between self-interested parties—politicians, taxpayers, current and future beneficiaries, and the other affected parties. Hence, an examination of public pension reforms ought to focus on political factors as well as standard pension variables. This paper compares four public choice scenarios—the median voter theorem, special interest group theory, a technocrat model (the unbiased political outcome), and a combined model. The methodology and model comparisons of this paper are similar to previous studies that compare median voter and special interest groups explanations of outcomes of the political process (Congleton and Shughart 1990). My paper adds a technocrat model to account for scenarios where reforms are primarily determined by pension factors not politics. Insofar as there are several plausible models of the politics of pension reform, the empirical results and the comparison of the models drive the conclusions of the paper, rather than a priori suppositions.

“Reform”, for the purposes of this paper, occurs when a state legislature alters the characteristics of a pension plan for the purpose of sustainability by either reducing outflows or increasing inflows. Types of reform that reduce outflows include increasing the retirement age, reducing the cost-of-living-adjustments (COLAs), lowering benefit levels, and cost-effectively transitioning to a defined contribution system. Figure 1 shows the total employee contribution increases and/or benefit decreases for each year of the sample period as determined by the Pew Research Center’s website. There is a noticeable rise in reforms after the financial crisis of 2008-2009.

Three models are discussed below, each of which reflects the interests of different subsets of the stakeholders in state pension reform. The median voter model represents the political outcome that is determined by taxpayers; the median voter prefers public pension reforms that maximize utility from the public sector while reducing present and future tax costs. Special interest group theory characterizes the preferences of the public workers and retirees, but the success of public sector unions and their lobbying efforts at altering political outcomes is somewhat ambiguous, due to differing time horizons and preferences of union members. The unbiased political model represents a scenario where politicians are making decisions independent from outside political influences. In addition, all stakeholders rely on information to form preferences on pension issues and to utilize the political process for their own self-interested objectives.

2.3.1 The Median Voter Theorem

Taxpaying voters clearly have a financial interest in the political outcome of public pension reforms, being the ultimate backstop of severely underfunded public pension plans. For the purpose of winning elections, politicians may adopt the preferences of the median voter—a middle-aged taxpayer in most states. If voter preferences are single peaked with perfect information, this strategy is successful for politicians, and the median voter's preferences manifest themselves as political

outcomes (Downs 1957). Failure of a legislature to address pension insolvency concerns can be costly for taxpayers, since larger funding shortfalls correspond to more devastating pension crises. Nonetheless, the median voter, who is concerned about utility, stands to incur tax increases and reductions in government services from budget reshuffling to alleviate pension shortfalls.

Unfunded liabilities function similar to deficit spending, delaying costs (labor costs in the case of public pensions) of public sector spending. Given that employment compensation consists of wages as well as other benefits, lower wages in the present and larger pension benefits in the future can be substitutes. If a link exists between compensation and productivity in the public sector, citizens' utility from the public sector goods and services likely increases along with the wages and retirement benefits of public sector employees.

Increases in public utility from unfunded pension liabilities may saddle future taxpayers with larger tax costs. Nevertheless, the actions of private individuals might nullify the intertemporal transfer of wealth from unfunded liabilities, if citizens change their present behavior in anticipation of future tax increases and Ricardian equivalence holds (Barro 1974). Ricardian equivalence assumes that there are intertemporal linkages between generations (such as bequests) and that individuals save in anticipation of future tax increases. Ricardian equivalence is unlikely to materialize at the state level, given that individuals and their children can relocate to states with less indebtedness to avoid future tax burdens. Instead, public debt may affect the values of goods, such as property, that are immobile and commonly taxed. Debt capitalization, an alternative equivalence mechanism, occurs when current property values decline in response public borrowing and expectations of larger tax costs in the future (Daly 1969). Thus, individuals bear the burden of public borrowing in the present through lower property values.

Independent from the success of these equivalence mechanisms, the median voter is likely unaware of the "true" intertemporal distribution of the costs and benefits of public borrowing.

Buchanan (1960) applies the term “fiscal illusion” to the scenario where individuals inaccurately perceive to benefit from public borrowing at the expense of future taxpayers. In summary, a self-interested median voter likely supports public pension reforms that appear to maximize public and private utility while minimizing tax costs, regardless of the actual incidence of public borrowing and unfunded liabilities.

2.3.2 Special Interest Group Theory

Public sector special interest groups have a clear stake in the outcome of the political processes that determine pension reforms. Members of state-level public retirement systems are active in the political process and have a greater incentive than the median voter to become informed of pension policymaking.¹⁵ In addition to collective bargain powers, public worker special interest groups utilize various channels of the political process to influence compensation levels.

Special interest groups may be successful at altering political outcomes in their favor by contributing to reelection campaigns of politicians and extracting rents from the political process (Stigler 1971). Public sector workers are in a natural position to lobby state legislatures and influence political outcomes, since retirees are already organized for collective bargaining purposes. Becker (1983) depicts the political arena as a process of numerous competing special interest or pressure groups.¹⁶ Successful rent seeking is not always in the form of explicit increases in retirement benefits, but includes lower retirement ages and changes in actuarial assumptions.

To address severe pension underfunding, state legislatures have two options: reduce pension benefits to current and future pensioners or increase contributions to the plan. Public sector workers

¹⁵The recent Wisconsin recall elections provide evidence of the magnitude of public sector employee involvement in the politics. \$43.9 million was spent on the recall elections for nine state senators in August of 2011, and over \$60 million was spent in the recall election of Governor Walker in June of 2012; previously, the most expensive race in Wisconsin was the 2010 gubernatorial election at \$37.4 million (Davey 2012; Mayers 2011).

¹⁶ When groups compete for resources within the political processes for state budgeting, no natural opposition group to public pensioners clearly exists. Nevertheless, municipal bondholders oppose pensioners in the instance of bankruptcy. Gerson (2012) discusses possible conflicts between public sector workers and other constituencies within the Democratic Party.

prefer the latter remedy to the extent that contribution increases come from taxpayers and other areas of the budget not employee wages. Rattsos and Sorensen (2004) suggest that the constituency of public employees functions as a swing voter with blocking power, overcoming its non-majority status to promote the status quo and prevent unfavorable reforms. In addition to collective bargaining and political involvement, public sector unions use the legal system to discourage unfavorable reforms. Strong legal protections of public pension promises by governments to employees significantly limit the ability of state legislatures to reduce the pension benefits of current workers. Hence, public sector unions virtually always challenge legislative benefit reductions in court, creating legal costs for governments.

The time horizons of unions' leaderships likely influence special interest group objectives and lobbying (Mitchell and Smith 1994). Focusing primarily on the short-term, union leaders may encourage high profile agenda items and resist prudent reforms to the point of jeopardizing the long-term sustainability of the pension system. On the other hand, public sector union leaders with long-term time horizons can guide policymakers with management and reforms of the pension system, being incentivized to acquire high cost information on their plans. Thus, the impact of effective public sector special interest groups is unclear.

2.3.3 Benevolent Government Model

Most states have adopted institutions, such as independent boards, that attempt to insulate pension fund management from politics. Insofar as the legislature defers to their fund managers and pension actuaries, decision-making for public pension systems may be largely independent from the preferences of the median voter and the political influences of special interest groups. In such cases, reforms may be based entirely on future pension fund characteristics, such as the anticipated outflows, expected employee contributions, reserves, and the funding level. In a scenario with a

fiscally responsible government, a low funding ratio is the primary factor that signals to policymakers a need for pension reform.

An assumption of the other two models is that politicians are self-interested and that they make decisions to promote their own political careers whether it is aligning with the median voter in order to win elections or aligning with special interest groups in order to receive larger campaign contributions. The benevolent model suggests that that politicians may be less self-interested (or more sophisticated in determining their long term interests) than the median voter and special interest group models assume.

2.3.4 The Role of Information

The stakeholders of the pension reform process rely on information to form opinions on the timing and magnitude of pension reforms. Since only a few voters and/or interest group members carefully study the annual pension fund reports of state fund administrators, it seems clear that the extent of information available from mass media sources is integral to the political process for most stakeholders.

For example, perfect information is a necessary assumption for the median voter model to operate perfectly. Politicians can only represent the interests of the median voter if the median voter and elected officials are aware of one another's preferences. If public pension information is costly for the median voter to obtain, given the complex actuarial methods and the nonstandard accounting principles, voters may not know their true interests or, indeed, may largely ignore the issue entirely (Congleton 2007). The median voter is incentivized to become rationally ignorant of public pension funding and other issues. It bears noting that Ricardian equivalence and debt capitalization require an informed populace. Similar informational problems also affect the typical member of large interest groups, such as public officials.

This creates a void the news media can fill by lowering the cost of obtaining the information through collection, analysis, and mass distribution. By looking at the front page of a newspaper or at the headlines of Yahoo News, taxpayers can more easily get a general idea about the funding of the public pension plans, for which they are fiscally responsible, than by searching through government reports. Consequently, their preferences for reform are at least partly induced by mass media sources.

Public workers have a greater incentive to become informed of the true risks affecting their public pension plans, but also have information costs and associated biases. Nevertheless, the leadership of special interest groups can use information to their advantage by releasing information at advantageous times and manipulating facts in the ways suggested by Mueller and Stratmann (1994). Likewise, politicians have little incentive to delve deeper than the Certified Annual Financial Report of their public pension systems—such as examining actuarial assumptions—unless voters and/or the mass media do.

Given that the outcomes of pension reforms are dependent on the quality of information available to policymakers, the media play an integral role when outcomes are unaffected by the biases of the median voter and special interest group influence.

Due to the fact that pension issues are not on the radar of most pension stakeholders, pension reform is somewhat dependent on the ability of the media to inform the public of possible pension risks. Boeri and Tabellini (2012) suggest that citizens are more likely to acquiesce to benefit reductions from their countries' social insurance and pension systems if mass media coverage significantly improves available information on these systems. The quality and quantity of information available on state and local public pension plans in the United States have both increased over the past decade. Highlighting both the importance of low cost information and the opaqueness of pension reporting, MacKay (2011) finds evidence of debt capitalization in Los

Angeles property values after the release of a report that showed unfunded liabilities of the city were considerably understated.

