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ACCOUNTING FOR THE COST OF A PUBLIC SECTOR WORKER IN NEW JERSEY

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I. Introduction

Cities across the United States are grappling with the growing cost of public employee salaries and benefits. The portion of budgets needed to pay out benefits to retirees is growing rapidly. Anaheim, California, currently spends 22 percent of its budget on pensions, a cost that is expected to increase by 50 percent in four years.[1] The unfunded pension liabilities of Cook County, Illinois, are $25 billion, or about one-quarter of the county's debt. Costs for pension and health-care related benefits are quickly consuming larger shares of the budgets of New York City, San Francisco, Boston, New Haven, Connecticut, and Philadelphia.[2] The city of Central Falls, Rhode Island, has declared bankruptcy over the cost of its local pension plans. Rhode Island reports that 23 of its 36 locally-administered pension plans are "at risk" due to the low funding ratios or declining contributions.[3]

Much of the debate over the growing size of pensions relative to budgets has focused on whether public sector compensation costs are fair either in comparison to other municipalities or to the private sector. But this fairness debate, while important, obscures a more technical and far more fundamental question: why does the bill for public employee benefits appear to be a surprise to governments, beneficiaries, and taxpayers? This paper finds two primary reasons. First, the costs are not fully reported, but instead reflect accounting and actuarial assumptions that systematically underestimate the size of benefit liabilities. Second, the data are not always made easily available to the public. This information is important as the cost of long-term liabilities for pension and health benefits are matters that inform negotiations between public sector unions and state and local government officials. If the full costs are obscured by accounting conventions and actuarial techniques then policy makers, taxpayers and public employees are agreeing to policies without sufficient information about costs.

This study focuses on public sector benefits costs in the state of New Jersey. Along with several other states, New Jersey's pension system is badly underfunded and health care and other benefits for public sector workers (known as Other Post Employment Benefits, or OPEB) are entirely unfunded. One study

[1] Steven Malanga, "The Compensation Monster Devouring Cities," City Journal, Spring 2011, Vol.21, No. 2, http://www.city-journal.org/2011/21_3_public-workers.html.
[2] Robert Novy-Marx and Joshua Rauh, "The Crisis in Local Government Pensions in the United States," Kellogg School of Management at Northwestern University Working Paper, October 2010.
[3] State of Rhode Island Senate Fiscal Office Report, "Senate Municipal Pensions Study Commission Final Report," February 15, 2011, 9, http://www.rilin.state.ri.us/senatefinance/special_reports/municipal%20pension%20report.pdf.

estimates New Jersey may run out of assets to pay out pension obligations by 2019, necessitating an increased reliance on revenues.[4] In addition to being poorly funded, New Jersey's pension crisis affects not only the state's finances but the finances of its 566 municipal governments. In a state with high property taxes, this makes it all the more important to know how large these benefits are relative to the budgets of municipal governments. Two of New Jersey's five major pension systems—the Public Employees Retirement System (PERS) and the Police and Firefighters Retirement System (PFRS)—are operated and partially funded by the state. New Jersey's local governments also make annual required contributions to these plans to fund the retirement of public employees. The pressures building at the state level in PERS and PFRS are shared by local governments and are certain to strain the budgets of many of New Jersey's 566 municipalities.

In this study of New Jersey state and local employee compensation costs, the purpose is not to determine if public sector workers are paid too much or to establish criteria for governmental efficiency. The focus is solely on whether governments are accounting for personnel costs in a way that enables governments to make informed policy choices that ensure retirement security for public servants, and a service-tax mix that reflects the demands of voters.

The policy implications of the increasing costs of public sector employees' benefits are most keenly felt locally where vital services such as police and firefighters, safety services, road maintenance, and sanitation are delivered. By failing to fully account for and fund the cost of employee benefits, governments are increasingly faced with difficult budgetary choices.

2. Why Do Rising Costs Seem To Be a Surprise?

1) Data Reporting

Currently, both New Jersey state and local budget data and financial reports are of limited use to the public. A budget is a planning document that provides information on the expenses and revenues of a

[4] Rauh, Joshua D., Are State Public Pensions Sustainable? Why the Federal Government Should Worry About State Pension Liabilities (May 15, 2010). Available at SSRN: http://ssrn.com/abstract=1596679. Rauh estimates New Jersey will have to increase its annual contribution from $3.6 billion to $12.9 billion, representing about 14.1 percent of New Jersey's tax revenue.

government in a fiscal period. Budgets contain information on the annual costs associated with salary and benefits for active employees relative to revenues collected.

