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State Retirement Systems: Examining the Impact of Partisan Political Control of State Government Institutions on the Funded Ratio

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MARTIN SCHOOL OF PUBLIC POLICY AND ADMINISTRATION

State Retirement Systems

Examining the Impact of Partisan Political Control of State Government

Institutions on the Funded Ratio

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Graduate Capstone Project

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Executive Summary

Since the Financial Crisis of 2008, pension plans in the United States have sunk into a crisis that there seems to be no escape from. While all 50 states have at least one retirement system for employees, several of these systems have been repeatedly hit by massive problems involving funding for future benefits and paying out current obligations. Taken as a collective whole, public retirement systems in this country have been estimated to be underfunded anywhere from \$934 billion to \$3.2 trillion. Several states barely have half the money needed to meet all obligations promised. While several studies have been conducted to establish the reasons for these numerous problems affecting retirement systems in the United States, more attention should be paid regarding the impact of politics and partisanship on state retirement policy as a whole, and state retirement system funding, more specifically. This study offers such an analysis.

Using the funded ratio as the primary measure of retirement system health, and the most recent pension plan data available, a panel dataset spanning the years 2001-2015 was created to investigate the relationship between partisanship and pension plan funding for state-administered retirement systems. This panel data was then tested via statistical analysis to determine these potential relationships. An intensive statistical model containing four fixed-effects regressions test the funded ratio with 16 explanatory variables. This set of explanatory variables includes several variables representing partisan political control to properly conduct the analysis.

The results derived from the regressions present highly unexpected and interesting results. Contrary to the expected outcome, divided government has a positive, and significant, impact on the funded ratio of state-run retirement systems. Divided state government is a 0.018 increase to the funded ratio. Other unexpected results include no effect on the funded ratio from a Democratic governor or Democratic controlled state senate, and a negative effect on the ratio from a state house controlled by Democrats and the particular number of seats controlled by Democrats in a state house. The percentage of seats held by Democrats in a state senate has a positive and statistically significant effect on the funded ratio via a 0.28 increase.

Following from the results of the fixed-effects regression analysis, the author recommends both political parties undertake evidence-based approaches to retirement system policy to ensure that funding for pension obligations is at acceptable levels. Attention should always be paid to retirement system policy no matter what party is in control, but it is of vital importance when the state is operating under divided government. It is also recommended that states should study and learn from the states that have achieved better pension policy outcomes under divided government to learn best practices and solutions to combat the underfunding problems and keep up with all current and future obligations.

Introduction

On November 28, 2016, Kentucky Retirement Systems (KRS), the state agency that administers many of the public retirement systems of the state of Kentucky, announced that the primary public pension plan for the state, the Kentucky Employees Retirement System (KERS), designed for Kentucky state employees, had 16% percent of the funding that would be needed for all present and future payment obligations. This announcement was met by renewed panic across the Commonwealth of Kentucky as fresh realizations set in regarding the serious underfunding and fiscal ill health of the state's public retirement systems. Similar realizations have reverberated across the country on a yearly basis as it becomes clear that the U.S. public pensions crisis that started in the brutal aftermath of the 2008 Financial Crisis has shown no real signs of subsiding. Indeed, the Pew Center on Public Sector Retirement Systems reported last year that, as of the 2014 fiscal year, state-run retirement systems across the country combined to have a \$934 billion funding gap between promises made via pension benefits to workers and the funding need to fulfill all these obligations (Pew 2016). These reported figures do not include the fiscal years 2015 and 2016, which are feared to be worse in the funding gap by the Pew Center on Public Sector Retirement Systems due to the estimated weakness of investment performance (Pew 2016). One thing, above all else, is certain with this report and many like it: the public pension crisis across this country is not going away any time soon, even though other economic measures seem to suggest that the effects of the financial crisis have subsided.

Public Retirement Systems, administered by the states themselves, have become a large target for this political interference and influence as states find ways to elude their required contributions to these public pension plans to balance budgets and stave off sizeable budget deficits (Stalebrink 2014). Coinciding with the pension crisis roiling state retirement systems across the country, has been the growth of blatant political partisanship over the past eight plus years on the federal, state, and local levels. Over this time frame, but especially since the 2010 midterm elections, when the Tea Party came into being on the national level, the center of the political spectrum has all but been wiped out as both the Democratic and Republican parties have radicalized and moved away from the center into their respective political camps. State political parties have not been immune to this growth of partisanship, with some state parties walking further to the left or the right than their neighbors or federal counterparts, mainly due to different ideological strands dependent on local conditions. In addition, the expansion of state level gridlock induced by the rapidly increasing instances of divided government across state governments around the country have not helped matters. Thus, a side effect from this growth in partisanship on both sides of the aisle are the ever-increasing amounts of political interference and influence in dozens of programs on every level of government, especially on the state level, due to the continuous gridlock in Washington, D.C. (Stalebrink 2014).

These two topics of pension underfunding and political partisanship, especially in the states, should be explored in more detail to assess whether any pertinent connections exist between the two. This capstone investigates the relationship between partisanship and state pension plan funding through two guiding research

questions: does divided government of individual states have any effect on the funded ratio of state-administered retirement systems? What impact does Democratic control of state government institutions have on the funded ratio of state-administered retirement systems? These two questions, answered by an extensive analysis, will be able to show if there are any correlations between pension underfunding and political partisanship.

This study, contained in the proceeding sections, includes a problem statement, a concise background section highlighting key concepts pertinent to state-run public retirement systems, an in-depth review of the current state of academic literature on public pension plans, and a research design elaborating the paper's analytic approach. Following these sections, an examination of the analytical results, limitations, and recommendations will conclude this study.