2.4 Data and Methodology

2.4.1 Exogenous Variables

The statistical analysis of legislative public pension reforms examines data from 2001 to 2010 for 47 states with 95 large state-level plans.¹⁷ Table 4 reports the descriptive statistics for the exogenous variables of the empirical analysis. The state-level public pension data is from the Public Pension Database (PPD) (2010)—a dataset sponsored by the Center for State and Local Government Excellence and the Center for Retirement Research at Boston College. Public pension actuarial and accounting methods in the United States are somewhat heterogeneous, partly reducing the comparability of pension statistics across plans. Minor adjustments were made to the PPD numbers in a few instances when differences with the states' CAFR reports were detectable.

The funding ratios in this paper's dataset are cumulative for each state, being compiled from the large state-level public retirement plans in the PPD. Thus, the funding ratio is the quotient of the sum of the actuarial values (not the market values) for a state's large plans and the sum of the corresponding accrued actuarial liabilities. Public pension membership data for each state and year is compiled similarly for the classifications of active members, inactive members, and retirees. The cumulative totals of these categories, along with state population data from the U.S. Census Bureau, create descriptive ratios, such as the actives to retirees ratio (a measure of transferability to a unfunded pension system) and the ratio of plan membership to population (a gauge of special interest strength). The mean ratio of active members to retired members for the dataset is 2.3, suggesting that on average a state has 23 current public workers for every ten retirees.

¹⁷ Connecticut and Tennessee are excluded because of the biannual reporting methods of their large plans, and Washington is not included due to its numerous tiers.

Hirsch and Macpherson (2010) calculate detailed estimates of public sector union membership, but do not distinguish between federal workers and government employees at the state and local levels. To separate state and local public employee union membership from the federal bias, I adjust the Hirsch and Macpherson (2010) numbers by removing a Bureau of Labor Statistics estimate of the federal workforce, assuming a 60% (the BLS national estimate) federal worker union membership rate in all states.

The median household income data comes from the U. S. Census Bureau and approximates the income of the median voter. The age of the median voter in each state is an estimate by the author using U.S. Census voting numbers for various age ranges, assuming uniform distributions within the given ranges. These estimates of median voter age and state-specific life tables of the Center for Disease Control produce life expectancy estimates for median voters in each state. Table 4 illustrates the average characteristics of median voters across states; the median voter has an average income around \$51,287 and a mean age of around 50 years old with an estimated average life expectancy of about 30 years.

To identify risk sharing between public employers and employees, the dataset includes a binary variable that indicates if a state has a non-supplemental defined contribution pension plan or hybrid plan that is an optional or mandatory alternative to the state's traditional defined benefit plan (Munnell 2012, 201).¹⁸ About 19% of the state-years in sample represent an optional or mandatory defined contribution or hybrid plan for new or current public employees.

The analysis uses binary indicator variables to denote the party of the governor and legislature of each state, which are obtained from National Council of State Governments. During the sample period, more state legislatures were controlled by the Democratic Party, but Republican Party candidates held more of the governorships. The ratio of state debt to state income is from

¹⁸ A hybrid plan has both defined benefit and defined contribution components.

Moody's (2010)—a report that primarily focuses on public borrowing at the state-level and excludes unfunded liabilities.

Testing the secondary informational hypothesis of the paper requires explanatory variables that approximate the availability of low cost information in the media. The initial variable *Goog* is the total number of Google News Citations for each year for the search terms “state,” “pension,” and “crisis” on March 1, 2012 (Munnell 2012, 2). I calculated two additional informational factors from the website specific search engine at the *New York Times* website on May 29, 2013. The variables are the number of article search hits with the terms “public” and “pensions” for *NYT 1* and with the terms “public”, “pensions”, and “reforms” for *NYT2*.

Table #4				
Descriptive Statistics				
Variables	Mean	Min	Max	Std. Dev.
Median Income	51287	35582	73598	7651.8
Median Voter Age	50.58	45.74	56.02	1.82
Life Expectancy MV	29.95	21.7	62.79	4.35
Public Union	0.327	0.0311	0.744	0.191
Members to Population	0.076	0.027	0.15	0.024
Democratic Legislature	0.4	0	1	0.49
Republican Legislature	0.35	0	1	0.48
Democratic Governor	0.47	0	1	5
Republican Governor	0.52	0	1	0.5
Funding Ratio	83	39.2	117.9	15.6
Acitves to Retirees	2.31	1	4.27	0.6
Non-Defined Benefit	0.19	0	1	0.4
State Debt to Income	2.94	0	12.1	2.17
Google New Citations	1312.3	203	3010	953.3
NYT1	307.5	127	718	219.8
NYT2	121.6	54	288	74.1
No Social Security	0.256	0	0	0.44

2.4.2 Estimation Specification and Dependent Variables

The initial empirics utilize two dichotomous variables from the Pew Research Center website (both are shown in Figure 1) that indicate whether a state increases employee contributions and/or reduces benefits during the sample period of 2001 to 2010. The paper uses probit analysis to confine regression estimates to the probabilistic range between zero and one. Moreover, likelihood of interdependence between legislative decisions for reducing benefits and increasing employee contributions suggests a bivariate probit model as shown in equation 1.

The bivariate probit model assumes a joint distribution—the bivariate normal distribution, ϕ_2 —to obtain the joint probabilities for the dependent variables. *Reform1* and *Reform2* are binomial variables that indicate whether a state legislature enacts a pension reform with payout reductions or employee pension contribution increases, respectively, in a given year. The index variables i and t represent state and year, respectively. The exogenous variables form the matrices x_{1it} and x_{2it} , with the beta vectors containing parameter estimates. Rho is a correlation parameter, signifying the degree of covariance between the two sublevel probability models of the bivariate probit model. No covariance of the residuals exists if rho equals zero, and the two dependent variables are perfectly positively (negatively) correlated with one another when rho equals one (negative one).

$$Prob(Reform1_{it} = 1, Reform2_{it} = 1) = \int_{-\infty}^{u_{1it}} \int_{-\infty}^{u_{2it}} \phi_2(X_{1it}\beta_1, X_{2it}\beta_2, \rho) du_{1i} du_{2i} \quad (3)$$

$$u_{1it} = \eta_{it} + \varepsilon_{1it} \quad (4)$$

$$u_{2it} = \eta_{it} + \varepsilon_{2it} \quad (5)$$

Equations 2 and 3 present the compositions of the residuals for the individual ancillary probit models of dependent variables that comprise the bivariate probit model analysis. Each error term consists of a portion, η , which is common in both models and another part, ε , which is unique to each ancillary probit model. The interaction between the residuals of the two ancillary probit

models captures the interdependence of the two legislative decisions to reduce benefits and increase contributions.

Table #5	
Index of Pension Reform	
Values	
Zero	363
One	61
Two	24
Three	14
Four	5
Five	3
Six	0
Seven	0
Index Factors	
1. Employer Contribution Increases	
2. Employee Contribution Increases	
3. Reduce COLA	
4. Increase Retirement Age	
5. Reduce Benefit Multiplier	
6. Modify Salary Calculations to Reduce Benefits	
7. Implement a Defined Contribution or Hybrid Plan	

The binary probit analysis fails to distinguish between insignificant and substantial legislative pension reforms. Thus, I compile an index to capture the magnitude of pension reforms, using the annual legislative reports of Ronald Snell at the National Conference of State Legislatures.¹⁹ Table 5 shows the distribution of the new variable of pension reform, which represents the extent of pension reforms for each state and year during the sample period. The values of the pension reform variable derive from numerations of seven different types of possible legislative pension reforms for each state and year of the sample period. The seven reforms include the following: increases in the employee contribution rate, increases in the employer contribution rate, reductions in the COLA, increases in the retirement age, reductions in the benefit multiplier, modifications of the definition

¹⁹ The new pension reform measure derives from Snell (2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010).

of pensionable compensation (the salary used to calculate benefits), and implementations of a non-supplementary defined contribution or hybrid pension plan.

The non-continuousness and discreteness of the pension reform variable cause standard OLS regressions to yield inefficient estimates. Attributes of the new reform variable favor a count data interpretation. Nevertheless, the Poisson model's assumption that counts be random and independent events is not met, since a legislature that implements one type of pension reform in a legislative session is more likely to implement others. In preliminary Poisson regressions, overdispersion—inequality of the mean and variance—is detected with Cameron and Trivedi's regression based tests, violating another Poisson assumption. Negative binomial models relax these assumptions by introducing an unobserved effect in the error term with a gamma distribution, but have the same expected coefficient values as the Poisson model. This paper estimates negative binomial models, using quasi maximum likelihood estimation with robust standard errors from a “sandwich” of the inverse of the Hessian and the outer product of the gradient.

$$P(X = k) = \frac{\Gamma(\alpha+k)}{\Gamma(\alpha)\Gamma(k+1)} \left(\frac{\alpha}{\alpha+\lambda}\right)^\alpha \left(\frac{\lambda}{\alpha+\lambda}\right)^k \quad (6)$$

$$E(y|x) = \exp(x'\beta) \quad (7)$$

The paper uses the more common Negbin II specification with $\theta=\lambda/\alpha$, $\alpha=\sigma^{-2}$, and $\lambda=\exp(x'\beta)$. Alpha and theta are parameters that are greater than or equal to zero. Equation 4 shows the probability function. Equation 5 shows the conditional probability of the dependent variable y, in this paper the new reform variable, on a matrix of the independent variables x.

2.5 Empirical Results

This paper compares a median voter model, a special interest group model, a technocrat model, and a combined model of the three to gain perspective on the determinants of legislative

Table 6 presents the empirical results of the bivariate probit model analysis for the two binary dependent variables from the Pew Research Center. Statistical tests on the rho correlation coefficients for all five models suggest that significant interdependence between the two dependent variables exists, indicating the suitability of the bivariate probit model. Indeed, state legislatures that reduce benefits are more likely to increase employee contributions, and vice versa. In addition, an indicator variable of Social Security participation controls for structural differences between these two types of plans.

