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The Causes and Consequences of the Rising Costs of Public Employee Pensions

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Abstract

This paper posits a political economy explanation for why the public sector has remained on the deferred compensation defined benefit (DB) model of pension provision while the private sector has transitioned to defined contribution (DC) plans. Budgeting for deferred compensation in the public sector is generally done on the basis of targeting the mean of a distribution of outcomes of investments in the pension fund's risky assets. The budget is viewed as balanced under the assumption that the mean is attained. I document that the loading on the stock market of public pension fund assets has increased very dramatically over the past several decades. The mean outcome on which the budget is based therefore is increasingly less reflective of the wide distribution of outcomes that might obtain, and the "expected return" is often an outcome that is substantially less likely than 50% to be realized. Using CalPERS and CalSTRS as examples, I show that the growth in unfunded liabilities since 2000 has been due to a combination of benefit increases, insufficient funding, and poor investment returns. Pension contributions across many US cities have increased substantially since 2000, although nationally benefit payments are exceeding contributions by increasingly wider margins. Cities that are contributing more are reducing some public safety coverage, particularly fire forces.

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When an employer offers a traditional, defined benefit (DB) pension to its employees, it enters into a contract to provide deferred compensation to the employees, with such compensation due upon the employee's retirement. The economic cost of that compensation is the present value of the newly accrued liabilities in any given year. This so-called service cost equals the difference between the present value of the pension the employee was entitled to based on his situation at the beginning of the year and the present value of the pension he is entitled to at the end of the year. If the employer does not contribute this service cost to a pension fund from which the benefits will be paid, the employer incurs a debt to the employee that would have to be recognized in any economically accurate accounting of the employer's financial situation.

The private sector in the US has experienced a gradual shift away from the DB model towards a defined contribution (DC) model, in which retirement benefits are provided via access to an account into which both the employee and the employer can make pre-tax contributions. As long as the employer makes no guarantees about the returns on the assets, retirement benefits provided through a DC plan do not generate any liabilities for the employer.

The public sector, on the other hand, remains largely on the DB model. This is particularly the case for state and local governments, as shown in Table 1. As of 2012, 83% of state and local government employees had access to a DB plan, with 78% participation. This compares to access and participation rates of 19% and 17% respectively for private sector workers as a whole, and 14% and 12% for non-unionized private sector workers. Around 70% of state and local government employees are enrolled in Social Security, with the remaining 30% in state and local government systems that do not offer Social Security.

At the federal level, most federal civilian employees hired in 1984 participate in the Federal Employees Retirement System (FERS), which has both a DB and a DC component and includes Social

Security. Federal employees hired before that are part of the Civil Service Retirement System (CSRS), unless they chose to switch during "open seasons" in 1987 and 1988 (Isaacs (2013)). The CSRS is a pure DB system, whose employees are not enrolled in Social Security.

This paper considers a political economy explanation or why the public sector has remained on the deferred compensation DB model while the private sector has transitioned to DC plans, as well as some of the consequences of this disparity. State and local governments are essentially self-regulating as far as funding is concerned. This stands in contrast to private sector pension systems, which are regulated by the ERISA law of 1974 and Congressional legislation in the decades following it. As a consequence, the funding position of state and local government pensions is on the whole much worse than that of the corporate pension system in the US.

The hypothesis is therefore that state and local governments have used their ability to defer the recognition of pension liabilities as a form of off-balance sheet borrowing. Instead of paying public employees more in current compensation, they paid them in deferred compensation without having to raise taxes to fund that deferred compensation today. If the assets in pension funds performed well enough, then current contributions would be sufficient for funding. If not, then future generations of taxpayers pay the costs.

Government budgeting for DB pensions is generally done on the basis of expected return assumptions. The budget is viewed as balanced under the assumption that an expected return on a portfolio of risky assets is achieved. I document that the loading on the stock market of public pension fund assets has increased very dramatically over the past several decades, and that the loading on alternative assets has increased as bond yields has fallen in recent years. The greater the risk that systems take on, the less likely it is that the expected return will be realized. The mean outcome on which the budget is based therefore is increasingly less reflective of the wide distribution of outcomes

that might obtain. Note that under standard assumptions about financial markets, the "expected return" is often an outcome that is substantially less likely than 50% to be realized.

The paper proceeds as follows. In Section 1, I discuss state balanced budget requirements and how state and local governments can run imbalanced budgets with pension promises and risk-taking. Section 2 examines the historical record of pension liabilities and funding in California going back to 1980 to shed light on this mechanism and how the large unfunded liabilities arose. Section 3 presents results on contribution increases and the crowd-out of public services at the city level. Section 4 considers the political economy of pension reform. Section 5 concludes.

1. Balanced Budget Requirements and Deferred Compensation

In the early years of the history of the United States, the federal government had absorbed state debts run up during the Revolutionary War and the war of 1812. But after the financial Panic of 1837, the Federal Government declined to step in and absorb state debts, thereby establishing a precedent that it would not bail out states. Eight states (including PA and MD, not MA and NY) and the territory of Florida defaulted on their debts.

Nineteen states subsequently implemented balanced budget requirements during 1842-1860. Presumably these states realized that without federal backing, their ability to borrow even small amounts of money for an emergency, or to invest in capital projects or even bridge a gap between when suppliers need to be paid and when tax revenues come in would be severely limited. Unless, that is, they promised the public that they would adhere to some standards of fiscal balance. This also established what the National Conference of State Legislatures (NCSL) has referred to a strong expectation and political culture for states to achieve balanced budgets.

In budgetary processes today, most of the 50 U.S. state constitutions limit extent to which governments can run deficits (NASBO (2008)). In 44 states, the governor must submit balanced budget. In 37 states, the legislature must enact balanced budget. In 30 of these states, deficit carryforwards are prohibited. Poterba (1995) points out that in many states these rules only apply to specific parts of the budget. In 48 of the 50 states the balanced budget rule applies to the general fund or operating budget, but in only 34 states does it apply to special funds. In only 33 states does the balanced budget rule apply to capital spending funds, and in some cases (such as Illinois) the proceeds from authorized debt issuances count towards treating the budget as balanced.

Some recent polls point to a view by policy economists that these balanced budget rules have not been sufficient to keep state finances more or less in balance. In September 2012, the Initiative for Global Markets (IGM) forum at the University of Chicago asked its economic policy experts whether they agreed with the following statement: "During the next two decades some US states, unless they substantially increase taxes, cut spending, and/or change public-sector pensions, will require a combination of severe austerity budgets, a federal bailout, and/or default." 92% either agreed or strongly agreed. 5% were uncertain. 3% had no opinion.

The fact that the finances of many states have deteriorated so dramatically despite the balanced budget rules suggests that this state of affairs is due to promises for future spending that have not been recognized in the budgetary process. When those deferred promises eventually have to be paid, taxpayers in the generation that pays them would essentially have pay twice: once for the services consumed by the previous generations of taxpayers, and once for the current compensation portion of the services that they are consuming today.

There is a range of treatment of deferred pension promises in state budgetary processes. As discussed in Shnitser (2012), some states have apparently no legally binding requirements. For example,

New Jersey skipped the funding of most state plans in 2010-2011. Other states have statutes that specify funding requirements for their systems. For example, Illinois statute specifies the number of years over which unfunded liabilities must be reduced to a given level. California statute stipulates the funding rates for the California State Teachers Retirement System (CalSTRS) as a percentage of teacher pay.