Problem Statement

While the Pew Center on Public Sector Retirement Systems has calculated the funding gap, between what state governments have promised in pension benefits for workers to funding that is available to make good on all these obligations, at \$934 billion as of 2014, other researchers think that the funding gap is much larger. One piece of research recently found evidence that suggested state-run public retirement systems in the U.S. are currently underfunded to the amount of around \$1 to \$3 trillion (Shnitser 2015). Stalebrink (2014), using a different calculation method based around market-to-market accounting principles that changes how the discount rate values future obligations, calculates the funding gap at \$3.2 trillion. Regardless of the

researcher or the calculation method used, these funding gaps, officially known as unfunded liabilities in pension parlance, are not going to go away all by themselves. It will take considerable technical knowledge and consistent policy improvements on the part of states, state government institutions, and retirement system administrative agencies to reduce this combined unfunded liability across all state-administered retirement systems.

While knowledge of unfunded liabilities is important to understanding the dire state of public retirement systems across the country, this study is primarily concerned with another key metric of public pension plan health, that of the funded ratio. The funded ratio is defined as the ratio of actuarial assets divided by actuarial accrued liabilities (*Public Plans Data 2001-2015*). This ratio was encountered in the previous section as the percentage of the total funding that would be needed for all present and future payment obligations. Since 2008, the funded ratio has been used in conjunction with unfunded liabilities as the primary measures to judge the health of a public retirement system and whether the retirement system in question is sufficiently funded or not (Munnell et al. 2008). This paper will use the funded ratio as the prime measure of public retirement system health, as per the current stock of literature recommendations (Munnell et al. 2008).

Given all the challenges that public retirement systems are currently battling, it is absolutely critical to keep investigating potential factors that impact public retirement systems in general, and the funded ratio, in particular. These investigations could continue to prove crucial to policy makers to affect positive change for the benefit of public pension plans and their health. While various studies have been conducted to

explain different impacts on the funded ratio, a study investigating the potential connection between political partisanship and pension health via the funded ratio has not been attempted. Such a study would allow state lawmakers to see the effect of political conflict on state fiscal and retirement policy choices, and pursue more collaborative evidence-based approaches to put state-administered retirement systems on a fiscally healthy path for future beneficiaries. In addition, this type of study will be of great interest to citizens, public sector employees, and most importantly voters to determine which party, and whether united or divided government, takes the most fiscal care of public retirement systems.

This study will analyze the relationship between the funded ratio of state-administered retirement systems and a set of explanatory variables that represent partisan political control of the state houses, state senates, state governorships, and the concept of divided government. Other variables will be used to control for some economic conditions and other varied pension characteristics. The ultimate objective is to find an answer for the two research questions posed in the previous section. Based on my readings of the public retirement system literature, that is detailed in the literature review section of this study, and my own educated guesses, I hypothesize that divided government, during the time frame of 2001-2015, between the state houses, state senates, and state governorships will adversely affect the funded ratio. In addition, I hypothesize that partisan political control does have an impact on the funded ratio via adverse effects when Republicans are in control, versus a positive effect on the funded ratio when Democrats are in control of the state government institutions since they have been known as the party of the working class and strong

supporters of retirement benefits since the founding of the New Deal Coalition (Hacker 2004).

Background

In both the public and private sectors in the United States, employees are typically enrolled in a retirement plan to aid in living comfortably in the post-employment phase of their lives. They are enrolled in either a defined benefit retirement plan or a defined contribution retirement plan. Both types of plans offer individual strengths and weaknesses, but they are structured very differently in how they operate and where the burden of the potential risk falls. A defined benefit retirement plan guarantees a particular monthly payout over all their retirement years, dependent on a formula defined by the plan administrator. This formula usually contains several factors governing its calculation, including the pay of the employee, retirement age, and years of employment (commonly known as service time) (Bikker & De Dreu 2009). The monthly payout to the employee is then computed based off this set formula. In addition, since these plans guarantee a certain level of benefits via the set formula, the plan administrator assumes the risk of potential shortfalls in the payouts. In essence, if the plan's investment returns are not as assumed and expected, the employer must cover the shortfall in funds (Novy-Marx & Rauh 2009). A predominant portion of retirement plans for the public sector, including for several state-administered retirement plans, are defined benefit plans.

On the other hand, a defined contribution plan is where contributions by the employee and the employer are paid into an individual retirement account for each

employee. These contributions are then invested into all manner of investment vehicles and the resultant returns (which could be either positive, negative, or unchanging) go back into the employee's account, allowing it to hopefully keep growing in this manner until retirement (Bikker & De Dreu 2009). This is the most common type of retirement plan in the private sector, with a 401(k) being the most common example. While there is no guarantee with this type of retirement plan, it is hoped that the market performance of the investments will grow the retirement account, taking typical market fluctuations into account (Novy-Marx & Rauh 2009). Since there is no guarantee for a set amount of benefit payout, the investment risk in this retirement plan sits with the employee.

It is prudent to note that every retirement system is not the same; each has its own individual and unique characteristics. This holds true for every state-administered retirement system. As mentioned above, most state-run retirement systems are still defined benefit plans, but the change to defined contribution plans is growing more widespread, with this switch often accelerating in certain states due to the 2008 Financial Crisis (2016 Pew). In addition to these growing changes, some states, such as Alaska, have started to experiment with hybrid plans that combine the structure of both retirement plans types. These plans are officially known as either cash balance or pension equity retirement plans (Bikker & De Dreu 2009).