The median voter coefficient effects in column 1 are statistically insignificant, suggesting that median voter preferences do not influence the political process of public pension reforms. In the special interest group model, state and local public sector union membership negatively corresponds to the probability that a legislature enacts employee contribution increases, and a Democratic Party majority in a state legislature is a significant positive predictor of legislative reductions in retirement benefits.

The technocrat model in column 3 outperforms the median voter and special interest group models as the log likelihood ratios and subsequent Wald tests show. A lower funding ratio—a measure of insolvency risk—leads to an increase in the likelihood of both types of pension reform, as statistically significant coefficient effects indicate. Moreover, the presence of a non-supplemental defined contribution or hybrid plan in a state is a significant negative predictor of employee contribution increases. Public pension systems that promote risk sharing between employers and employees may better manage insolvency risks. The ratio of public debt to state income corresponds to legislative employee contribution rate hikes with a significant as well as negative coefficient effect.

The combined model in column 4 explains more of the variation in the dependent variables, given that it includes all the explanatory variables of other three political models. The coefficient effect of the union membership variable loses significance as shown in column 4. Nevertheless, the

exogenous factors of the technocrat model remain consistent in sign and in statistical significance in the combined model. The addition of the informational factor in column 5 captures the influence of information distribution by media sources, improving the explanatory power of the combined model. The informational factor dominates the funding ratio variable for both types of reform. Interestingly, the age of the median voter becomes a significant negative predictor of reductions in public pension benefits in column 5, supporting the hypothesis that older voters tend to defer pension problems.

Table 7 presents the empirical results for the new reform variable with quasi likelihood maximization negative binomial regression estimation. The coefficient estimate of median voter life expectancy is the only significant coefficient in the median voter model in column 1. The result suggests that a greater life expectancy for a median voter corresponds to a reduction in the probability and severity of a legislative pension reform—at the ratio of one year to about negative one-tenth of the new reform measure. For the special interest group models (shown in columns 2 and 3), only the political party indicator variable for a Republican legislature has a significant coefficient estimate; Republican legislatures are less likely to enact pension reforms.²⁰

The technocrat model for the reform variable in column 4 improves upon the other two political models with three factors that are economically and statistically significant. Lower pension funding ratios in states increase the probability of legislative pension reforms. The ratio of active members to retirees, another factor of the technocrat model, gauges the costliness of switching from a traditional defined benefit pension plan to a pay-as-you-go (or unfunded) system; retirement systems with more workers and fewer retirees can pay current benefits with the contributions of current employees. The coefficient estimate of the actives to retirees ratio is significant and negative. Thus, it appears that the ability to economically switch to an unfunded pension system discourages

²⁰ Regressions with other political party indicator variables—Republican governors, Democratic governors, and Democratic legislatures—are not significant and consequently not shown in Table 4.

legislatures from implementing pension reforms. The indicator variable for non-defined benefit plans is a significant negative predictor of pension reform. Hence, greater risk sharing between public employers and employees corresponds to fewer and lesser public pension reforms; perhaps these plans are better managed.

The combined model in column 5 slightly outperforms the technocrat model. The factors of funding ratio, state debt, and median voter life expectancy remain significant with consistent signs and effects in the combined model; however, the active to retiree ratio loses statistical significance when the political variables are added.

Information has a strong positive effect on public pension reforms as shown by the statistical significance of three different information variables in columns 6, 7, and 8. One could conclude that an electorate with greater levels of information is more likely to encourage (or at least acquiesce to) public pension reforms. The coefficient effects of these informational explanatory variables are difficult to interpret, since it is unlikely that one *New York Times* article directly causes state legislatures to reform a certain number public pension reforms. Thus, these informational variables only approximate the total distribution of public pension information by news media sources across the country.

To summarize, pension funding and the distribution of pension information by the media have the largest influence on the legislative decision to enact public pension reform. The funding ratio is statistically significant and consistently negative throughout all of the negative binomial regression models as well as in both the technocrat model and combined model in Table 6. In addition, the informational factors are significant when included in regressions.

Table #7
Regression Results for New Measure of Pension Reform

	Median Voter	Special Interest		Benevolent Government	Combined Model	Information		
	1	2	3	4	5	6	7	8
Constant	1.88 (0.55)	***-1.03 (-2.94)	***-0.91 (-2.68)	***2.68 (4.19)	5.61 (1.51)	**10.31 (2.5)	**10.21 (2.45)	***11.78 (2.72)
Median Income	0.000002 (0.18)				0.000012 (0.68)	0.0000049 (0.28)	0.000006 (0.34)	0.000004 (0.21)
Median Voter Age	-0.00028 (-0.004)				-0.023 (-0.37)	**-.013 (-2.00)	*-.012 (-1.83)	**-.016 (-2.21)
Life Expectancy MV	***-0.103 (-3.39)				***-.01 (-2.63)	**-.011 (-2.43)	**-.011 (-2.45)	**-.010 (-2.38)
Public Union		-0.15 (-0.27)	-0.51 (-0.92)		0.007 (0.008)	0.32 (0.40)	0.23 (0.30)	0.26 (0.33)
Members to Population		0.96 (0.24)	3.15 (0.76)		4.09 (0.89)	3.08 (0.70)	3.15 (0.72)	2.47 (0.57)
Leg_GOP			**-.0501 (-2.28)					
Fund Ratio				***-0.03 (-4.24)	***0.029 (-4.06)	***-0.022 (-2.98)	***-0.024 (-3.20)	***-0.023 (-3.05)
Actives to Retirees				*-0.38 (-1.84)	-0.33 (-1.43)	-0.17 (-0.77)	-0.22 (-0.98)	-0.21 (-0.95)
Non-Defined Benefit				-0.45 (-1.54)	-0.4 (-1.34)	-0.43 (1.46)	-0.41 (-1.42)	-0.43 (-1.50)
State Debt to Income				**-.011 (-2.31)	**-.011 (-2.13)	*-.0102 (-1.83)	*-.0101 (-1.84)	*-.0094 (-1.69)
No Social Security	*0.42 (1.67)	0.27 (1.13)	0.22 (0.96)	0.13 (0.52)	0.21 (0.77)	0.063 (0.26)	0.071 (0.29)	0.021 (0.085)
Google News Cites						***0.00039 (3.55)		
NYT1							***0.0014 (2.79)	
NYT2								***0.0049 (3.24)
Alpha	***2.8 (5.36)	***2.94 (5.76)	***2.82 (5.76)	***2.31 (5.21)	***2.25 (4.9)	***2.01 (4.55)	***2.07 (4.59)	***1.97 (4.40)
Observations	470	470	470	470	470	470	470	470
Log-likelihood	-375.95	-379.15	-377.19	-367	-364.82	-360.2	-361.64	-360.2

Note: Regression results are for negative binomial models with the new measure of pension reform as the dependent variable. Z-statistics are in parentheses; asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels on a two tailed test.

2.6 Concluding Remarks

State and local government retirement plans in the United States face unprecedented insolvency risks in the aftermath of the 2008-2009 Financial Crisis. State legislatures enact pension reforms that either reduce benefit payments or increase contributions, or both, to increase the sustainability of their public pension systems. Since 2009, 43 states have reformed their pension systems with some of these states doing so in multiple years (Snell 2012). This paper examines public pension reforms from 2001 to 2010 for 47 states and compares three conjectural political explanations—a median voter model, a special interest group model, and a technocrat model—along with a combination of these models. In addition, I create a new measure of pension reform magnitude and test the hypothesis that information has a significant role in the process of public pension reforms.

The empirical results suggest that pension underfunding is the most significant determinant of public pension reform. Nevertheless, the effectiveness of the median voter and special interest groups in the political process should not be hastily dismissed. Although state legislatures appear to primarily focus on pension financials, the preferences of all stakeholders may align to avoid a pension default when a public pension plan is hazardously underfunded. The median voter and other taxpayers potentially face a decline in government services, greater public borrowing costs in the future, and larger tax burdens. Public sector unions are incentivized to become informed of their pension plans and be active on public pension issues, for public pensioners of severely underfunded plans could lose their pension benefits for period time in a worst case scenario, as took place during the bankruptcy of Prichard, Alabama.

The statistical significance of the informational factors supports the hypothesis that the distribution of low cost information on public pensions by the mass media encourages public pension reforms. Voters, politicians, and members of public sector special interest groups likely rely

on news stories and online articles to form opinions and operate within the political process, foregoing the reading of annual financial reports and the studying of actuarial assumptions and accounting methods.

In practice, benefit reductions for current public sector workers and retirees rarely occur without significant pension underfunding, and benefit payment cuts to the pensions of current public employees are almost always challenged in court by public sector unions. Consequently, most pension reform legislation only applies to the benefit structures of future hires. It bears noting that high-profile and large-scale pension reforms have been attempted since the end of the paper's sample period: most notably the public pension reforms led by State Treasurer Chaffee in Rhode Island and the bankruptcy filing of Detroit. The judicial conclusions of these and other legal cases will likely clarify the latitude that policymakers have when reforming public pensions. Nonetheless, this paper sheds a somewhat favorable light on the recent wave of pension reforms; for, it appears that pensioners' benefits are not being reduced aimlessly or arbitrarily, but in contrast, for the purpose of addressing insolvency risks.

Chapter 3

Constitutional Protections of Public Pension Promises

3.1 The Public Pension Promise

Public workers and retirees of state and local governments in the United States depend on their employing governments for retirement income, which is supplemental to Social Security in most cases. Over the past 80 years, state judicial rulings and legislative action have established strong legal protections for public pension benefits. Consequently, public pension promises are legally binding obligations for the sponsoring government entities in most states. This paper provides a detailed description of the legal landscape for public pension benefit protections, focusing on state constitutional constraints. In addition, statistical analysis shows the influence of the different types of legal protections on pension funding and other plan characteristics.