The most rigorous provisions are found in the constitutions of the 13 states that direct systems to be funded according to generally accepted actuarial standards or on an "actuarially sound" basis (Shnitser (2012)). Such a directive, however, relies on governmental accounting procedures that understate the value of a guaranteed pension promise (Novy-Marx and Rauh (2009), Novy-Marx and Rauh (2011)). In essence, these states require that pension systems contribute the Actuarially Required Contribution (ARC). Historically, the ARC has based on Governmental Accounting Standards Board (GASB) rules under which the cost of all newly accrued liabilities as well as the amortized paydown of legacy liabilities are measured using an expected return on assets. That is, the ARC is based on the assumption that the targeted return on the portfolio of risky assets in the pension fund will be achieved. The average expected return assumption for large pension systems in the US in 2012 was around 7.8% per year.

GASB rules do provide that pension systems that fall behind relative to that expected return have to include catch-up contributions (the "amortization of the unfunded liability") in the ARC. However, these catch-up contributions are subject to the same return assumptions, as well as allowances for the smoothing of pension plan assets, so that losses may only gradually be recognized. It should also be noted that sometimes state governments have responded to skyrocketing ARCs by changing their statutes so that they do not have to contribute those ARCs. For example, in New York state, the 2011-2012 budget capped state's contribution rates at 9.5% for the Employee Retirement

System and 17.5% for the New York state system for police and fire officials, instead of "billed" rates of 11.9% and 18.2%. The law then mandated that state contribution rates could only increase by one percentage point per year, with shortfalls amortized over 10 years (McMahon and Barro (2010)).

The standard of actuarial soundness is considerably less rigorous what financial economics would view as a totally funded obligation. The traditional GASB rules encourage states that follow actuarial standards for their funding practices to consider pension promises fully funded assuming that the "expected return" on pension fund assets is met. The portfolio of risky assets exposes the pension system to a distribution of outcomes. If a state funds according to traditional GASB rules, it will be fully funded only if the mean of this distribution of outcomes is achieved. The entire rest of the distribution is ignored.

The exact nature of this distribution depends on the underlying stochastic process that determines investment returns. Table 2 shows key points in this distribution under a standard Black-Scholes-Merton model with lognormally distributed returns. The model is calibrated assuming a time horizon of T = 30 years, $\sigma = 0.17$, a market risk premium over the risk-free rate of 5.5%, a risk-free rate (R_f) of 0%, and an annual targeted return of 8% per year. To target an annual 8% arithmetic mean return requires a portfolio beta, or market loading of $\beta = (\ln(1+E[R]) - R_f)/\ln(1+MRP) = 1.4$.

Several key observations emerge from this model. First, an 8% compound annualized return over 30 years under an investment strategy that targets a simple annual arithmetic mean return of 8% occurs only with around 25% probability. This is because lognormal returns have positive skewness. Second, the actual average compound annualized return over 30 years is considerably less than the annual 8% arithmetic mean that the system targets. As the returns on risky assets are compounded over longer and longer periods of time, the mean compound annualized return declines from the annual arithmetic return to the median return over states of the world (see McCulloch (2003) for an

illustration). So if CIOs of public pension systems are targeting annual arithmetic returns of, say, 7.75%, the risk that they have to take on to do that makes the average compound annualized return much lower than that.

In essence, therefore, systems that follow traditional GASB standards for funding purposes are treating their budgets as balanced under the assumption that the future outcomes will be among the top 25% of all future possible outcomes. That is, they are budgeting assuming an outcome that will only occur with 25% probability. This raises the question from a political economy standpoint of what type of budgeting actually should constitute a balanced budget when the state is exposed to a distribution of possible future outcomes.

A strict definition would say that the budget is only balanced if the state has enough money in every state of the world to pay the pensions, which it could achieve if it bought deferred annuities for each employee as the employee earned pension rights.[1] A more lax definition might allow the state to consider its budget balanced if the funds in the pension plan were sufficient to pay pensions without further cash injections under a reasonably large percentage of possible future outcomes. The extent to which taxpayers might be interested in allowing the state to borrow to take investment risk on their behalf would also be informed by how much of the upside would likely be split between taxpayers and public pension beneficiaries. Given the likelihood that public pension beneficiaries would receive some of that upside, and the idea that one purpose of government is to smooth utility for individuals over good and bad times, it could be argued that the targeted point in the distribution should be substantially below the median.

There are some empirical predictions if governments are responding to the incentive not to recognize the financial costs of pension benefits. Specifically as yields on safe securities decline, the

[1] This is in essence the nature of a plan proposed in a recent Congressional Act, The Secure Annuities for Employees (SAFE) Retirement Act of 2013.

discount rate chosen by US public sector plans should remain constant, but risk-taking should increase. Figure 1 shows the 10-year Treasury yield and the average assumed rate of return for the 10 largest public pension systems in the US, which have a total of $1 trillion in assets and covering 8.3 million participants. While the 10-year Treasury yield fell very substantially from 2001 to 2012, the average assumed rate of return declined only very slightly from a little over 8% to a little under 8%.

Figure 2 shows average asset allocation in these 10 plans. It shows that while the share of cash and fixed income remained roughly flat, about 15% of the portfolios have been shifted from public equities to alternative assets such as private equity, real estate, and hedge funds. Andonov, Bauer, and Cremers (2012) also provide evidence that in the past several decades, US public pension funds have uniquely increased allocations to riskier investments to maintain high discount rates, in contrast to US private sector funds, and non-US pension funds. Andonov et al (2012) are using a more refined definition of risky assets, which includes high-yield bonds and mortgages. They therefore are able to illustrate the deterioration in quality of the fixed income portfolio.

In some recognition of these issues, GASB has recently enacted some pension accounting reforms that would have plans calculate the share of liabilities covered by existing pension assets using the expected returns. To the extent that some liabilities are expected to be not covered even if those expected returns are achieved, those liabilities will have to be discounted at a high-grade municipal bond yield, which is much closer to a risk-free rate. The benefits that are “expected” to be covered by existing assets assuming those assets earn the expected return on assets continue to be discounted at the expected return on assets. There is no basis in financial theory for such an approach. Indeed, liabilities that are uncovered by existing assets would be expected to be riskier and less likely to be paid than those that are covered, and if anything should perhaps be discounted at a *higher* discount rate, if the intent were to reflect the possible ability of the states to default in part on those liabilities.

Figure 3 shows that the loading of public pension fund assets in the US on the stock market has risen dramatically over the past 45 years. The data for this figure are from the US Census Bureau Quarterly Survey of Public Pensions, which tracks a panel of 100 retirement systems comprising 89.4 percent of "financial activity" among public sector retirement systems.[2] At each quarterly data point this figure shows the relationship between the percent change in US public pension assets for these 100 plans over the preceding 4 quarters and the total return on the S&P 500 including dividends over the preceding 4 quarters. The beta line (author's calculation) then shows the loading of the quarterly asset evolution on the S&P 500 over the 10 years preceding the datapoint. Note that the changes in total US public pension assets are inclusive of contributions and benefit payments, which make these changes less sensitive to the stock market than a pure return on assets would be. Note also that the true betas have to be higher to justify current expected returns on assets. With a beta on pension fund assets of only 0.4 and an aggressive view of the market risk-premium of 8% above Treasury bills, the systems would only be able to target a 3.2% expected return on assets.[3]

Figure 4 also shows the increased extent to which public pension funds are relying on returns rather than contributions to pay benefits. The line in the figure shows the contributions of the 100 large retirement systems in the Census survey minus the benefits paid out, in billions of dollars. Since the mid-1990s, the amount of benefit payouts have been greater than the amount of contributions. By the second quarter of 2013, around $28 billion per quarter more was flowing out of public sector pension funds in benefits than flowing in through contributions.