It should also be noted that contributions for each individual employee from the employer in public retirement systems are all added together and contributed to the retirement system as one big block. Actuaries estimate these contribution levels, known as actuarial required contributions (ARC), that states must contribute to cover

current and future benefits for employees, and make good on the total value of benefits for members of the retirement system. These contributions are then allocated to several different investment vehicles and securities to meet the future benefits needed (Blake, Lehmann, & Timmermann 1999). Actuaries also make long term assumptions and projections regarding the performance of the investments invested in by the system. Typically, these projections and assumptions on investment returns are quite optimistic, with the average being around an eight percent return (Coggburn & Kearney 2010). Because the future benefits to be paid and the future investment returns are not known for certain, but are only estimated, there is no guarantee that the contribution levels will be enough to actually meet the benefits that need to be paid out (Coggburn & Kearney 2010). Simply, this means that even with estimates of required contributions and projected investment returns by trained actuaries, sometimes the ARC is not enough to keep pension plans up to speed with payouts for benefits. Overall, this is one of the most critical concepts in understanding public retirement systems—the concept of pension funding.

Literature Review

Over the course of several years, numerous studies have analyzed and reviewed the various factors affecting the fiscal solvency, and most importantly, the sustainability of public retirement systems. While several of these studies have taken place over the past 20 years as a result of emergent problems in public pension systems, Abigail R. Bacon's 1980 study serves as an initial precursor to the large uptick in literature from the mid '90s onward. Bacon sought to evaluate what funding

method would work best for municipal governments between the full funding scheme or the pay-as-you-go financing scheme. Bacon (1980) suggested that there was merit in the pay-as-you-go funding method being used by municipal and state governments, and advocated that public administrators get a bigger seat at the table in determining pension policy to offset the competing interests between legislators and retirement system officials.

This initial analysis set the table for the current range of studies covering public pension plans and various factors that impact their funding. The following paragraphs review the literature on public retirement systems to establish the importance of the various factors that affect pension funding. In particular, this review highlights the absence of research that considers how partisan political control of state government institutions impacts public pension plan funding. Fully understanding this complex public policy field requires research that considers political control alongside well established influences.

In 1994, researchers from the National Bureau of Economic Research found that the governance of public pensions plans did have an impact on their performance (Mitchell & Hsin 1994). More specifically, they found that pension funding—as explained in the background section—was stronger, more consistent, and met required contributions when a particular system employed pension professionals on its staff and when its governing board did not consist of employees that were a part of the retirement system. The major conclusion was that funding and plan performance could be linked to pension board characteristics and reporting requirements, in addition to plan investment strategy and the allocation of assets. These subtopics in the larger

field of public retirement systems have consistently been studied to the present day. In 1999, a group of researchers evaluated the performance of plans around the direction of asset allocation via pension funds in the United Kingdom (Blake, Lehmann, & Timmermann 1999). Their analysis found that a system's allocation between low volatility and high volatility assets does have an impact on fund performance, with high volatility assets and/or actively managed assets having a higher risk of uneven performance (Blake, Lehmann, & Timmermann 1999). This analysis was the first academic evaluation of the performance of managed portfolios in relation to public retirement system performance, and the authors make it a point to emphasize that their evidence regarding managed portfolios could apply to pension plans in the United States.

In 2000, Hans-Werner Sinn wrote a key review recapitulating the studies in the particular strand of literature that had arisen around Bacon's (1980) foray into funding methods. He argues that while the current system of PAYGO (pay-as-you-go) financing is quite inefficient when it comes to rate of return, and that a fully funded system offers evidence-based superior performance in the rate of return arena, there is almost nothing to gain for public pension plans to switch to the fully funded method in terms of present value (Sinn 2000). In fact, the study provides empirical evidence that a transition between the funding methods would not affect tax burdens or honoring existing pension promises, and thus be inefficient. In addition, Barr (2002) largely confirmed Sinn's findings, but in the space of reforming public pension plans as a whole, not just in funding method. However, Barr (2002) argued that effective government, organized in whichever manner, is a key requirement for a competently

run pension plan, and at this point, government cannot get out of the pension business.

Additional public retirement system analysis has shown that pensions boards directed by member-elected trustees are important to ascertain good investment performance for pension plan assets (note that this is different from overall retirement system performance) and that these trustees have the potential to block the political problem of governments using pension assets as budgetary safety nets (Hess 2005). Clark and Urwin (2008) present an extensive set of best practices in the area of pension governance and suggest that application of these comprehensive best practices can improve system performance and the pension institution as a whole.

In 2008, a team of researchers at the Center for Retirement Research, located at Boston College, established clear evidence that the best measure for funding performance during the current recession climate (and subsequent post-recession climate) was the funded ratio (Munnell et al. 2008). Before this establishment, several researchers used unfunded liabilities and net assets as some prime measures of funding performance. While these are still very strong measures in their own right, Munnell and her colleagues provided strong support that the funded ratio is the main measure to determine if a public pension plan has the funding for existing and future claims. This study also provided evidence that another primary factor in determining funding performance is the ability of the system to make its actuarial required contribution (ARC) on an annual basis. Basically, if a system does not fund up to ARC, an increase in the plan's unfunded liabilities is very likely, which causes the funded ratio of the system to decrease. Furthermore, Truesdell (2011) provides evidence

suggesting that systems with a higher ARC also have a lower funded ratio and that there is a strong correlation between these two measures.

Cogburn and Kearney (2010) explore the relationship between politics and public retirement systems. Their findings indicate that the level of pension contributions from the state governments are directly related to overall pension funding and funding performance in general (Cogburn & Kearney 2010). They also find that the professionalism of the state legislature and state fiscal constraints also significantly affect pension funding. Additionally, they found that political ideology is significantly related to other postemployment benefits (such as health care for retirees), which means that this is one of the earliest contemporary studies to examine the role of politics in the performance of pension plans. On the other hand, Thom (2013) finds that the enactment of public employee defined contribution accounts (away from the typical defined benefit accounts) was largely due to Republican legislative partisanship (Thom 2013). Furthermore, Stalebrink (2014) found empirical evidence to suggest that the adoption of investment return assumptions by investment boards is partially explained by the boards' connection to the political process. His evidence shows that high investment return assumptions are typically adopted when these investment boards have a particular proportion of political appointees (Stalebrink 2014). He also finds that fiscally unhealthy plans consistently adopt higher investment return assumptions than their healthier cousins. These studies reflect an emerging but small literature that examines the effect of partisan political control on public retirement systems.