The public pension obligations of state and local governments in the United States are some of the strongest governmental commitments, being nearly risk free (Brown and Wilcox 2009). In most states, public workers and retirees have legal recourse to recover future benefits that are reduced from anticipated levels, even if these benefits are not yet accrued and employees are not yet vested in some cases (Monahan 2012). Relying on case law and statutes, state and local judges consider a public pension promise to be one of the following: a right, a contractual promise, a promise, a property interest, or a gift. The legal doctrines that protect public pension benefits include constitutional law, contract theory, property interest, gratuity theory, and promissory

estoppel (Monahan 2010; Munnell and Quinby 2012). In addition, these legal protections begin to cover pension benefits at different points in the public workers' careers—such as the point of hire, the point of vesting, or the point of retirement—depending on legal precedents. Benefit protections are generally strong, despite extensive heterogeneity. Seven states have constitutional provisions that explicitly prohibit legislatures from impairing or diminishing the pension benefits of public workers. The heterogeneity of pension benefit protections across states creates a breadth of protection levels; the spectrum of benefit protection levels provides an avenue for studying the constitutionalization of governmental promises, which could potentially shed light on issues well beyond the scope of state and local pension plans.

In this paper, the term “constitutionalization” refers to payments that a government is legally obligated to pay regardless of future legislative actions. Recently, state legislators tend to favor paying bondholders over pensioners in order to preserve lower borrowing costs in the future. Public pension benefits tend to be fixed amounts and consequentially more stringent obligations than other, more opaque forms of governmental commitments such as health insurance promises. Given that large levels of public unfunded liabilities from a variety of sources have materialized at all levels of government in the United States, these state protections should provide relevant insights for the current public discussion.

Actuarially, state retirement plans should be able to sustain themselves in perpetuity, but inadequate pension contributions by state governments and other lesser factors have led to the accumulation of large unfunded liabilities. The legal environment for benefit protections may change as states have become increasingly less able to pay pensioners. Of course, the expenditure capacity of sponsoring governments, with budget shifting and potential tax increases, limits the provision of public pension benefits. Cloud (2011) discusses legal strategies that might allow for the reduction of

public pension benefits for plans with large unfunded liabilities, foreseeing that courts will allow for benefit reductions of public pensions in the near future.

Public sector unions maintain inherently strong positions for influencing their pension plans, through both collective bargaining and the political process. The specific legal protections of public pension benefits in a state likely influence the political process, affecting pension outcomes. The statistical analysis of the paper examines the influence of legal protections on plan retirement ages, benefit levels, and funding ratios in special interest group models. The presence of state constitutional protections corresponds to pension underfunding. The insolvency of a state and its subsequent debt restructuring would test the true strength of these legal protections. If state governments are able to force concessions from public pensioners in nearly insolvent states with constitutional protections, constitutional amendments may ultimately have a negative effect on benefits.

Section 2 provides background information on public pension plans, highlighting some differences between public sector and private sector pension plans. A description of the various legal protections of public pension promises is given in Section 3 with subsections on current litigation and bankruptcy law for public entities. Section 4 discusses “constitutionalization” of government obligations in general. Section 5 introduces the data. The empirical estimations are presented in Section 6, and Section 7 concludes.

3.2 Some Differences Between Public and Private Pension Plans

The public pension promises of state and local governments are more binding than similar promises by private sector companies in most U.S. states. Earned retirement benefits are legally secure in both public sector and private sector plans; however, future unearned benefits, which are unprotected in private sector plans, may not be reducible for public sector plans in some instances. Munnell and Quinby (2012) contend that public pension benefits should have the same

conditionality as private pension plans, which would allow state legislatures the flexibility to reduce future pension outflows when addressing pension underfunding.

Public pension plans are not subject to the regulation of the Employee Retirement Income Security Act (ERISA), the primary law governing private pension plans. Public retirement plans are also excluded from the Pension Benefit Guaranty Corporation (PBGC), a compulsory governmental insurance program for private sector pension plans. Thus, state, rather than national, taxpayers are the eventual financial backstop for these public retirement plans in cases of near insolvency or a negative tail-risk scenario.

Given the lack of federal government oversight, state legislators can attune their public pension systems to the specific economic and political circumstances of their state. Nonetheless, the standard method for providing retirement income to state and local government employees remains the traditional defined benefit plan, in which the participants are guaranteed a specified retirement income upon retirement. A benefit formula—typically, the product of the number of working years, final salary, and a benefit multiplier—determines the level of retirement income.

Some states have a single public pension system that covers all state and local public workers (of course, excluding federal government workers who have their own federal pension plans), yet others have separate retirement systems for the different types of public employees. In addition, some local jurisdictions have their own smaller retirement plans that are exclusively for their public workers. It bears noting that the members of some state and local pension plans do not participate in the United States Social Security system; non-participatory members typically receive slightly larger benefits and prefer to maintain their independence.²¹

²¹ A large portion of voters would probably be surprised to learn that the benefits of these federal programs have neither constitutional nor legal protections that are comparable to those of state and local public pension obligations. Legally, the U.S. Congress along with the President could stop Social Security and Medicare payments with legislation. Of course, politicians would suffer severe ramifications at the ballot box from outraged constituents. See Hawes (2004) for a discussion of possible legal protections of Social Security promises.

The Governmental Accounting Standards Board (GASB) issues statements with strong (but optional) suggestions that provide guidance to public entities in regards to the actuarial assumptions, accounting methods, and financial reporting of their pension plans. Many academics of economics and finance criticize the GASB's suggested discount methods of future pension liabilities; public pension liabilities are typically discounted at the expected rate of return on the corresponding investment portfolio, about 8%—a rate too high for justification with basic financial theory (Novy-Marx 2013; Munnell 2012; Novy-Marx and Rauh 2009; Mitchell 2012).²² The GASB recently released new statements to address the discount rate issue and improve the comparability of public pension reporting. Munnell et al (forthcoming), one of the foremost academic researchers in the area of public retirement plans, is doubtful of their effectiveness.

3.3 Legal Protections of Public Pension Benefits

The pension promises of public retirement plans are different in nature from private sector pension plans, given that the sponsoring government entities create and adjudicate the law in their respective jurisdictions. Moreover, public pension promises by state and local governments are some of the strongest governmental commitments to citizens in the United States. State governments maintain the legal right to repudiate their bond debt; using constitutional law and contract theory, however, many states prohibit the diminishment of future public pension benefits (in some cases benefits that are not yet accrued). Indeed, public pensioners have gotten precedence ahead of municipal bondholders in the bankruptcy proceedings of New York City in the 1970s and Orange County, California in the 1990s (Brown and Wilcox 2009). That is to say, public pensioners, in many states, face a historically lower risk of default on payments than municipal bondholders and other claimants.

²² Theoretically, riskier future payments require a larger discount rate. A riskier lump sum payment is worth less in the present than a similar but less risky lump sum, given the lower probability of the payment being made.

3.3.1 The Various Legal Interpretations of Public Pension Benefits

State and local public retirement plans are almost exclusively subject to state laws, since state governments are partly distinct sovereign entities in the United States' system of fiscal federalism. State courts interpret public pension benefits under a variety of legal doctrines, including benefits as gratuities from the state, as contractual benefits between the public employer and the public employee, as quasi-contractual benefits enforced by promissory estoppel, and as the beneficiaries having a property interest in the benefits. In addition, some states have clauses in their state constitutions that prohibit the impairment and diminishment of public pension benefits.

Prior to the twentieth century, many of the initial public pensions from state governments were entirely arbitrary enactments by state legislatures. Consequently, courts originally interpreted pensions as gratuities (gifts from the state). Gratuity theory interpretation implies that public pension obligations are adjustable, upwards as well as downwards, subjecting public pensioners to considerable political risks. Case law has shifted in most states to provide stronger protections of public pension benefits, with the exceptions of Texas and Indiana. In 2000, the Arkansas Supreme Court ruled that actual pension contributions by public employees (not de facto employee contributions that are paid by employers) are a requirement for benefits not to be interpreted as gratuities, weakening the claims of public employees who make no direct contributions to their plans.²³

The interpretation of public pension benefits as property interest offers an alternative legal protection. If public employees have a property interest in their pension benefits, state legislatures must use due process and successfully utilize the takings clause when diminishing the retirement payments to public sector workers. That is, states must provide just compensation to the impaired individual and use the taken property for a public purpose. Generally, strengthening the financials of

²³ Robinson v. Taylor, 29 S.W.3d 691, 694 (Ark. 2000).

a public pension plan is not a legally accepted public purpose, although recent budgetary woes may change this standard.

Minnesota applies the legal doctrine of promissory estoppel to public pension benefits when a contract is not explicitly created by the legislature (Monahan 2010). Minnesota courts view public pension benefits as a promise, in the legal sense, to public sector workers and assume that public workers have relied on the expectation of these payments when making other decisions. This quasi-contractual principle establishes slightly weaker legal protections than the more common contract theory.

Courts in most states use contract theory to interpret public pension benefits. As part of the compensation agreement, public workers and their public employers create an implicit contract upon the point of hire, vesting, or retirement, according to the legal custom of the state. The compensation package is an influential factor in the decision-making process of potential government workers, given that the labor market is competitive with employment options in the public as well as private sectors. It bears noting that contract theory is more applicable to the private sector labor market and that legislative enactments rarely create legal contracts between individuals and the state.

If a state establishes contract theory protections for public pension benefits, ambiguity exists over the proper legal classification of the employing government in the contract—the sovereign power or the employer-side of the contract. In the context of the government as a sovereign power, a contract breach would be admissible if it serves a public purpose.²⁴ Contract infringements must undergo a three part judicial test: (1) did a contract exist? (2) was there an infringement? (3) did this infringement serve a public purpose? In addition by exercising their sovereign immunity powers, state governments might be able to reduce pension benefits and avert legal challenges from impaired

²⁴ The Contract Clause of the United States Constitution and nearly identical clauses in most state constitutions prevent governments from infringing on private contracts, unless it is for some imperative public purpose.

pensioners.²⁵ Alternatively, state or local governments that maintain the role of the contracting employer may only break the contract according to the doctrine of excuse—the legal standard for private parties.

Table #8	
State Constitutional Protections	
State	Year Included
Alaska	1956
Arizona	1998
Hawaii	1978
Illinois	1970
Louisiana	1974
Michigan	1963
New York	1938
Source: Center for Retirement Research at Boston College	

As shown in Table 8, seven states go beyond a contract theory interpretation to include provisions in their state constitutions that specifically protect public pensioners from impairments and diminishments of benefits. The state constitutions of Illinois and Michigan provide representative samples of the constitutional provisions of all seven states.