2. Decomposing the Rising Cost: Evidence from California

[2] http://www.census.gov/govs/qpr/ . The census also provides the following note: "From 1969-1973, the panel contained the 100 largest systems by total holdings. From 1974-1976, the panel increased to the 111 largest systems. From 1977-1979, the panel decreased to the 106 largest systems. From 1980-1982, the panel decreased to the 105 largest systems. From 1983-1984, the panel decreased to the 102 largest systems. From 1985-1994, the panel increased to the 104 largest systems. From 1995-1999, no data about the panel are available. From 2000-present, the panel contains the 100 largest systems."

[3] Assuming a 0% yield on Treasury bills, the expected return would be 0% + 0.4*8% = 3.2%.

In this section I consider the evidence from California's two primary pension systems, the California Public Employee Retirement System (CalPERS) and the California State Teachers Retirement System (CalSTRS), with around 1.6 million and 870,000 respectively. We collected information from the Comprehensive Annual Financial Reports and the Actuarial Valuations for these two systems going back at least to 1980.

Figure 3a shows the total liability of CalPERS in real 2012 dollars under three different discounting assumptions: the expected return on assets chosen by CalPERS in the given year, the Treasury rate at the approximate duration of pension liabilities (15 years), and a 15-year municipal rate. For an exact calculation one would re-discount the entire stream of benefit cash flows each year using the points on the yield curve corresponding to the timing of each specific cash flow (Novy-Marx and Rauh (2011)). The calculations performed here are approximations based on the duration of the liability, which is estimated to be around 15 years (Novy-Marx and Rauh (2011)).

Specifically, the calculation implemented to derive the liability at Treasury rates is

$$L_{Treasury} = L_{Expected\ Return}\left(\frac{1+E[R]}{1+r_{Treas,T}}\right)^{T}$$

where $L_{Treasury}$ is the liability recomputed using the Treasury rate, $L_{Expected\ Return}$ is the liability stated in the system's reports using the expected return, $E[R]$ is the expected return on assets used by the system, T is the duration of the pension liabilities, and $r_{Treas,T}$ is the point on the Treasury yield curve at horizon T. Similarly,

$$L_{Muni} = L_{Expected\ Return}\left(\frac{1+E[R]}{1+r_{Muni,T}}\right)^{T}$$

where L_{Muni} is the liability recomputed using the Treasury rate, $L_{Expected\ Return}$ is the liability stated in the system's reports using the expected return, *E[R]* is the expected return on assets used by the system, *T* is the duration of the pension liabilities, and $r_{Muni,T}$ is the point on the Treasury yield curve at horizon *T*.

Treasury rates were obtained from segment H.15 of the of the Federal Reserve's statistical releases. To obtain an approximate 15-year rate, we performed a linear interpolation between the 10 year and the 20 year rate. To obtain an approximate 15-year municipal rate, we used the Bond Buyer 20-Bond index of 20 general obligation bonds that mature in 20 years. The average rating on these bonds is close to Standard & Poor's Corp's AA or Moody's Investors Service's Aa2. We then subtract half of the spread between the 10-year and 20-year Treasury to obtain an approximate 15-year municipal yield. Specifically:

$$Muni15 = Muni20 - \left(\frac{Treas20 - Treas10}{2}\right)$$

The solid line in the Figure 4a represents the total actuarial liability by CalPERS own calculations. Since 1980, the expected rates of return used by CalPERS have been rather stable in the range of 7.5% (the lowest and current value) to 8.75% (the highest value in 1991-1993). As of the early 1990s, the expected rates of return were very close to yields on Treasury securities, and as of the mid 1990s, they were still close to the yields on tax-advantaged municipal securities. However, bond yields have decline steadily since then, and as a result the liabilities measured at the bond rates have risen much more than the liabilities measured at the expected rate of return. It has over the past two decades become much more expensive to provide fixed life annuities, due to the market factors that have driven down interest rates. Public accounting has not recognized that fact, but the true economic value of liabilities is now much higher than it would be if rates had stayed at their early 1990s levels. Figure 4b shows the same calculation for CalSTRS and reveals similar patterns.

Both graphs show an acceleration in the growth of actuarial liabilities as measured by the systems themselves (the solid line in the graph) starting around 2000. For CalPERS, much of this is attributable to the CalPERS-sponsored Senate Bill 400 in 1999 that gave all state workers a retroactive pension increase in 2000 (Mendel (2013a)). CalSTRS also implemented large benefit increases in 2000 in order to be "equitable with CalPERS" (Mendel (2013b)). The lines that show the liabilities measured at the bond rates show how falling bond yields exacerbated the problem by substantially raising the costs of providing these expanded benefits. As a result, measured at Treasury rates, the total liability for CalPERS stands at a level that is about 3 times its level 20 years ago, and the total liability for CalSTRS stands at a level that is around 4 times as large.

Figures 5a and 5b show analogous calculations for unfunded liabilities, that is, for liabilities net of plan assets, again with everything expressed in real 2012 dollars. Here we see a similar picture. In the year 2000, CalPERS and CalSTRS were both according to the actuarial definition that uses expected rates of return essentially fully funded. But then there were large benefit increases, declines in asset values, and declines in interest rates, leaving CalPERS over $400 billion underfunded and CalSTRS over $300 billion underfunded as of the latest years for which actuarial valuation data are available (2010 for CalPERS and 2012 for CalSTRS).

CalPERS and CalSTRS actuarial liability also increased dramatically on a per-member basis. Much of the increase has happened since 2000, particularly when seen as a fraction of the number of active members. For example, in 2000, the CalSTRS actuarial liability was around $300,000 per active member in 2012 dollars. By 2012 it was around $500,000 per active member.

Figure 6 shows that in both CalPERS and CalSTRS, the ratio of active employees to total members has plummeted from around 65-70% in 1980 to below 50% today. CalPERS has seen a decline of around 10 percentage points in the ratio of active to total members since 2000, and CalSTRS of

around 14 percentage points, from 63% to 49%. The reduced rate of contributions from employees flowing into these systems has exacerbated the funding problem, requiring increasing government contributions per employee. Figures 7a and 7b demonstrate that rising salaries are not primarily responsible for the increase in either total or unfunded liabilities. While nominal salaries have increased, real salaries in 2012 dollars have not grown that substantially.

Table 3 examines actual benefit payouts, instead of the total present value of expected future payouts. It shows that since 1980, the dollar value of nominal retirement benefits has risen by 22.5 times for CalPERS and 18.7 times for CalSTRS, or 8.1 times and 6.7 times respectively in real terms (that is in 2012 dollars). A large portion of this stems from the increases in the number of retirees – real benefits per retiree are in 2012 dollars around 2 times what they were in 1980.

In sum, the California systems have seen very large increases in total liabilities particularly since 2000 when substantial benefit increases were granted to both CalPERS and CalSTRS participants. Since that time, asset returns underperformed the targeted levels and bond yields fell making the provision of fixed income benefits more expensive. Furthermore, the number of retirees rose relative to the number of active employees which reduces the positive impact of the annual resources the systems receive from active employees.

3. Contribution Increases and Crowd-Out for Cities

In this section I examine the increase in contributions by cities into their pension funds and whether that has correlated with any observable changes to public services. Figure 9 shows city contributions per capita (that is, per city resident) in the 20 largest cities across the US for which data were obtainable. On average, contributions have tripled from $38 per capita in 2000 to $164 per capita in 2012. Total contributions in the 20 cities have risen from $48 per capita in 2000 to $242 per capita in 2012.

Figure 10 provides preliminary evidence on whether there is evidence of these contribution increases crowding out the provision of public safety services for the 12 cities where counts of police and fire officials were available over the 2000 to 2012 horizon. The y axis shows changes in the ratio of police and fire officials per capita, and the x axis shows the change in contributions to pension systems per capita. There is little evidence that police forces have declined per capita, but there is a positive relationship between fire officials per capita and contributions per capita. For every $100 increase in contributions per capita, there were approximately 30 more people covered by each fire official in 2012 as there were in 2000.