Two recent studies have also advanced the literature in regards to public retirement systems. A researcher at the University of Kentucky was able to corroborate

Truesdell's original assertion that systems with a higher ARC also have a lower funded ratio by investigating the inverse of this relationship. Simply, the empirical results show that higher funded ratios for states lead to a lower ARC, which in turn directly supported the findings of previous studies (Skop 2013). This particular study further found that the funded ratio is positively affected by actuarial assets. In addition, Groves (2014) found that several governance characteristics have an impact on the funded ratio. He argues that public pension plans with a special investment council to control investment decisions and asset allocation is better than letting the pension board handle the investment decisions (Groves 2014). These councils could lead to an increase of up to 7% in the funded ratios compared to systems that do not have these special councils.

It has been clearly shown in this review section that there is a wide-ranging literature that examines various facets of pension plans in general, and public retirement systems, specifically. This literature has grown in breadth and depth over the last twenty plus years to cover a sizeable portion of our understanding on how pensions behave and how these behaviors will affect pensions in the future. Since several public retirement systems across the country are surrounded by crises, it is not too far of stretch to say that this set of literature will continue to expand to more comprehensive levels. The proceeding empirical analysis will expand on the research mentioned in this section and use it as guidance, whilst employing the most current data regarding state retirement systems, to evaluate the effect of partisan political control of the state legislative houses and the governorship on the funded ratio.

Research Design

This study will use quantitative statistical analysis to answer the two research questions posed previously in the Introduction section. The key objective of this study, and thus, this research design described herein, is to determine, and evaluate, the impact of partisan political control of state government institutions on the funded ratio of state-administered retirement systems. As review, the funded ratio is the ratio of actuarial assets divided by actuarial accrued liabilities, usually displayed as a percentage. It is possible to have a ratio of one or more for this measure, which means that the retirement system would be able to payout all present and future benefit obligations. Additionally, in this study, state government institutions are the state houses, state senates, and the state governorships. I define a state-administered retirement system as any state pension plan that is directly administered by the state or a state agency. This definition allows retirement systems of state employees, teachers, education employees, fire, police, higher education employees, and county employees to be included in the study, and does not limit this analysis to only state employees. Finally, it is important to understand that the number of retirement systems is not the same across states. As an example, Texas has five state-administered retirement systems, while Florida has just one.

Data

The data used for this study primarily comes from the Public Plans Database (PPD) created by Boston College's Center for Retirement Research (CRR) and the Center for State and Local Government Excellence. This extensive panel dataset contains 15 years of data from 2001-2015 for each retirement system contained within

the set, and includes 95% of total pensions assets in the United States between state and locally administered retirement plans. The data is broken down by each individual retirement plan, state, and fiscal years between 2001-2015.

Since I wish to analyze only state-administered retirement system funded ratios, I excised locally administered systems (county, city, and school district retirement systems) and the several retirement systems run by the District of Columbia. Next, I pulled various state political variables from the University of Kentucky Center for Poverty Research's National Welfare dataset, created binary dummy variables to represent partisan control of state governorships, state houses, state senates, and whether the state government was divided or not, and matched all of this data with the corresponding retirement system, state, and fiscal year to be my political variables to represent partisan political control and act as my primary explanatory variables. I had to excise the one retirement system contained in the PPD for the state of Nebraska, since it has a unicameral legislature and is typically excluded from studies involving state politics. I also pulled and matched data for states' total nominal revenue, revenue growth, and state population to the corresponding retirement system, state, and fiscal year from the U.S. Census Bureau via the State & Local Government Finance Data Query System, hosted by the Tax Policy Center. Overall, my dataset, primarily built around the PPD, and also including numerous variables from two other datasets, contains data for 114 state-administered retirement systems across 49 states from the years 2001-2015, for a total of 1,710 observations.

Model

This study uses a fixed-effects regression analysis of four different regressions to test the hypotheses previously mentioned in the problem statement section. A fixed-effects regression is best for a panel dataset because the panel data has multiple observations for each retirement system, which allows it to capture several variations over the time period measured for each state-administered retirement system caused by unobservable or unique characteristics that are fixed or unchanging. In essence, a fixed-effects regression does not measure the total deviations between the retirement system observations; instead it measures the deviations of each observation from the retirement system average. This average is then able to capture a lot of the unobservable and unique characteristics of the state-administered retirement systems.

On the other hand, a study structured around a statistical regression analysis must be aware of the potential problem of endogeneity. Thus, it would be prudent to build a check into this study that combats the potential for endogeneity that might permeate the results. In light of this, the fixed-effects regression analysis used in this study consists of four different models, one that is a standard fixed-effects regression, while the other three explore the effects of lags on the variables in 1 year, 3 year, and 5 year increments, respectively. A lag model will use a time lagged value of the explanatory variables using older values instead of the current values. In essence, if a *past* value of the explanatory variables is significant, it will accurately reflect if it is causing the dependent funded ratio, rather than the other way around. Besides being a robustness check for endogeneity, the three lag models are beneficial to explore the idea that it is the past political situation in the state, as much as the current political

climate, which determines the current state of pension funding for state-administered retirement systems.