Membership in any pension or retirement system of the State, any unit of local government or school district, or any agency or instrumentality thereof, shall be an enforceable contractual relationship, the benefits of which shall not be diminished or impaired.²⁶

The accrued financial benefits of each pension plan and retirement system of the state and its political subdivisions shall be a contractual obligation thereof which shall not be diminished or impaired thereby.²⁷

These constitutional provisions as well as the other five establish a contractual nature for the public pension benefits and forbid the diminishment or impairment. A noticeable distinction of state

²⁵ Sovereign immunity is being used by New Jersey in public sector union lawsuits. New Jersey Education Association versus State 11-5024.

²⁶ Constitution of the State of Illinois, Article XIII, Section 5

²⁷ Constitution of the State of Michigan, Article IX, Section 24

constitutional clauses is the inclusion of the phrase “accrued benefits”, like in that of Michigan as well as others. Yet this difference appears to be primarily linguistic, for judicial interpretation overrides the accounting or actuarial implications from the phrase. State courts seem to apply these constitutional protections to past benefits and future benefits uninfluenced by the exact phrasing of the constitutional amendment. Without any explicit reference in its constitutional provision, Alaska courts extend the state constitutional protections to cover health insurance benefits for public workers and retirees. Thus, judges have considerable discretion in the application of constitutional protections.

3.3.2 Further Discussion of Benefit Protections

Independent from the legal interpretation of public pension promises in a state, the legal protections for benefits begin at different points in the workers’ careers depending on the state’s case law. Virtually all states protect public pensioners from benefit reductions after retirement, with the exception of the two states that continue to use a gratuity approach. Most states protect pension benefits from either the point of vesting or the point of hire. Legal protections in some states include prospective benefits—future benefits that are expected but not yet earned; after an employee is hired in states where protections begin from the point of hire, his or her benefit formula cannot be impaired without an offsetting benefit increase of some type.

Legislative enactments that reduce public pension benefits often invoke costly and lengthy lawsuits from public sector unions. To avoid litigation and political consequences, legislators usually enact pension reforms that only apply to future hires or nonvested employees, not current retirees or vested members. The legal scope of pension benefit impairments is not limited to pension reductions; some state courts include legislative enactments that increase employee contributions as impairments to the contract between the public employer and the public employee. The Arizona

state legislature passed employee contribution increases to improve the funding status of the Arizona State Retirement System only to have these increases overturned in court.²⁸

Taking advantage of their benefit formulas and pension systems, some public employees engage in “spiking” to earn retirement benefits well beyond the actuarial projection. Beerman (2013) suggests that courts might interpret benefits earned from “spiking” differently and allow for reductions of these ill-gotten government benefits.

3.3.3 Bankruptcy Solutions

Federal bankruptcy courts provide a means for some local governments to partly shed the fiscal burden of their pension funds. Given that bankruptcy occurs in federal courts, its rulings override state law as well as state constitutional provisions. Nonetheless, the overseeing state government must authorize the bankruptcy filing of a local government. The legal landscape of these authorizations is diverse across states; five classifications of state law exist in the authorization of bankruptcy filings by local governments—states that explicitly authorize filings, states that conditionally authorize filings, states that limit authorization, states that prohibit authorization, and states that have unclear or no laws regarding municipal bankruptcy (Spiotto et al. 2012).

The probability of a state insolvency scenario is increasing as unfunded liabilities and state debt have grown since the recent recession. Insolvency scenarios for states are not a new phenomenon. During the Great Depression, Arkansas defaulted on its bonds for road construction but eventually refinanced, and overexpansion of infrastructure in the 1830s, mostly from the building of canals, led to default and repudiation of state debt throughout the nineteenth century. Dove (2012) finds that state constitutional amendments put in place after these defaults in the nineteenth century raised bond prices, suggesting that bond markets perceived these constitutional

²⁸ The court case is *Barnes versus Arizona State Retirement System* (2011).

constraints as credible commitments. Courts in the United States have historically upheld a state's right to repudiate its debts, although this action invariably increases future borrowing costs.

Skeel (2012a, 2012b) makes the case that municipal bankruptcy protections or a similar type of debt restructuring should be extended to the states. State-level policymakers resist such action in fear of disturbing municipal bond markets. When considering the state government as an employer, state bankruptcy makes logical sense, given that governments could renegotiate contracts with employees. Furthermore, bankruptcy for state governments might be beneficial to the extent that it can isolate debt renegotiation from the political process. Nevertheless, politicians might use bankruptcy as a shield for politically unpopular actions, such as preserving future borrowing opportunities at expense of resident beneficiaries and public services.

3.3.4 Litigation: Recent and Current

The legal interpretation of public pension benefit protections is an active area of the law with more than 53 significant lawsuits between the start of 2009 and April of 2013 (Buck 2013). Most public pension litigation takes place in local and district courts, involving challenges from public sector unions to pension reforms that impair public pension benefits (Buck 2012). The recent wave of municipal bankruptcies along with the growing inability of governments to pay liabilities may catalyze a shift in the legal understanding of both public pension promises and the strengths of the various benefit protections. Thus, the binding nature of state and local government pension commitments remains largely uncertain, until legal challenges of benefit reductions traverse court systems in states across the country.

Before the recent financial crisis, the general consensus was that negative public pension benefit adjustments were off limits in governmental debt restructurings. Nevertheless, an insufficiency of funds tends to necessitate some form of benefit reduction for pensioners. The City

of Prichard, Alabama, which entered bankruptcy in 2009, stopped paying pensioners for the duration of the bankruptcy, despite a state law obligating the city to pay its pensioners in full.

Cost-of-living adjustments (COLAs) are no longer considered part of the inalterable portion of the public pension benefit after judicial rulings in Colorado, Minnesota, and South Dakota. An earlier lawsuit against the City of Omaha, Nebraska exemplifies the abandoned precedent, where courts rejected an attempt by the city to reduce its COLAs for the purpose of shoring up its pension fund.²⁹

Policymakers of overburdened jurisdictions tend to pay bondholders before pensioners, preserving low borrowing rates in the future. Central Falls, Rhode Island—a city with a population of 1,900—took this tactic, having a local public pension plan under 50% funded before entering bankruptcy; pensions above \$10,000 were cut by 55% in the settlement, with the state providing partial relief to pensioners during the first five years (Bidgood 2012; Simon 2013). Addressing a \$7 billion shortfall, the state of Rhode Island passed the Rhode Island Retirement Security Act of 2011 that reduces the benefits of current workers as well as pensioners (Pew 2012). Multiple public sector unions have challenged the Rhode Island reforms, and as of the writing of this paper, the lawsuits remain in mediation.

The California cities of Mammoth Lakes, Stockton, San Bernardino, and Vallejo have applied for bankruptcy protections since the recent financial crisis. The judicial system of California maintains one of the strongest forms of benefit protections—what Monahan (2012) refers to as the “California Rule”—using contract theory to protect all anticipated benefits from the point of hire. San Jose and San Diego passed referendums in 2012 that reduce the benefits for both public employees and public pensioners. Public sector unions challenge virtually all reductions of public

²⁹ Calabro versus City of Omaha (1995)

pension benefits in California. Initial court rulings in California have been favorable to the public sector workers, but these public pension lawsuits have yet to reach the state's highest court.

New Jersey Governor Chris Christie, along with the state legislature, enacted controversial public pension reforms in 2010, reducing public pension benefits. Public sector unions contested these reforms in court. Up to the writing of the paper, the state of New Jersey has been able to successfully utilize the doctrine of sovereign immunity to maintain its public pension cuts, and public sector unions continue to appeal decisions.

Detroit applied for bankruptcy protection in July 2013, attempting to gain concessions from both bondholders and pensioners. The fact that bankruptcy proceedings take place in federal courts, not subject to state law, was a motivation for Detroit's emergency manager Kevyn Orr to file for Chapter 9 bankruptcy protections. Michigan law prohibits local governments from impairing or diminishing public pension benefits by constitutional amendment. Given the size of the bankruptcy (the largest in history at \$18.2 billion or \$27,000 per resident)³⁰, its legal conclusions will provide some clarity to the limits of benefit protections and perhaps set a precedent for large municipal bankruptcies in the future.

3.4 Constitutionalized Government Promises

When public promises are constitutionalized, neglected beneficiaries have legal recourse to claw-back unpaid government obligations. Without constitutionalization of government payments, the political channel is the principal means for individuals to preserve their future payments as promised. Constitutionalization of pension payments offers protection to beneficiaries against the political risk of benefit reductions, setting a minimum amount but not preventing pension increases.

Municipal bondholders, like public pensioners, are government beneficiaries with constitutionalized governmental obligations. However, public debt holders are less likely to involve

³⁰ Numbers are from *The Economist* (2013).

themselves in the political process for the following two reasons. First, municipal bondholders are less likely to live in-state and consequently have a weaker influence in relevant elections. To contrast, almost all active members of a public retirement system and a large portion of retirees live in-state, boosting special interest group influence in the political process. Glaeser and Ponzetto (2013) show that the portion of retirees that reside in the state of their pension system impacts pension compensation levels. Second, municipal bondholders have little upside from lobbying in the political process, since bond payment amounts are fixed barring default or repudiation.

The spectrum of public pension benefit protections by states provides a framework to study the topics of constitutionalization and constitutionalization at the margin. Judicial decisions determine the degree of constitutionalization in most states; however, state legislatures implement constitutional amendments in some instances. As far as the legal constraints are determined by the judicial system, the degree of constitutionalization is mainly exogenous from the political influences; however, the method of judicial selection in a state might influence judicial decision-making—perhaps from the politicization of judicial elections.

A question of causality exists, since the legislature determines both the spending level and the institutions. Legal protections have greater independence from political influences to the extent that they are determined by apolitical judges. Unlike most of the other legal protections, constitutional provisions are determined by state legislatures in most instances; however, all constitutional amendments predate the sample period of the paper, in most cases by over 25 years. Thus, this paper assumes that state constitutional provisions exogenously influence other pension factors. The interdependence of pension and political characteristics with specific benefit protections, in the context of constitutionalization, illuminate useful insights into public pensions as well as broader insights into governmental promises.