4. The Political Economy of Pension Reform

An important question in the political economy of public sector pensions is whether the pension rights can be altered. As detailed in Monahan (2012), some state courts have held that the statutes establishing state retirement systems created contracts between the employees and the states. Federal constitutions as well as the constitutions of many states prohibit the impairment of contractual obligations, so if the statutes are contracts then they limit changes in the pensions to those changes that do not violate the contract. The legal relationship between the state and its employees as far as pensions are concerned is then quite different from, say, the legal relationship between the US government and participants in the Social Security system, which is non-contractual and can be modified.

What particular changes in pensions would violate an employment contract? As explained in Monahan (2012), the jurisprudence surrounding federal contract law generally suggests that accrued benefits are protected and prospective changes are not. Yet courts in California and twelve other states that followed California's precedent have held that the contract is created on the first day of employment, and hence even contracts are protected. If that is the case then reform prospects that do

not break contracts would be limited to future employees. A contractual breach is in general not necessarily unconstitutional – a court can deem that it is valid if it is both for "an important public purpose" and if the action undertaken to advance this interest is "reasonable and necessary," although this is a high bar to clear.

A further question is whether the California Rule that protects prospective benefit accruals is constitutional under federal law. Monahan (2012) argues that the California Rule "improperly infringes on legislative power by holding that a legislative contract exists without ever evaluating whether there is clear and unambiguous evidence of legislative intent to form a contract." At least two other states that had previously followed the California Rule have examined whether there was such an intent and found that some aspect of future benefits were not protected: Oregon in a 1992 change in the state tax exemption for public employee pension benefits not earned by 1992, and Colorado in a 2011 ruling that COLAs were not protected and could be reduced. The Oregon case is particularly notable since the U.S. Supreme Court had found in previous cases that state law can create a contract when that law has granted a specific state tax exemption.

Monahan (2012) also argues that the California rule creates economic inefficiency: "California courts have held that even though the state can terminate a worker, lower her salary, or reduce her other benefits, the state cannot decrease the worker's rate of pension accrual as long as she is employed." So even if an employee would prefer lower pension accrual to, say, termination, this so-called California Rule would prohibit that trade-off.

Actual pension reforms have tilted towards changes that will not run afoul of lawsuits for breach of contract. The simplest and most widespread reform has been to increase contributions. Since these changes do not impair benefits already accrued, they generally occur without legal opposition. Other states, such as Rhode Island and New Jersey, have reduced Cost of Living Adjustments, which in the

private sector would have been covered as an accrued benefit under ERISA, but in the public sector have a more tenuous legal standing.

5. Conclusion

In this paper I have considered the political economy of deferred compensation in the public sector. The accounting regime for pension promises in the public sector allows state and local governments to run budgets that are only balanced if the mean of a distribution of expected outcomes is achieved. If returns on financial assets are positively skewed, these mean outcomes can be substantially above the median. That is, they will be met with less than 50% likelihood.

In the case of California, benefit increases were given exactly when the market was at its peak in 1999. Assets then fell in value, interest rates fell making it more expensive to provide fixed payment streams, and retirees became a larger share of membership. The analysis of cities in this paper suggests that when funding falls short, contributions eventually have to rise, and that this might well crowd out the provision of public services such as fire safety.

In recent years, many cities and states have indeed begun contributing more to their pension systems. This is because some government entities have enough rules in place so that funding must increase when underfunding becomes large enough. For example, in systems that must contribute the Actuarially Required Contribution (ARC), contributions must increase unless legislation is enacted to work around those rules, as happened in New York State. Other government entities, such as Chicago, have not yet made substantial increases to pension contributions despite a deterioration in the funding ratio. As with any self-regulating system, there is a range of governance quality and hence a range of the extent to which the different entities regulate themselves to protect the interests of unrepresented constituents such as future taxpayers.

One conclusion that emerges from this analysis is that it requires very good public governance for states to responsibly run defined benefit pension programs under the existing self-regulating regime. It is quite possible that public employees would have a greater preference for deferred compensation than private sector employees, even if such compensation were properly measured and accounted for. But in offering deferred compensation, governments face the severe temptation of promising fixed income benefits and hoping that those benefits will be funded with strong investment returns. Most state and local governments have been unable to resist.

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Table 1: Access and Participation in Different Types of Retirement Plans

	Private Sector			State or Local Government Employee
	Non-Unionized	Unionized	All	
1. Social Security	100%	100%	100%	70%
2. Occupational DB				
Access	14%	69%	19%	**83%**
Participation	12%	66%	17%	**78%**
3. Occupational DC				
Access	60%	57%	59%	31%
Participation	41%	45%	41%	15%

Sources:
(1) Government Accountability Office GAO-08-983T
(2)-(3) National Compensation Survey Benefits (2012)
http://www.bls.gov/ncs/ebs/benefits/2012/ownership/private/table02a.htm

Table 2: Distribution of Outcomes under Simple Monte Carlo with 8% Arithmetic Mean Return Target

The table shows points in the distribution for a simulation of a typical Black-Scholes-Merton model with T = 30 years, σ = 0.17, a Market Risk Premium of 5.5%, and a risk-free rate (R_f) of 0%. To target an 8% arithmetic mean return requires a portfolio β = (ln(1+E[R]) − R_f)/ln(1+MRP) = 1.4.

	Annualized Return	Cumulative Multiple
1st	-5.52%	-0.8x
10th	-1.01%	-0.3x
25th	1.71%	1.7x
Median	4.82%	5.1x
75th	8.03%	10.1x
90th	10.99%	22.9x
99th	16.30%	92.7x
Geometric Mean Return	4.93%	4.2x
8% occurs at	74^{th}-75^{th} percentile	

Table 3: Growth in Benefits in CalPERS and CalSTRS

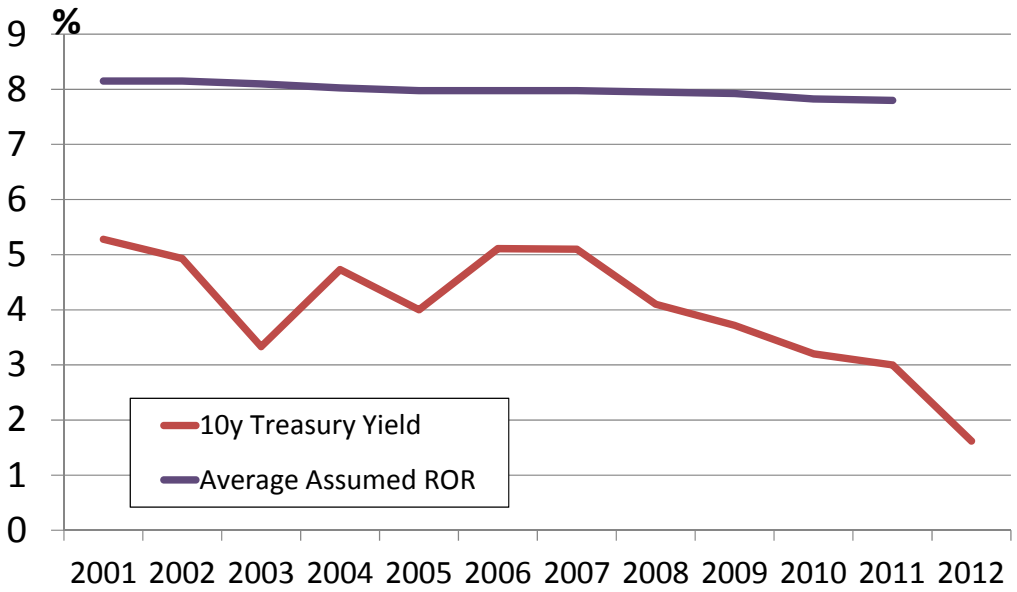
Panel A: CalPERS

	Total Benefits,	Growth in Benefits from Year to 2012			
	$ Millions	Nominal	Real	Real per Active	Real per Inactive
1970					
1980	682	22.5x	8.1x	5.0x	2.0x
1990	2,248	6.8x	3.9x	2.9x	1.4x
2000	5,317	2.9x	2.2x	2.0x	1.3x
2012	15,357				