After putting together, cleaning, and formatting my dataset, I used the statistical software package, STATA, to run my models. My hypotheses are arranged to evaluate the impact of partisan political control of state government institutions on the funded ratio of state-administered retirement systems. Essentially, each model is set up with the funded ratio as the dependent variable, and various explanatory variables, with the political variables being the primary explanatory variables. The fixed-effects regression equation follows:

$$\begin{aligned}
 \text{Funded Ratio } i,t = & \alpha_i + \beta_1 * \text{Divided Government } 1 \ i,t-n + \beta_2 * \text{Democratic} \\
 & \text{Governor } 2 \ i,t-n + \beta_3 * \text{Democratic State House } 3 \ i,t-n + \beta_4 * \text{Democratic State} \\
 & \text{Senate } 4 \ i,t-n + \beta_5 * \text{Democratic State House \% } 5 \ i,t-n + \beta_6 * \text{Democratic State} \\
 & \text{Senate \% } 6 \ i,t-n + \beta_7 * \text{Total State Revenue } 7 \ i,t-n + \beta_8 * \text{State Revenue Growth } 8 \ i,t- \\
 & n + \beta_9 * \text{Actuarial Assets } 9 \ i,t-n + \beta_{10} * \text{Unfunded Liability } 10 \ i,t-n + \beta_{11} * \text{ARC } 11 \ i,t-n \\
 & + \beta_{12} * \text{Percent of ARC Paid } 12 \ i,t-n + \beta_{13} * \text{1-year Investment Return } 13 \ i,t-n + \\
 & \beta_{14} * \text{Asset \% in Equities } 14 \ i,t-n + \beta_{15} * \text{Asset \% in Bonds } 15 \ i,t-n + \beta_{16} * \text{Total} \\
 & \text{Retirement System Membership } 16 \ i,t-n + \varepsilon_{i,t-n}
 \end{aligned}$$

In the equation, n is an indicator for the four-different fixed-effects regressions that comprise this analysis, thus each model has a different n to represent the number of lag years used. Model A is the standard fixed-effects regression that does not contain any lag and comprises the full dataset from 2001-2015. Model B is a fixed-effects regression that has a 1-year lag on all the explanatory variables containing data from 2002-2015. Next, Model C has a 3-year lag on the explanatory variables used for the fixed-effects regression, meaning that the data put into this regression runs from 2004-2015. Finally, Model D is executed with a 5-year lag on the explanatory variables, running data from 2007-2015.

Variables

The dependent variable for this study is the funded ratio of the state-administered retirement systems. The current literature clearly states that the fiscal health of retirement systems is best described by the funded ratio. Table 1 displays essential information regarding the six partisan political control variables whose impact on the funded ratio are the focus of this paper; thus, they are termed the primary explanatory variables. The table describes how they are defined for the purpose of this study's analysis, their unit of measurement, and their predicted relationship to the funded ratio. Four of the primary explanatory variables are binary "dummy" variables that are designed to display information compiled from multiple individual variables, while the other two have percentages, expressed as a number between zero and one, as their unit of measurement.

Table 1. Primary Explanatory Variables

Variable	Definition	Unit of Measurement	Hypothesized Relationship to Ratio
Divided Government	Whether the state government institutions are all controlled by one party or there is divided government	0 = Non-Divided Government 1 = Divided Government	Negative
Democratic Governor	Whether the Governor of a state is a Republican or Democrat	0 = Republican Governor 1 = Democratic Governor	Positive
Democratic State House	Whether the State House of a state is controlled by	0 = Republican Controlled State House	Positive

	Republicans or Democrats	1 = Democratic Controlled State House	
Democratic State Senate	Whether the State Senate of a state is controlled by Republicans or Democrats	0 = Republican Controlled State Senate 1 = Democratic Controlled State Senate	Positive
Democratic State House %	Proportion of State House members that is Democrat	0-1	Positive
Democratic State Senate %	Proportion of State Senate members that is a Democrat	0-1	Positive

Divided government articulates if the state government in question is operating as a divided government or a non-divided government. Political scientists define a government as divided if one political party controls the state executive branch, while the opposing political party controls one or both houses of the state legislative branch. On the other hand, if one party controls the governorship and both houses of the state legislature, some term this as a trifecta government. There has been a long debate in the political science community regarding whether divided government leads to more or less gridlock, thus this study should determine how divided government and its gridlock potential affects the funded ratio. I hypothesize that divided state government will have a negative impact on the funded ratio. Democratic Governor, Democratic State House, and Democratic State Senate articulates the political party in the control of these three state government institutions. An observation for any of these three variables coded as a zero represents Republican control, while a code of one represents Democratic control. For the sake of the legislative houses, partisan control

is determined by which party has the majority. I hypothesize that state government institutions controlled by Democrats have a positive effect on the funded ratio.

Democratic State House % and Democratic State Senate % articulates the proportion of seats in each house of the legislative branch that is controlled by Democrats, expressed as a number between zero and one, with numbers closer to one meaning Democrats hold more seats. I hypothesize that the percentage of seats in both houses of the state legislatures held by Democrats will have a positive effect on the funded ratio.

Table 2 displays critical information about the secondary explanatory variables that control for various factors related to state governments and state run public pensions plans. These ten variables were selected as secondary explanatory variables because retirement systems literature has shown that these variables have various effects on the funded ratio. This is especially true of the various retirement system and actuary variables that are well known to have impacts on the funded ratio. These variables help support the key study objective of a clear evaluation of the effects of the six partisan political control variables on the funded ratio.