The fact that constitutionalization mitigates default risk on future government payments provides value to self-interested beneficiaries. That is to say, there exists some larger level of unconstitutionalyzed benefits and a lesser level of constitutionalized benefits over which a recipient would be indifferent. Constitutionalization of future retirement benefit payments may provide a way for policymakers to save money in the present by reducing wages and retirement incomes and freeing up resources to be spent elsewhere; essentially, public workers exchange retirement income for security of that income. If constitutional protections accompany budgetary as well as pension troubles, however, constitutionalization may be a reason for these shortfalls.

Public sector unions form special interest groups to influence the political process that determines their pension outcomes. Public sector special interest groups likely prefer sustainable government retirement systems that are well funded. A constitutional provision might lead to overconfidence by the plan members in a state's ability to pay. If public sector unions view themselves as first in line in any debt renegotiating proceedings, they will likely shift to other objectives, such as lower retirement ages and large benefit levels. Thus, constitutional provisions could lead to a reduction in monitoring by special interest groups with regards to the solvency of a public pension plan. Due to the high cost of information, public sector unions could be integral to guiding pension policymaking, given that special interest groups, of all the pension stakeholders in the political process, likely have the largest incentive to become informed of the true solvency risks of their retirement system.

Benevolent politicians would exert additional efforts to ensure full funding of their pension systems in an ideal scenario. Nevertheless, there may be a natural tradeoff between pension underfunding (preferred by current politicians with short-term time horizons) and constitutional provisions (preferred by the public-sector workforce), when politicians and beneficiaries are assumed to be self-interested. Thus, state constitutional benefit protections appear to negatively

impact pension funding—a counterintuitive result. These constitutional protections essentially fail if a state can shed its future pension liabilities through debt restructuring or something similar to Chapter 9 bankruptcy in federal courts.

3.5 Description of the Dataset

The dataset consists of 47 states and covers the years 2001 to 2010.³¹ The classifications for states' legal protections of benefits are taken from Munnell and Quinby (2012) as shown in Table 9.³² There are five legal doctrines that states use to protect public pension benefits—constitutional law, contract theory, property interest, promissory estoppel, and gratuity theory. Depending on the case law of the state, legal protections may be applied differently to benefits at different parts of in the accrual process. To capture this inconsistency, states can be divided into four categories based on what types of benefits are under protection—past and future benefits, past and possibly future benefits, only past benefits, or none (Munnell and Quinby 2012).

³¹ The dataset excludes Washington, given its numerous tiers, as well as Tennessee and Connecticut, due to biannual reporting.

³² For their classifications, Munnell and Quinby (2012) rely on Cloud (2011), Monahan (2010), NCPERS (2007), Mumford and Pareja (1997), Reinke (2011), Staman (2011), Sinko (1996), as well as discussions with legal counsels of state retirement systems.

Table #9 Legal Protections of Public Pension Benefits					
	Constitution	Contract	Property	Gratuity	Promissory Estoppel
Past & Future	Alaska Illinois New York	Alabama California Georgia Kansas Massachusetts Nevada New Hampshire North Dakota Oregon Pennsylvania Vermont West Virginia	Maine Wyoming		Minnesota
Past & maybe Future	Arizona	Colorado Idaho Maryland Mississippi New Jersey Rhode Island South Carolina	New Mexico Ohio		
Past	Hawaii Louisiana Michigan		Wisconsin		
None				Indiana Texas	
Source: Munnell and Quinby (2012)					

Table 10 provides summary statistics and source information for data of the empirical analysis. The Public Pension Database (2010) or PPD is compiled by the Retirement Research Center at Boston College and the National Association of Retirement Administrators. Funding ratios and participation numbers are cumulative for the large state-level plans that are included in the PPD. State population numbers are from the U.S. Census Bureau. The state debt data from Moody's (2010) excludes unfunded liabilities, avoiding covariance with the funding ratio variable. The Wisconsin Legislature's Survey of public pension plans provides sufficient data to estimate the

minimum retirement age for a public worker with ten years of employment³³ and to create a binary indicator variable for Social Security participation. Hirsch and MacPherson (2010) estimate union membership for public sector workers, but do not distinguish between local, state, or federal government workers. The author uses Bureau of Labor estimates of federal workforce per state and a national federal union membership participation rate to isolate public sector union membership at the state and local levels of government. The U.S. Census Bureau's Annual Survey of Public-Employee Retirement Systems provides data on investment earnings as well as benefit levels.

Table #10 Summary Statistics							
Variable	Description	Source	Mean	Minimum	Maximum	Std Dev	
Retirement Age	Youngest possible retirement age for a person with ten years employment	Wisconsin Legislative Surveys: 2000-2010	62.01	55	67	2.34	
Benefit Level	Benefits Paid to Number of Beneficiaries	U.S. Census Bureau, Annual Survey of Public-Employee Retirement Systems	18.49	9.183	32.256	4.793	
Fund Ratio	Cumulative for large plans in PPD	Public Pension Database	82.988	39.167	117.93	14.602	
Debt	State Debt to State Income	Moody's (2010)	2.936	0	12.1	2.175	
Percent Population	Plan Members to State Population	Public Pension Database and U.S. Census Bureau	0.076	0.0268	0.15	0.0241	
Public Union	Percent of state and local government worker who are members of a union	Author estimate: based on data from Hirsch and MacPherson (2010) and the U.S. Department of Labor	0.327	0.0311	0.744	0.191	
Right to Work	Indicator Variable: one if state has right to work		0.447	0	1	0.498	
No Social Security	Indicator Variable: one if state has a large plan that does not participate in the Social Security	Wisconsin Legislative Surveys: 2000-2010	0.255	0	1	0.437	
Investments	Investment Earnings per Beneficiary	U.S. Census Bureau, Annual Survey of Public-Employee Retirement Systems	13.291	-154.53	153.23	38.401	

3.6 Empirical Results

Causation is a concern with most institutional studies. This paper assumes that the legal protections influence pension characteristics, given that most state constitutional amendments predate the sample period by thirty years. Judicial rulings being more independent from the political process than legislative action, one could further assume that all legal factors are determined exogenously. Public pension funding was poor or nonexistent until the late 1970s and reached a peak during the asset price boom of the late 1990s. The years from 2001 to 2010, the sample period, lies between the dot-com boom of the nineties and aggressive pension reforms following the

³³ Retirement age estimations do not include early retirement.

financial crisis of 2007-2008. Thus, pension funding during the sample period is somewhat exogenous to the preceding and later environments.

The paper estimates special interest group models to further explore the influences of legal institutions that protect benefits. The empirical estimations focus on three pension variables—retirement age, benefit levels, and funding ratio—that likely draw the attention of public sector unions. Union members prefer younger retirement ages, providing the option of more recreational utility and longer payouts of retirement income. Of course, benefit levels draw the attention for public sector unions, being a large component of a public employee’s compensation package. Public pension systems are complex institutions, relying on complex accounting principles and actuarial methods. Public worker special interest groups are more incentivized than politicians or voters to become informed of the exact solvency risks of a pension fund, since they will incur substantial costs in an insolvency scenario. Thus, public sector special interest groups, to the extent that they focus on the long-term, can provide helpful guidance to pension managers and state legislatures, discouraging pension underfunding. Pension funding is a likely objective of public sector unions, if they focus on the long-term, since money put away in the present increases probability of pension payments in the future as well as increases the expected value of the future payments if government promises are not assumed to be risk-free.

Table 11 provides the regression results for a special interest group model of retirement age. Public union membership corresponds negatively to retirement age as expected. However, the portion of public sector workers in state population appears to have positive impact on retirement—perhaps a structural result. States that do not participate in the Social Security system for public workers have lower retirement ages, given that non-participatory public plans may be better managed, and the respective state legislatures do not shirk their required contributions. Ample pension funds might allow for earlier retirements by public employees in these more prudent states.

To compare the coefficients of the indicator variables of legal protections, constitutional law and property interest are insignificant and consequently indistinguishable from the rest of the sample. Contract law, a strong protector of benefits, and gratuity theory, the weakest protector of benefits, have a negative point estimate and a positive point estimate, respectively. The indicator variables of the types of benefits protected provide a more linear representation of benefit protection strength. Stronger protections correspond to lower retirement age, and weaker protections correspond to higher retirement ages.

Table #11								
Retirement Age								
	1	2	3	4	5	6	7	8
Fund Ratio	0.035*** (0.0069)	0.035*** (0.0069)	0.036*** (0.007)	0.035*** (0.007)	0.037*** (0.007)	0.030*** (0.006)	0.037*** (0.007)	0.028*** (0.007)
Debt	-0.12*** (0.047)	-0.12*** (0.048)	-0.13*** (0.05)	-0.12*** (0.047)	-0.10** (0.046)	-0.19*** (0.04)	-0.14*** (0.04)	-0.15*** (0.046)
Percent Population	26.75*** (3.75)	26.77*** (3.81)	22.9*** (3.95)	26.59*** (3.95)	29.26*** (3.73)	25.24*** (3.50)	24.56*** (3.90)	29.2 (3.68)
Public Union	-5.23*** (0.71)	-5.23*** (0.71)	-5.59*** (0.71)	-5.22*** (0.71)	-4.89*** (0.70)	-2.92*** (0.72)	-5.03*** (3.90)	-4.49 (0.71)
Right to Work	-1.04*** (0.28)	-1.04*** (0.28)	-1.04*** (0.27)	-1.03*** (0.28)	-0.093*** (0.27)	-0.65*** (0.26)	-0.99*** (0.71)	-0.98 (0.26)
No Social Security	-1.64*** (0.21)	-1.64*** (0.21)	-1.73*** (0.21)	-1.64*** (0.21)	-1.74*** (0.21)	-1.47*** (0.20)	-1.61*** (0.27)	-1.61*** (0.21)
Constitutional Law		-0.007 (0.28)						
Contract Theory			-0.6*** (0.21)					
Property Interest				0.041 (0.31)				
Gratuity Theory					1.84*** (0.44)			
Past and Future						-1.52*** (0.18)		
Past and Possibly Future							0.44** (0.22)	
Past Only								0.96*** (0.19)
R-squared	0.369	0.369	0.38	0.369	0.392	0.453	0.374	0.402
F-Statistic	17.7	16.6	17.4	16.6	18.3	23.4	16.9	19
Note: OLS Regression results with fixed time effects. Standard errors are in parentheses.								