Panel B: CalSTRS

	Total Benefits,	Growth in Benefits from Year to 2012			
	$ Millions	Nominal	Real	Real per Active	Real per Inactive/Retired
1970	157	66.7x	11.3x	6.8x	2.4x
1980	558	18.7x	6.7x	4.2x	1.9x
1990	1,482	7.1x	4.0x	2.8x	1.5x
2000	3,515	3.0x	2.2x	2.2x	1.2x
2012	10,450				

Figure 1: 10-Year Treasury Yield and Average Assumed Rate of Return for the Ten Largest Public Pension Systems in the US



10 largest pension systems by membership are CalPERS, Texas Teachers, Florida Retirement System, New York State Common, CalSTRS, Pennsylvania School Employees, Ohio PERS, Arizona SRS, Virginia RS, and New Jersey PERS. They cover 8.3 million participants and have over $1.00 trillion in assets (as of 30 Sep 2011).

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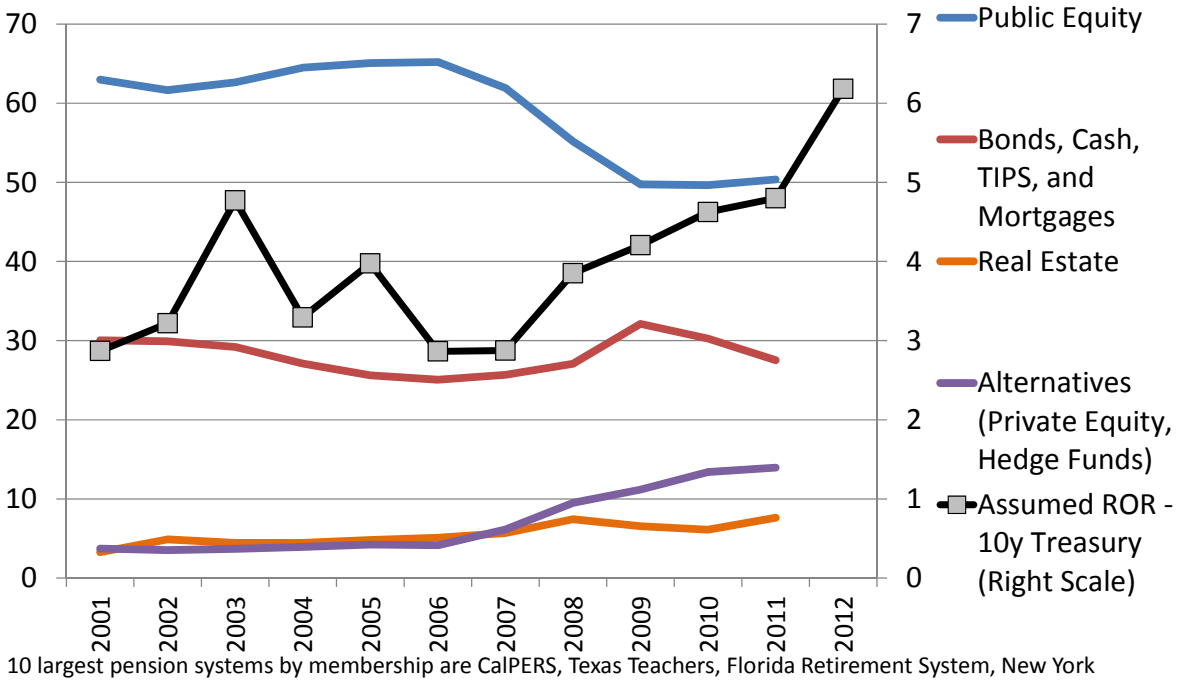
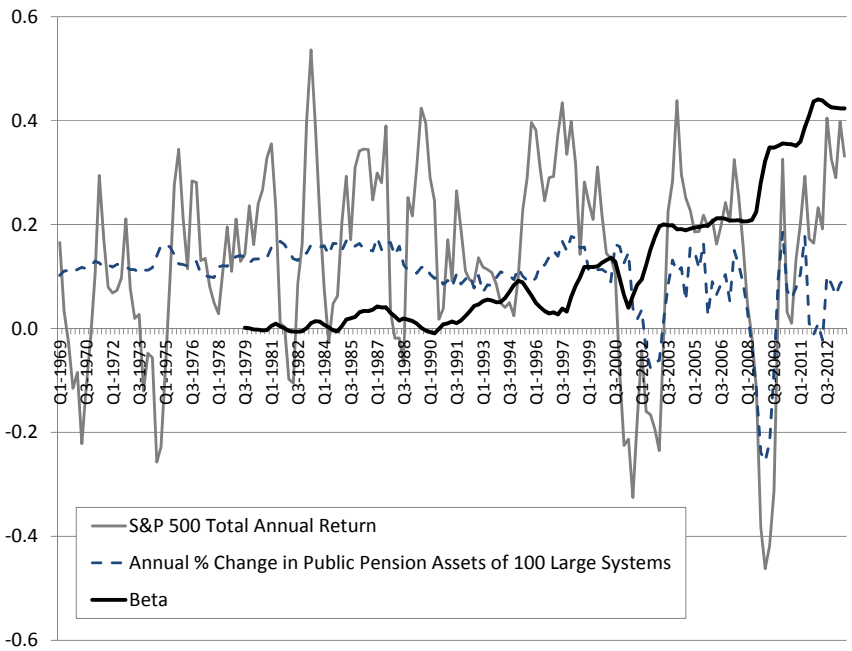
Figure 2: Asset Allocation for the Ten Largest Public Pension Systems in the US and the Gap between the Assumed Rate of Return and the 10-Year Treasury Yield



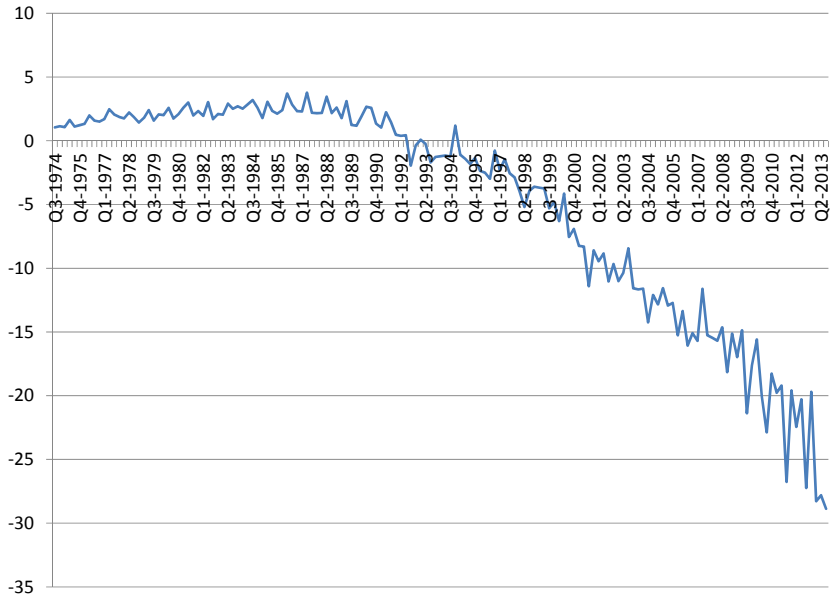
10 largest pension systems by membership are CalPERS, Texas Teachers, Florida Retirement System, New York State Common, CalSTRS, Pennsylvania School Employees, Ohio PERS, Arizona SRS, Virginia RS, and New Jersey PERS. They cover 8.3 million participants and have over $1.00 trillion in assets (as of 30 Sep 2011).