Table 2. Secondary Explanatory Variables

Variable	Definition	Unit of Measurement	Hypothesized Relationship to Ratio
Total State Revenue	Total nominal state revenue by year	Millions of dollars	Negative
State Revenue Growth	Revenue growth percentage from previous year	0-1	Positive

Actuarial Assets	Actuarial determined amount of assets	Millions of dollars	Positive
Unfunded Liability	Actuarial accrued liability minus actuarial assets. AKA the funding gap.	Millions of dollars	Negative
ARC	Employer's Annual Required Contribution to cover current and unfunded liabilities	Millions of dollars	Positive
% of ARC Paid	Percentage of ARC that employer paid	0-1	Positive
1-year Investment Return	1 year Investment Return Percentage	0-1	Negative
Asset % in Equities	Percentage of assets invested in equities	0-1	Positive
Asset % in Bonds	Percentage of assets invested in bonds	0-1	Positive
Total Retirement System Membership	Total number of people enrolled in the retirement system	Thousands of people	Negative

Analysis and Results

Summary Statistics

Table 3 below illustrates the basic summary statistics of all the variables that were used in the regression models, as constructed in the prior section. It can be clearly seen that there is large data variation between state-administered retirement systems in most of the non-binary variables. This is especially highlighted while looking at the entries for Total State Revenue, State Revenue Growth, Actuarial Assets, Unfunded Liability, ARC, and Total Retirement System Membership. These large

variations for the two revenue variables can be explained by the differences in revenue capacity of very populous states, states with limited population, states with tax codes advantageous for revenue generation versus states with highly inefficient tax codes, and individual state specific characteristics. The pension variables display the relative difference between some small state-run retirement systems, that will of course have fewer enrolled members and assets, as compared to large state-administered retirement systems that will often have a large number of enrolled members, a large asset base, and more often than not a high amount of liabilities due to the many enrolled members. It is also important to note that the two revenue variables have a lower amount of observations than all the other variables used in this study's model simply from the fact that revenue data for 2015 (the last observation year in the panel dataset) has not been published for the vast majority of states.

Table 3. Summary Statistics

Variable	Observations	Mean	Std. Deviation	Min	Max
Funded Ratio	1,678	0.818	0.196	0.191	1.974
Divided Government#	1,710	0.460	0.499	0	1
Democratic Governor#	1,710	0.481	0.500	0	1
Democratic State House#	1,710	0.532	0.499	0	1
Democratic State Senate#	1,710	0.458	0.498	0	1
Democratic State House %	1,710	0.516	0.146	0.13	0.92
Democratic State Senate %	1,710	0.498	0.160	0.11	0.96
Total State Revenue*	1,596	42.0	48.1	0.825	353.0

State Revenue Growth	1,596	0.081	0.302	-0.90	4.645
Actuarial Assets*	1,679	20.5	31.6	0.648	301.0
Unfunded Liability*	1,678	4.7	8.9	-17.7	93.5
ARC	1,696	570646.4	896761.4	0	7988037
% of ARC Paid	1,694	0.938	0.549	0	17.277
1-year Investment Return	1,696	0.064	0.111	-0.296	0.288
Asset % in Equities	1,710	0.527	0.132	0	0.997
Asset % in Bonds	1,710	0.274	0.10	0	1
Total Retirement System Membership	1,681	202215	254431	6789	1871845

#These are Binary Dummy Variables

*These numbers are reported in millions

Regression Results

Table 4 displays the regression results of all four models. There are some very unexpected relationships among the six variables representing partisan political control of state government institutions and the funded ratio of state-administered retirement systems. In Model A, of the six variables that this study is focusing on regarding partisan control, only three are statistically significant at the 0.01 level. On the other hand, one of the political control variables also has statistical significance, but it is at the 0.1 level, which is not at the accepted level of significance for policy studies. Overall, of the six partisan political control variables, only three have a statistically significant impact on the funded ratio in Model A.

Table 4. Fixed Effects Regression Results

Dependent Variable = Funded Ratio	Model A – No Lag	Model B – 1 Year Lag	Model C – 3 Year Lag	Model D – 5 Year Lag
VARIABLES	Coefficients	Coefficients	Coefficients	Coefficients

	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)
Divided Government#	0.0183*** (0.00543)	0.0119** (0.00507)	0.00635 (0.00492)	0.00908* (0.00516)
Democratic Governor#	-0.00550 (0.00587)	-0.00179 (0.00549)	-0.00479 (0.00529)	0.00123 (0.00545)
Democratic State House#	-0.0334*** (0.0102)	-0.0341*** (0.00950)	-0.0186** (0.00896)	-0.0170* (0.00911)
Democratic State Senate#	-0.0151 (0.0102)	-0.00512 (0.00995)	-0.0122 (0.00899)	-0.0171* (0.00950)
Democratic State House %	-0.110* (0.0615)	-0.0285 (0.0577)	-0.0799 (0.0569)	-0.0761 (0.0617)
Democratic State Senate %	0.281*** (0.0531)	0.162*** (0.0501)	-0.0216 (0.0502)	-0.0827 (0.0560)
Total State Revenue	-8.81e-10*** (1.92e-10)	-9.02e-10*** (1.85e-10)	-9.94e-10*** (1.77e-10)	-1.50e-09*** (1.89e-10)
State Revenue Growth	0.0185** (0.00840)	0.0148* (0.00785)	0.0168** (0.00706)	0.0399*** (0.00698)
Actuarial Assets	7.40e-09*** (5.91e-10)	4.28e-09*** (5.93e-10)	4.15e-11 (6.58e-10)	-3.17e-09*** (8.19e-10)
Unfunded Liability	-9.24e-09*** (6.95e-10)	-8.16e-09*** (7.48e-10)	-5.30e-09*** (8.15e-10)	-6.06e-09*** (9.86e-10)
ARC	-1.21e-08 (7.97e-09)	1.41e-08 (1.03e-08)	1.94e-08* (1.07e-08)	3.03e-08*** (1.16e-08)
% of ARC Paid	0.0196*** (0.00438)	0.0163*** (0.00406)	0.0140*** (0.00364)	0.0122*** (0.00327)
1-year Investment Return	-0.104*** (0.0239)	-0.0106 (0.0222)	0.0405** (0.0202)	-0.0778*** (0.0196)
Asset % in Equities	0.211*** (0.0249)	0.201*** (0.0232)	0.126*** (0.0236)	0.0294 (0.0263)
Asset % in Bonds	0.175*** (0.0351)	0.140*** (0.0329)	0.0786** (0.0318)	0.0814** (0.0319)
Total Retirement System Membership	-7.72e-07*** (1.26e-07)	-5.49e-07*** (1.18e-07)	-3.25e-07** (1.28e-07)	1.06e-07 (1.53e-07)
Constant	0.673*** (0.0391)	0.680*** (0.0372)	0.859*** (0.0385)	0.915*** (0.0433)
N	1,576	1,553	1,325	1,097
Groups	114	114	114	114
R-squared	0.443	0.356	0.262	0.291