The statistical results of the special interest group variables and legal protection indicator variables on benefit levels are shown in Table 12. Public union membership has a statistically significant positive point estimate as expected. Likewise, the results confirm that plans without Social Security provide larger levels of pension benefits to retirees. The legal doctrine indicator variables are statistically insignificant. States that protect future and past benefits as well as states that protect only past benefits pay lower average benefits as shown in columns 6 and 8, yet states with unclear protections have larger benefits in column 7. Perhaps, the pension systems in these states are better managed, and the laws in these states are unclear because public sector unions have not posed any lawsuits.

Table #12 Benefit Levels								
	1	2	3	4	5	6	7	8
Fund Ratio	0.032** (0.012)	0.032** (0.012)	0.032** (0.012)	0.033*** (0.013)	0.031** (0.012)	0.029** (0.012)	0.05*** (0.011)	0.045*** (0.045)
Debt	0.44*** (0.084)	0.44*** (0.086)	0.44*** (0.084)	0.44*** (0.084)	0.42*** (0.084)	0.40*** (0.085)	0.31*** (0.077)	0.49*** (0.82)
Percent Population	-0.31 (6.73)	0.032 (6.84)	1.4 (7.16)	1.2 (7.09)	-1.3 (6.83)	-1.09 (6.71)	-18.73*** (6.35)	-5.11 (6.59)
Public Union	9.96*** (1.27)	10.05*** (1.33)	10.12*** (1.29)	9.88*** (1.28)	9.82*** (1.28)	11.1*** (1.37)	11.66*** (1.16)	8.51*** (1.26)
Right to Work	1.26** (0.49)	1.28** (0.50)	1.25** (0.49)	1.21** (0.49)	1.21** (0.49)	1.45*** (0.49)	1.67*** (0.44)	1.14*** (0.47)
No Social Security	4.11*** (0.38)	4.12*** (0.39)	4.15*** (0.39)	4.12*** (0.38)	4.15*** (0.38)	4.19*** (0.38)	4.36*** (0.35)	4.05*** (0.37)
Constitutional Law		-0.12 (0.49)						
Contract Theory			0.27 (0.38)					
Property Interest				-0.38 (0.56)				
Gratuity Theory					-0.72 (0.81)			
Past and Future						-0.78** (0.35)		
Past and Possibly Future							3.68*** (0.36)	
Past Only								-1.87*** (0.34)
R-squared	0.514	0.514	0.514	0.514	0.515	0.519	0.60	0.544
F-Statistic	30	30	30	30	30	30.6	43.2	33.8

Note: OLS Regression results with fixed time effects. Standard errors are in parentheses.

The statistical results in Table 11 and Table 12 show no significant difference between states that have constitutional amendments and states that do not in regards to benefit levels and retirement age. In column 2 of Table 13, the constitutional law indicator variable has a statistically significant negative point estimate. The coefficient for property interest is positive and significant, indicating that states with property interest are better funded; the result could derive from a tendency of states without Social Security participation to use property interest as an interpretation of benefits. The coefficient estimates for debt and public sector unions are statistically significant with their expected signs in column 1 of Table 13. The positive coefficient for the “past and possible” indicator variable in column 7 likely results from the fact that a well-funded pension plan is the source of the legal uncertainty. Of course, legal challenges by public sector unions result from legislative attempts to reduce pension benefits, which is likely a response to pension underfunding.

The statistical analysis explores the legal protections of public pension benefits and their influence on pension characteristics in multiple special interest group models. Unclear legal protections are indicative of a lack of legal activity in the area of public pension benefits—most likely due to sufficiently funded pension plans. In addition, union strength or public sector influence might be the cause of the correspondence between lower retirement ages and stronger benefit protections.

The statistical and economic significance of the point estimate for the constitutional law indicator variable in Table 13 suggests that constitutional protections of public pension benefits reduce the funding levels of plans, thereby increasing insolvency risk. This result is counterintuitive, and important to policy makers and other pension stakeholders. If constitutional protections lead to pension underfunding that leads to insolvency and lower benefit payments, constitutional protections may be undesirable because they fail to achieve their intended objective—pension benefit security.

Table #13								
Funding Ratio								
	1	2	3	4	5	6	7	8
Debt	-0.56*** (0.32)	-0.36 (0.086)	0.56* (0.084)	-0.51 (0.31)	-0.62* (0.32)	-0.67** (0.32)	-0.37 (0.32)	-0.69** (0.31)
Percent Population	-1.84 (25.52)	10.39 (25.7)	0.102 (27.16)	-29.31 (26.52)	-7.01 (25.8)	-4.53 (25.5)	23.25 (26.30)	12.9 (25.2)
Public Union	13.3*** (4.78)	17.18*** (4.94)	13.48*** (1.29)	14.5*** (4.74)	12.6*** (4.81)	17.3*** (5.14)	10.66** (4.79)	17.2*** (4.76)
Right to Work	6.20*** (1.82)	7.32*** (1.85)	6.2*** (1.43)	7.19*** (1.82)	5.95*** (1.83)	6.82*** (1.84)	5.48*** (1.81)	6.26*** (1.78)
No Social Security	-6.54*** (1.41)	-5.88*** (1.42)	-6.49*** (1.43)	-6.69*** (1.40)	-6.3*** (1.42)	-6.17*** (0.38)	-6.82*** (0.35)	-6.10*** (1.39)
Constitutional Law		-5.17*** (1.84)						
Contract Theory			0.303 (1.43)					
Property Interest				6.69*** (2.06)				
Gratuity Theory					-3.79 (3.06)			
Past and Future						-2.72** (1.32)		
Past and Possibly Future							3.68*** (1.48)	
Past Only								-5.71*** (1.28)
Observations	470	470	470	470	470	470	470	470
R-squared	0.246	0.259	0.246	0.265	0.249	0.253	0.264	0.278
F-Statistic	10.6	10.6	9.9	10.9	10	10.3	10.9	11.6
Note: OLS Regression results with fixed time effects. Standard errors are in parentheses.								

3.7 Concluding Remarks

This paper looks at the legal environment for public pension benefit protections, discussing relevant topics such as state bankruptcy and current pension litigation. In addition, the paper examines the influences of the various legal interpretations of the public pension promise at the state-level on the funding ratios, benefit levels, and retirement ages. The empirical results suggest that constitutional provisions may negatively impact funding ratios, but the influences of legal protections on the plans' retirement ages and benefit levels are more ambiguous.

The public pension landscape in the United States with its variety of benefit protections can be used to draw broader conclusions on the constitutionalization of government promises. If constitutionalization reduces monitoring by recipients, its ultimate effect will be a negative one. An insolvent state will probably be unable to pay pensioners in full whether constitutional protections of benefits are in place or not. If constitutional constraints on government obligations discourage prefunding, their eventual effects on the constitutionalized payments may be negative. Nonetheless, lower funding ratios of public pension plans with constitutional protections of benefits may be a tradeoff of risks between public employees and public employers.

Policymakers have shown a tendency in recent years to pay bondholders ahead of public pensioners in order to preserve lower interest rates for future borrowing. Thus, the political channel offers a weaker means of protection for public pensioners than previously thought. As state budgets continue to face substantial constraints, protections of public pension promises likely will wane in most states. Thus, the ultimate effect of constitutional protections remains unclear until current litigations reach conclusions.

References

- Ahmed, S. & Greene, K. V. (2000). Is the median voter a clear-cut winner?: Comparing the median voter theory and competing theories in explaining local government spending. *Public Choice*, 105, 207–230.
- Anson, M. J. P. (2011). A discount rate for public pension plans. *Journal of Investment Consulting*, 12, 16–22.
- Banzhaf, H. S., & Oates, W. E. (2012, April). *On fiscal illusion and Ricardian equivalence in local public finance*. Andrew Young School of Policy Studies Working Paper.
- Barro, R. J. (1974). Are government bonds net wealth? *The Journal of Political Economy*, 82, 1095-1117.
- Barro, R. J. (2011, August 3). The coming crisis of governments. *The Financial Times*.
- Becker, G. S. (1983). A theory of competition among pressure groups for political influence. *Quarterly Journal of Economics*, 48, 371-400.
- Beerman, J. M. (2013). The public pension crisis. *Washington and Lee Law Review*, 70, 3-94.
- Bidgood, J. (2012, September 6). Plan to end bankruptcy in Rhode Island city gains approval. *New York Times*.
- Boeri, T. & Tabellini G. (2012). Does information increase political support for pension reform? *Public Choice*, 150, 327-362.
- Bohn, H. (2011). Should public retirement plans be fully funded? *Journal of Pension Economics and Finance*, 10, 195-219.
- Brainard, K. (2010, March). *Public Pension Plan Investment Return Assumptions*. Lexington, KY: National Association of State Retirement Administrators.
- Brown, J. R., Clark R., & Rauh J. D. (2011). The economics of state and local pensions. *Journal of Pension Economics and Finance*, 10, 161-172.
- Brown, J. R. & Wilcox, D. W. (2009). Discounting state and local pension liabilities. *American Economic Review*, 99, 538-42.
- Buchanan, J. M. (1960), *Fiscal theory and political economy*. Chapel Hill: University of North Carolina Press.
- Buck, S. (2012). The legal ramifications of public pension reform. *Texas Review of Law and Politics*, 17, 25-185.