Figure 3: The Correlation Between the Growth in Public Pension Fund Assets and the Return on the Stock Market Has Increased



Source: US Census Bureau Quarterly Survey of Public Pensions and author's calculations. At each quarterly data point this figure shows the relationship between the percent change in total US public pension assets over the preceding 4 quarters and the total return on the S&P 500 including dividends over the preceding 4 quarters. The beta line (author's calculation) then shows the loading of the quarterly asset evolution on the S&P 500 over the 10 years preceding the datapoint.

Figure 4: Net Contributions (Contributions - Benefits) for 100 Large Retirement Systems, $ billions



Source: US Census Bureau Quarterly Survey of Public Pensions, author's calculations.

Figure 5a: CalPERS Total Liability, 2012 $

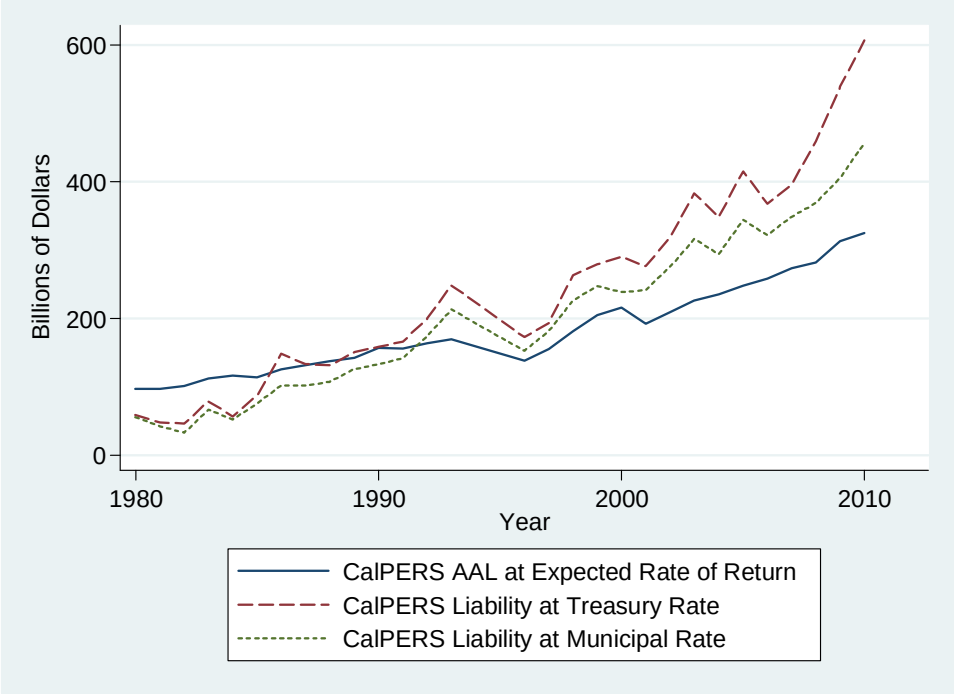


Figure 5b: CalSTRS Total Liability

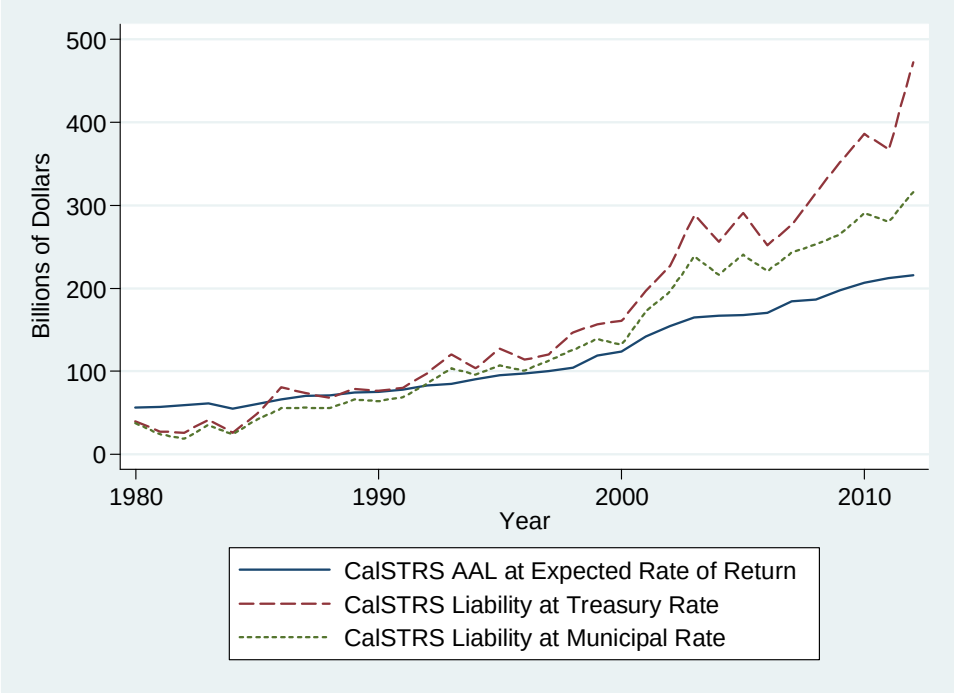


Figure 6a: CalPERS Unfunded Liability, 2012 $

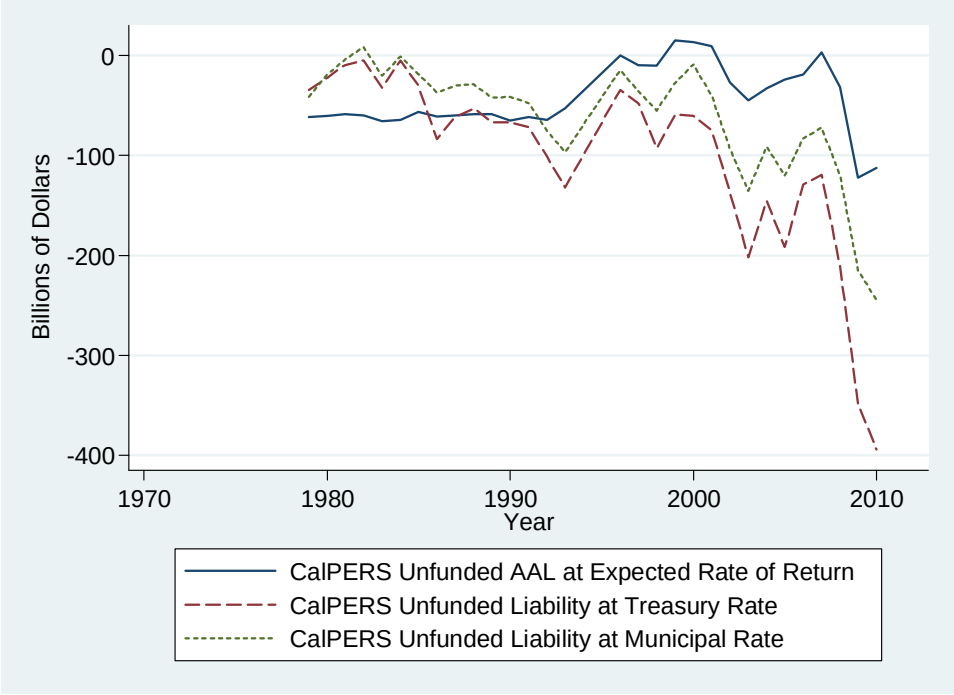


Figure 6b: CalSTRS Unfunded Liability, 2012 $

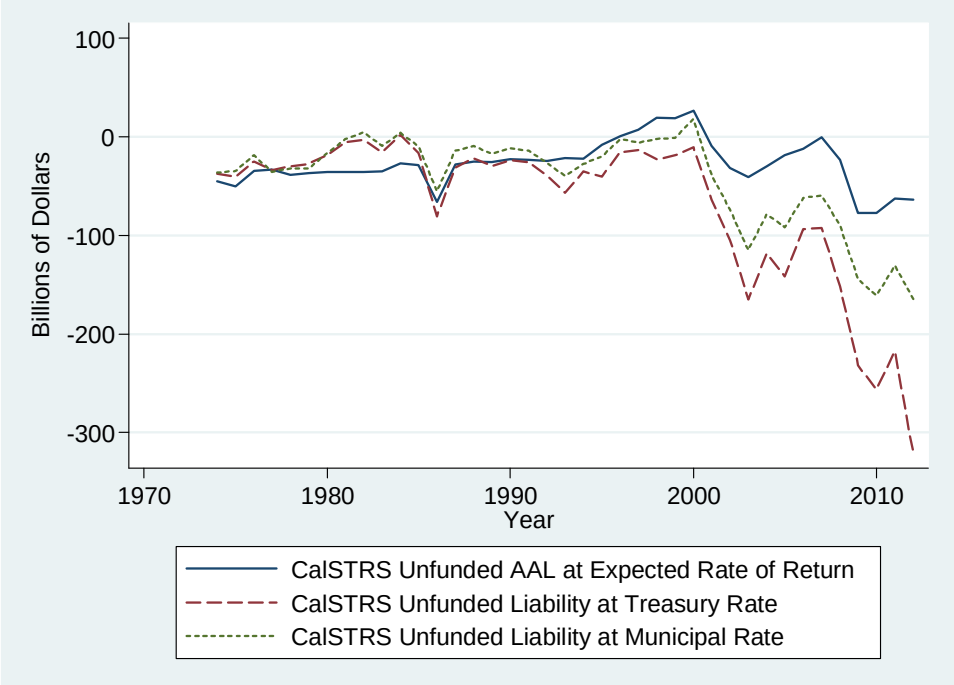


Figure 7: CalPERS and CalSTRS Ratio of Active to Total