Significance: ***p<0.01, ** p<0.05, *p<0.1
#These are Binary Dummy Variables

The regression output for Model A shows that divided government has a positive and statistically significant relationship to the funded ratio of state-

administered retirement systems. In essence, the effect of having a divided state government between Democrats and Republicans is a 0.018 increase on the funded ratio of state-run retirement systems. This is a very unexpected relationship and runs against my prediction that a divided state government would have a negative effect on the funded ratio. Based on these unexpected results, it seems that divided state government causes both political parties to moderate some of their more radical views about retirement system policy and proposals to just meet the ARC to keep up with pension obligations. Another possibility is perhaps retirement policy is not viewed as a strictly hot button partisan issue like environmental policy because there is a sense of obligation to state employees because funding pension obligations is an administrative function of the state.

No statistically significant relationship exists between the state having a Democratic governor and the funded ratio in any of the models. The effect of having a Democratic governor instead of a Republican governor has no impact. This means that, overall, political control of the governorship between the two political parties has no significant effect on the funded ratio of state-administered retirement system. This is a result that was not expected and refutes my hypothesis that governorships controlled by Democrats would have a positive impact on the funded ratio.

In Model A, a Democratic controlled state house has a negative and statistically significant relationship to the funded ratio of state-run retirement systems at the .01 level. The relationship is that having a Democratic controlled state house versus a Republican controlled state house is a 0.033 reduction in the funded ratio. This negative relationship is contrary to my prediction. In fact, my initial hypothesis was that

Democratic control in state houses would have a positive impact on the funded ratio. Although my model cannot explain why a certain relationship exists, one potential explanation for this negative relationship is that a large amount of state houses that were controlled by the Democrats for a majority of the dataset's 15-year time period, were also in Democratic hands during the 2008 financial crisis, and its immediate aftermath, which led to the beginning of the current pension crisis. Another potential explanation is that time matters in this case because it takes changes to state-administered retirement systems a long time to accumulate.

Another relationship that is not statistically significant is between a Democratic controlled state senate and the funded ratio in three of the four models. In Model D, this relationship is significant at the 0.1 level, but for the other three models the effect of having a Democratic state senate instead of a Republican controlled state senate has no impact. This means that, overall, political control of the state senate between the two political parties has no significant effect on the funded ratio of state-administered retirement system. This is a result that was not expected and refutes my hypothesis that state senates controlled by Democrats would have a positive relationship with the funded ratio.

Additionally, in Model A, the percentage of Democratic held seats in the state house has a negative effect on the funded ratio. However, this relationship is statistically significant at the 0.1 level, which is not the typical p-value standard for statistical significance in the public policy field. However, if one were to interpret the relationship, the impact is that the more seats in each state house that are held by Democrats yields a 0.110 decline in the funded ratio. This would disprove the

hypothesis that the proportion of state house members that are Democrats would have a positive impact on the funded ratio of state-run retirement systems. Another unexpected portion of this relationship is that it is not statistically significant at the 0.01 level.

Model A also shows that the percentage of seats in the state senates that are held by Democrats has a positive effect on the funded ratio. The relationship between these two is statistically significant at 0.01 level. In essence, the connection is that the more seats in state senates that are under Democratic control, it provides a 0.28 boost to the funded ratio of state-administered retirement systems. This positive relationship would confirm the hypothesis that the proportion of state senate seats that are held by Democrats has a positive effect on the funded ratio. Overall, of the six partisan political control variables, my standard model, Model A, had five unexpected results that disputed my original predictions, and one confirmed hypothesis.

Model B, which had a 1-year lag on every explanatory variable as a robustness check for endogeneity, to be sure that no reverse causation from the funded ratio was occurring, has most of the same results as Model A that was just discussed.

Democratic Governor and Democratic controlled state senates are still not significant in their connection to the funded ratio. Democratic State House % changes from being statistically significant at the 0.1 level to having no significance in its relationship to the funded ratio. On the other hand, Democratic controlled state houses and Democratic State Senate % still remains statistically significant, at the 0.01 level, in their relationship with the funded ratio. Finally, Divided Government remains statistically significant and has a positive effect on the funded ratio, just at the 0.05 level, instead of

the 0.01 level it was at in Model A.

The 3-year lag that is included on the explanatory variables in Model C, paring the data run through the regression to 2004-2015, has some very unexpected outcomes. Only one of the six partisan political control variables, Democratic control of state houses, remains statistically significant in its relationship to the funded ratio of state-administered retirement systems. This relationship is at the 0.05 level, which is a slight step down from the previous 0.01 level found in Models A & B. All the other five political control variables have no statistical significance on the funded ratio in Model C.

In Model D, which contained a 5-year lag on the explanatory variables, some of the political variables return to the state of significance that they were at in Models A & B. Divided Government has a positive, statistically significant relationship to the funded ratio at the 0.1 level. Democratic control of the state houses remains significant in all four models, but in Model D is only significant at the 0.1 level. The percentage of seats held by Democrats in both state houses and state senates no longer have any significant connection to the funded ratio. However, Democratic control of state senates has a statistically significant relationship to the funded ratio for the first time in Model D. The relationship is a negative one at the 0.1 level.