- Buck, S. (2013). *Pension litigation summary*. Houston, TX: Laura and John Arnold Foundation Policy Perspective.
- Center for Government Analysis. (2007). *An analysis of public employee retirement systems in California*. Newport Beach, CA: Author.
- Clark, R. L., Craig, L. A., & Sabelhaus, J. E. (2011). *State and local retirement plans in the United States*. Northampton: Elgar Publishing.
- Cloud, W. (2011). State pension deficits, the recession, and a modern view of the contracts clause. *The Yale Law Journal*, 120, 2199-2212.
- Congleton, R. D. & Shughart W. F., II (1990). The growth of social security: Electoral push or political pull? *Economic Inquiry*, 28, 109-132.
- Congleton, R. D., & Bennett, R. W. (1995). On the political economy of state highway expenditures: Some evidence of the relative performance of alternative public choice models. *Public Choice*, 84, 1-24.
- Congleton, R. D. (2001). Rational ignorance, rational voter expectations, and public policy: A discrete informational foundation for fiscal illusion. *Public Choice*, 107, 35-64.
- Congleton, R. D. (2007). Informational limits to democratic public policy: The jury theorem, yardstick competition, and ignorance. *Public Choice*, 132, 333-352.
- Congressional Budget Office. (2011, May). *The underfunding of state and local pension plans*. Washington DC: Author.
- Cooper, M., & Walsh, N. W. (2012, June 6). San Diego and San Jose lead way in pension cuts. *New York Times*.
- Cowen, T., & Parfit, D. (1992). Against the social discount rate. In P. Lasett & J. S. Fishkin (Eds.), *Justice between age groups and generations* (pp. 144-161). New Haven: Yale University Press.
- Daly, G. G. (1969). The burden of the debt and future generations in local finance. *Southern Economic Journal*, 36, 44-51.
- Davey, M. (2012, June 4). Frenzied campaigning on eve of Wisconsin vote. *New York Times*.
- Dove, J. A. (2012). Credible commitments and constitutional constraints: State debt repudiation and default in nineteenth century America. *Journal of Constitutional Political Economy*, 23, 66-93.
- Downs, A. (1957). *An economic theory of democracy*. New York: Harper and Row.
- The Economist (2010a, October 16). Three-trillion dollar hole. *The Economist*, 18.

- The Economist (2010b, October 16). A gold-plated burden. *The Economist*, 95-96.
- The Economist (2011, October 15). A trillion here, \$500 billion there. *The Economist*, 84.
- The Economist (2012, June 23). Burning fast. *The Economist*, 34.
- The Economist (2013, July 27). Can Motown be mended? *The Economist*, 23-24.
- Ehrenberg, R. G., & Schwarz, J. L. (1983). *Public sector labor markets*. NBER Working Paper No. 1179.
- Eichenberger, R., & Stadelmann, D. (2010). How federalism protects future generations from today's public debts. *Review of Law and Economics*, 6, 395-420.
- Government Accountability Office. (2005, June 9). *Social Security: coverage of public employees and implications for reform*. GAO-06-786T. Washington DC: Author.
- Gerson, M. (2012, June 6). Unions are driving a wedge between Democrats. *Washington Post*.
- Glaeser, E. L. and Ponzetto, G. A.M. (2013, June 15). *Shrouded costs of government: The political economy of state and local public pensions*. NBER Working Paper.
- Hawes, M. H. (2004). So no damn politician can ever scrap it: The constitutional protection of Social Security benefits. *University of Pittsburgh Law Review*, 65, 865-910.
- Hirsch, B.T. & Macpherson D.A. (2010). The union membership and coverage database from the CPS. from <http://www.unionstats.com>.
- Laing, J. R. (2010, March 15). The \$2 trillion dollar hole. *Barron's*, 40-43.
- Mackay, R. C. (2011). *The effect of unfunded pension liabilities on local housing prices*. Mimeo, University of California, San Diego.
- Mayers, J. (2011, September 20). Nearly \$44 million spent on Wisconsin recall elections. *Reuters*.
- Mitchell, O. S. (2012). Public pension pressures. In P. Conti-Brown (Ed.), *When states go broke: The origins, context, and solutions for the American states in fiscal crisis* (pp 57-76). Cambridge, UK: Cambridge University Press.
- Mitchell, O. S. & Smith, R. S. (1994). Pension funding in the public sector. *Review of Economics and Statistics*, 76, 278-290.
- Monahan, A. B. (2010). Public pension plan reform: the legal framework. *Education Finance and Policy*, 5; Minnesota Legal Studies Research No. 10-13.

- Monahan, A. B. (2012). Statutes as contracts? The ‘California Rule’ and its impact on public pension reform. *Iowa Law Review*, 97, 1029-1083.
- Moody’s Investor Services. (2010, May) *2010 State debt medians report*. New York: Author.
- Mueller, D.C. & Stratmann, T. (1994). Information and persuasive campaigning. *Public Choice*, 81, 55-77.
- Mumford, T. A.M. & Pareja M. L. (1997). *The employer’s (in)ability to reduce benefits in the public sector*. American Law Institute-American Bar Association, ALI-ABA Course Study.
- Mumy, G. E. (1978). The economics of local government pension and pension funding. *Journal of Political Economy*, 86, 517–527.
- Munnell, A. H. (2012). *State and local pension: what now?* Washington, D.C.: Brookings Institution Press.
- Munnell, A. H., Calabrese, T., Monk, A., & Aubry, J. P. (2010). Pension obligation bonds: financial crisis exposes risks. *Issue in Brief* SLP-9, Chestnut Hill, MA: Center for Retirement Research at Boston College.
- Munnell, A. H., Aubry, J. P., & Quinby, L. (2011). Public pension funding in practice. *Journal of Pension Economics and Finance*, 10, 247–268.
- Munnell, A. H. & Quinby L. (2012). Legal constraints on changes in state and local pensions. *Issue in Brief* SLP-25, Chestnut Hill, MA: Center for Retirement Research at Boston College.
- Munnell, A. H., Jean-Pierre A., Hurwitz J., & Quinby L. (forthcoming). How would GASB proposals affect state and local pension reporting? *Journal of Government Financial Management*.
- National Conference on Public Employee Retirement Systems [NCPERS] (2007). *State constitutional protections for public sector retirement benefits*. Washington, DC: Author.
- Novy-Marx, R. (2013). Logical implications of the GASB’s methodology for valuing pension liabilities. *Financial Analysts Journal*, 69, 26-32.
- Novy-Marx, R. & Rauh J. D. (2009). The liabilities and risks of state-sponsored pension plans. *The Journal of Economic Perspectives*, 23, 191-120.
- Novy-Marx, R. & Rauh J. D. (2011). Public pension promises: How big are they and what are they worth? *Journal of Finance*, 66, 1211-1249.
- Peltzman, S. (1976). Toward a more general theory of regulation. *Journal of Law and Economics*, 19, 211-240.

- The Pew Center on the States. (2012, March). *Rhode Island plan enacts new approach to states' pension woes*. Washington DC: Author.
- Public Pension Database. (2010). Center for Retirement Research at Boston College and Center for State and Local Government Excellence.
- Rattso, J. & Sorensen R. J. (2004). Public employees as swing voters: empirical evidence on opposition to public sector reform. *Public Choice*, 119, 281-310.
- Reinke, G. (2011). When a promise isn't a promise: public employees' ability to alter pension plans of retired employees. *Vanderbilt Law Review*, 65, 1673-1711.
- Reuters (2012, June 11). U.S. public pension funding dips on market volatility. *Reuters*.
- Russ, H. (2012, July 1). Analysis: Stockton, California new paradigm for struggling cities. *Reuters*.
- Schieber, S. J. (2012). Public pension promises: the good, the bad, and the ugly (chapter 20). *The predictable surprise*. New York: Oxford University Press.
- Simko, D. B. (1996). Of public pensions, state constitutional contract protections, and fiscal constraint. *Temple Law Review*, 69, 1059-1079.
- Simon, R. (2013, August 3). Rhode Island's Central Falls reeling from underfunded pension. *LA Times*.
- Skeel, D. A., Jr. (2012a). State bankruptcy from the ground up. In P. Conti-Brown (Ed.), *When states go broke: The origins, context, and solutions for the American states in fiscal crisis* (pp. 191-213). Cambridge, UK: Cambridge University Press.
- Skeel, D. A., Jr. (2012b). States of bankruptcy. *The University of Chicago Law Review*, 79, 677-735.
- Snell, R. K. (2001, December 11). *Pensions and retirement plan enactments in 2001 state legislatures: Final report*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2002, November 21). *Pensions and retirement plan enactments in 2002 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2003, November 5). *Pensions and retirement plan enactments in 2003 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2004, October 25). *Pensions and retirement plan enactments in 2004 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2005, November). *Pensions and retirement plan enactments in 2005 state legislatures*. Washington DC: National Conference of State Legislatures.

- Snell, R. K. (2006, October). *Pensions and retirement plan enactments in 2006 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2007, October). *Pensions and retirement plan enactments in 2007 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2008, July 31). *Pensions and retirement plan enactments in 2008 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2009, August 17). *State pensions and retirement legislation 2009*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2010, November 23). *Pensions and retirement plan enactments in 2010 state legislatures*. Washington DC: National Conference of State Legislatures.
- Snell, R. K. (2012). *Highlights of pension reform in 2012*. Washington DC: National Conference of State Legislatures.
- Spiotto, J. E., Acker A. E., & Appleby, L.E. (2012), *Municipalities in distress? How states and investors deal with local government financial emergencies*. Chicago: Chapman and Cutler LLP.
- Splinter, D, *State pension contributions and fiscal stress*. Working Paper.
- Staman, J. (2011), *State and local pension plans and fiscal distress: A legal overview*. Report 41736. Washington DC: Congressional Research Service.
- Steffen, K. (2001). State employee pension plans. In E. C. Hustead & O.S. Mitchell (eds.), *Pensions in the public sector*. Philadelphia: University of Pennsylvania Press.
- Stigler, G. J. (1971). The theory of economic regulation. *Bell Journal of Economics and Management Science*, 2, 3-21.
- Summers, A. B. (2010, June). How California's public pension system is broke (and how to fix it). *Reason*.
- Thompson, E. A. (1967). Debt instruments in macroeconomic and capital theory. *American Economic Review*, 67, 1196-1210.
- Wilshire Consulting. (2011). *2011 Wilshire report on state retirement systems: Funding levels and asset allocation*. Santa Monica: Wilshire Associates Incorporated.
- Wilshire Consulting. (2012). *2012 Report on state retirement systems: Funding levels and asset allocation*. Santa Monica: Wilshire Associates Incorporated.
- Wiedman, C. I. & Goldberg, D. G. (2002). Pension accounting: Coming to light in a bear market. *Ivey Business Journal*, 66, 38-41.