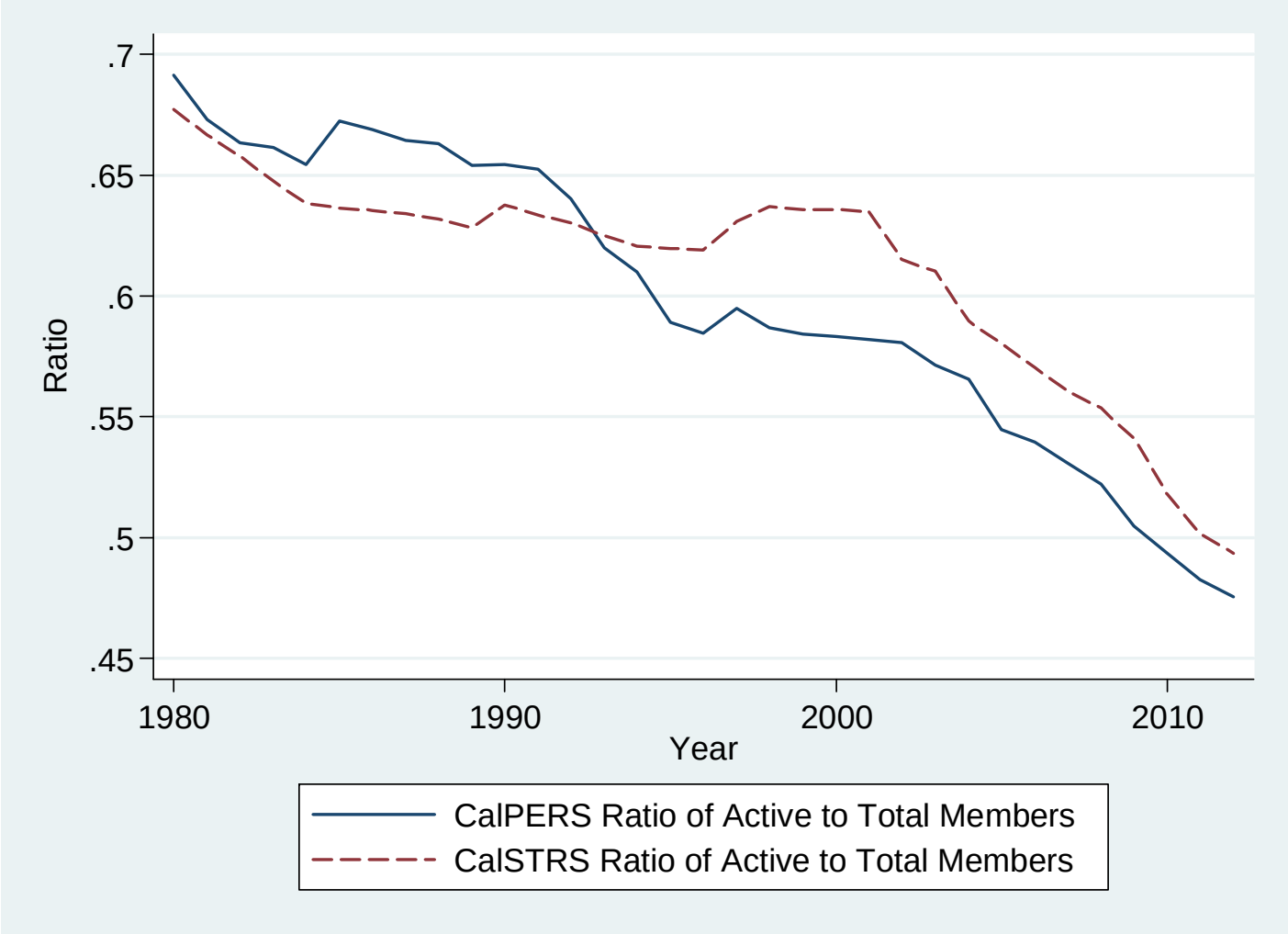


Figure 8a: CalPERS and CalSTRS Average Salary

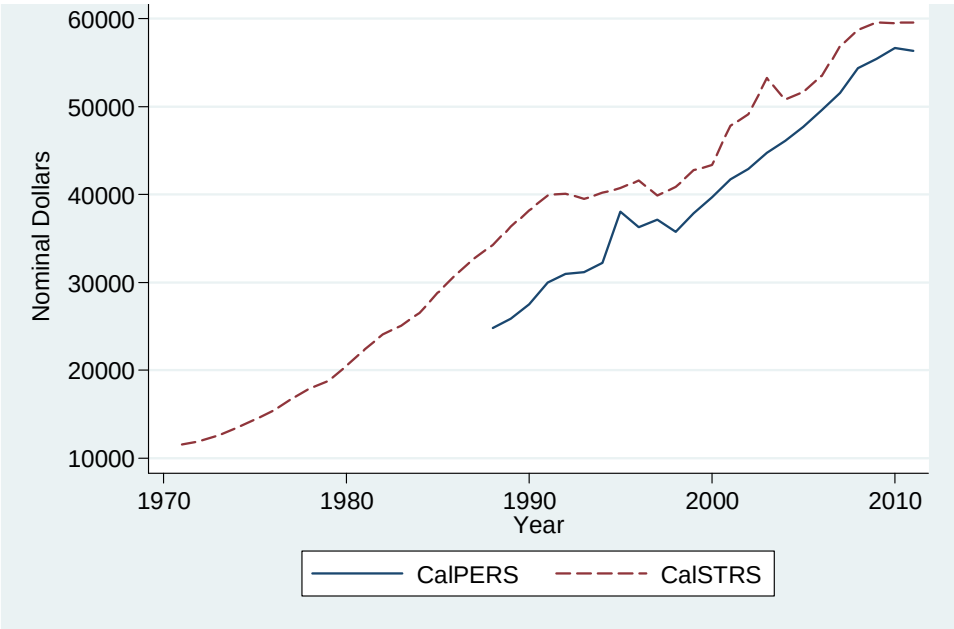


Figure 8b: CalPERS and CalSTRS Average Salary, 2012 $

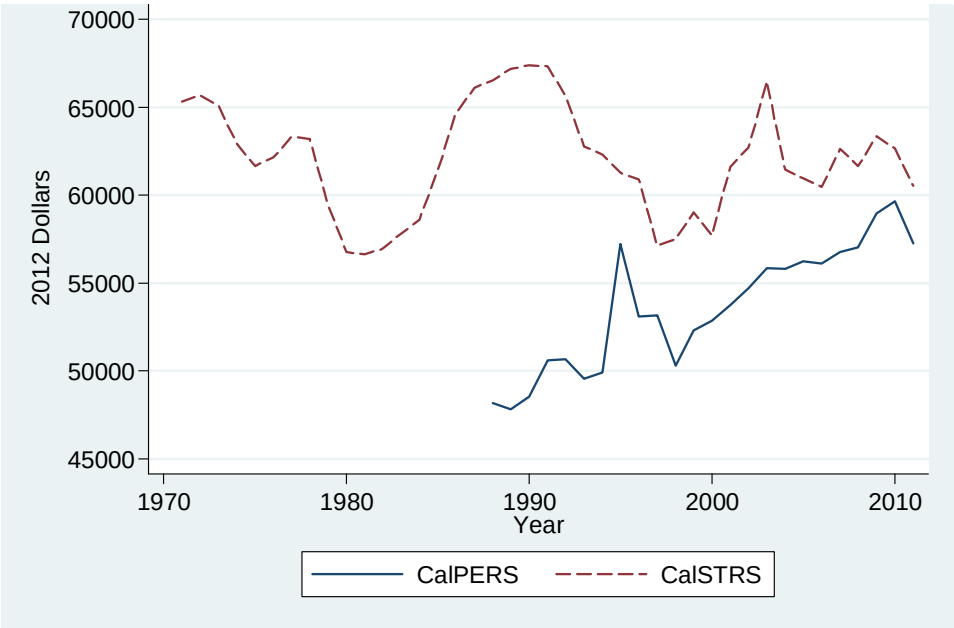
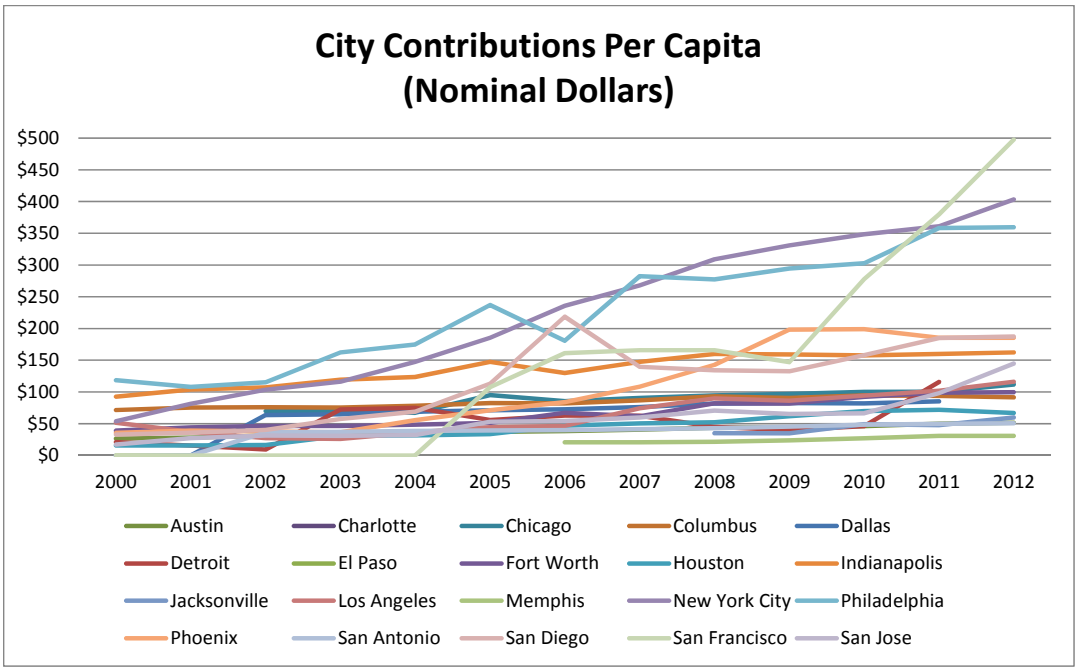


Figure 9: City Pension Contributions Per Capita (2000-2012)



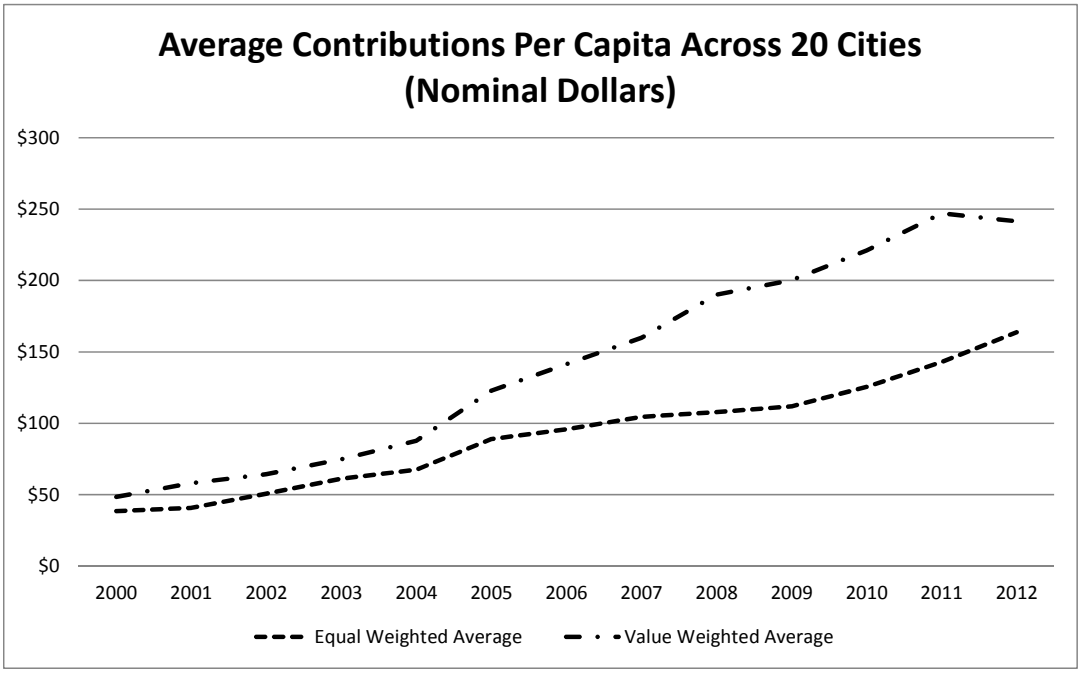


Figure 10: Changes in Police and Fire Officals per Capita and Pension Contributions

The y axis shows changes in the ratio of police and fire officials per capita, and the x axis shows the changein contributions to pension systems per capita.