Additionally, Table 4 also displays the significance of the ten secondary explanatory variables for all four models. In Model A, nine of the ten secondary explanatory variables have some type of statistically significant relationship with the funded ratio, and of those nine, all of them had the expected impact on the funded ratio. Eight of those nine have significance at the 0.01 level, and include total state

revenue, actuarial assets, unfunded liability, percentage of the ARC paid, 1-year investment returns, percentage of assets in equities and bonds, and the total retirement system membership. On the other hand, state revenue growth has a significant relationship to the funded ratio at the 0.05 level. While some of the relationships for these control variables change due to the lag models, a special note should be made regarding the behavior of the ARC in my statistical analysis. The literature points out that the ARC should have a positive, statistically significant relationship at the 0.01 level to the funded ratio. The ARC in the standard, no lag model, Model A, actually does the exact opposite: it has a negative, statistically insignificant impact on the funded ratio. In Models B and C, with the shorter time lags, the ARC has a positive relationship to the funded ratio, but is still not significant. Only in Model D, which contains a 5-year time lag, does the ARC finally behave as the literature reports it should. This study cannot offer an explanation for this unexpected behavior found in the ARC in the no lag model. Besides the unusual behavior of the ARC until the 5-year lag was introduced, all these relationships between the secondary explanatory variables and the funded ratio have happened previously in the literature and were expected. The model shows results that were expected from variables that are already known to have effects on the funded ratio of retirement systems.

Limitations of Study

Following from the full regression analysis in the prior section, it is prudent to note the study's limitations. The primary limitation of this study stems from the inability to accurately model the more in-depth characteristics of partisan policy agendas,

mandates, priorities, and the specific policy proposals of the two major political parties for the time period of the panel dataset used in the analysis due to this type of data only existing in some forms for particular locales. Until this data becomes more widespread, this more nuanced political information will be difficult to fit into these types of studies.

In addition, it is important to point out that each political party is unique in each of these varied characteristics in all the individual states. When combining these factors, it becomes clear that individual policy proposals on a state-by-state basis due to partisan control of the governorships, the legislative houses, or whether the states governments are united or in a divided government induced stalemate, lead to a data limitation that is difficult to model in a comprehensive manner, especially over a 15-year time frame. This, ultimately, leads to variation that is not observed by the panel dataset and that cannot be explained by the regression analysis conducted. It would be helpful if these varied, in-depth characteristics could be modeled by more nuanced political data for use in a statistical fashion, but as some of the characteristics described are qualitative in nature, one of the primary ways to overcome this limitation is to expand this study to incorporate a qualitative analysis. Specifically, future studies could further investigate the extent of the partisan split in the state legislative houses, more in-depth analysis of lags with political control, and the difference in individual state party ideology via the Squire Index.

There are also two secondary limitations inherent to the design of the study itself. The first limitation is related to the uniqueness of individual retirement systems and the data collected in the PPD. All public retirement systems have characteristics

that are unique to each individual system. These characteristics lead to a limitation that is contained in the PPD data. In essence, the PPD does not include all these characteristics that are unique, thus these are unobserved factors that cannot be measured by the dataset. Although the fixed-effects regression is designed to pick up on these sorts of characteristics, it can only do this to the extent that the characteristics in question are stable features of each system over the time period of the panel. In turn, some of the variance experienced between each individual retirement system cannot be explained via any statistical method, especially if they are unstable features of the systems. The second limitation descends from the fact, that as mentioned prior, this study only concerns itself with state administered retirement systems. With this in mind, the results from this study cannot be generalized and are not applicable to locally administered retirement systems, due to differing characteristics between the retirement systems of two different administrative and government levels.

Recommendations & Conclusions

Following the analysis and evaluation of the four models constructed to study any potential relationship between partisan political control of state government institutions and the funded ratio of state-administered retirement systems, recommendations can be made for lawmakers, citizens, public sector employees, and voters. Although five out of the six expected outcomes for the partisan political variables were refuted, and only one confirmed, in regards to the positive or negative nature of the impact on the funded ratio, an impact was shown. This study does

confirm that political control between the Republicans and Democrats of the state executive branch and the two houses of the state legislatures does affect the funded ratio.

According to the results of the models deployed, divided state government has a positive impact on the funded ratio of retirement systems. Taking that into account, I recommend that both political parties pursue rational, evidence-based approaches to retirement system policy to ensure that funding for pension obligations is at acceptable levels on a continual basis. In essence, great attention to pension policy should be given no matter what political party is in control, but it is doubly important when operating in divided government. In addition, it would also be vitally important to study and learn from the particular states that have achieved better policy outcomes under divided government, especially in regards to retirement system policy. This could lead to the dissemination of the specific compromises and practices that were used to improve funding of state-administered retirement systems. It appears, according to the regression analysis, that the best structure for divided government is a state senate with a large proportion of seats held by Democrats, a Republican controlled state house, and a governor from either party that would hopefully all work together to either fix, maintain, or improve the fiscal health of state-administered retirement systems by keeping on top of the funding needed to meet all current and future obligations.

Considering this study as a whole, it becomes clear that politics does have an effect on state pension plans across this country. While a divided state government having a positive effect on the funding ratio was unexpected, it is up to each individual state lawmaker to decide if they want to aid in solving the pension crisis through

cooperation with the other political party. This study suggests that when working in a bipartisan manner, the two parties will do a better job of funding state-run retirement systems, even though it is not at the top of their policy priority list. States will have to solve their pension problems on their own, and it appears that when it comes to politics, no one side has all the answers. Both sides of the aisle will have to come together and put sound pension policy and cooperation to use in a hope to end the ongoing pension crisis.

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