A financial statement provides information on special funds, assets, and liabilities. The financial statement reports on a government's long-term obligations and fiscal risks, including liabilities associated with pensions, OPEB, and debt.

As they are currently reported in New Jersey, neither local budgets nor financial statements provide the full picture of a municipality's costs and liabilities or the costs associated with public employees.

Due to a number of state pension policies that affect local accounting practice, municipal budgets report only a fraction of the cost of benefits associated with active employees. Retiree health-care benefits, also known as OPEB, are reported on a pay-as-you-go basis. The cost of OPEB earned each year by active employees (i.e., the normal cost) are not reported.

Furthermore, due to financial reporting practices, it is difficult for municipal residents to find how much their local government owes in unfunded accrued liabilities for either pensions or OPEB. Municipal financial statements—which are intended to provide information on the long term fiscal position of the municipality—are not always comprehensive. New Jersey does not require its municipal governments to comply with Generally Accepted Accounting Principles (GAAP), as established by GASB. This means that the liability for pension and health care benefits are not fully reported. In addition, financial statements are not always made available online.[5] In essence, local policy makers and voters are flying blind regarding important aspects of municipal government finance.

The goal of this paper is to calculate the cost of employee benefits for active employees as they are earned on a yearly basis, and determine what this represents as a portion of a municipal budget. This information should be included more prominently in fiscal reporting that is made available to the public online. Also of importance for both policy makers and the public is information regarding the long-term costs associated with employee benefits, in particular pension obligations, which are considered guaranteed payments, as binding as General Obligation debt. Thus, this paper also calculates benefits

[5] The authors had to submit Open Public Records Act (OPRA) requests to obtain municipal financial reports and in some cases budgets for the six individual New Jersey municipalities sampled. This information can easily be kept on the municipalities' websites to allow residents to examine the financial position of their local government. By contrast, the state of Rhode Island posts the annual financial reports for all 39 of the state's municipalities at the state's Department of Revenue. See http://www.muni-info.ri.gov/finances/municipal_audits_2010.php.

costs associated with current retirees—or the pension liability and health-care benefits associated with employees' past service.

Ideally, governments should pay for the full cost of employee benefits and the payment towards any accrued liability. This case study shows that fully accounting for these costs in the municipalities of Garfield and Englewood Cliffs would drastically increase the percentage of municipal budgets dedicated to personnel costs.

This paper begins with a brief overview of employee costs on a statewide basis. Then, this paper undertakes a study of two municipal budgets in New Jersey: Englewood Cliffs and Garfield. When fully accounted for, including both active and retired workers, personnel costs increase by 44 percent and 50 percent over what is reported in the budgets of Englewood Cliffs and Garfield, respectively.

2) Mismeasurement of Benefit Liabilities

The true size of New Jersey's pension liabilities are masked by several factors. These include a factor that is shared by all pension plans – namely the method used to discount pension liabilities which is guided by government accounting standards. Other practices such as pension holidays and adjustments to the timing of pension contributions are unique to New Jersey.

a. The Discount Rate

Underestimation of personnel costs arises from several sources, including national government accounting standards, state pension-funding policies, and local accounting convention.

First, Government Accounting Standards Board (GASB) statement No. 27 states that a pension liability may be discounted using the expected rate of return on pension assets.[6] GASB 25 is contrary to financial theory, which states that a liability should be valued using an interest rate that matches the risk (or safety) and timing of payment of the liability. This approach is called the Market Value of Liability (MVL).[7] Public sector pensions are government-guaranteed and should be discounted using a risk-free

[6] See Eileen Norcross and Andrew Biggs, "The Crisis in Public Sector Pension Plans: A Blueprint for Reform in New Jersey," (working paper, Mercatus Center at George Mason University, Arlington, VA, 2010), http://mercatus.org/pensions.

[7] See Joshua Rauh and Robert Novy-Marx, "The Liabilities and Risks of State-Sponsored Pension Plans," *Journal of Economic Perspectives*, Vol. 23 (4) 191-210, 2009; Jeremy Gold and Gordon Latter, "The Case for Marking Public Pension Plan Liabilities to Market," Pension Finance Institute Working Paper, August 11, 2008; Jeffrey Brown and

rate, such as the yield on 15-year Treasury bonds, currently 3.96 percent.[8] According to the CBO, the MVL (or fair-value) approach to valuing pension liabilities "can be thought of as what a private insurance company operating in a competitive market would charge to assume responsibility for those obligations."[9] The Congressional Budget Office (CBO) recently endorsed valuing public sector pensions using the market value approach since, "the discount rate reflects the fact that the cash flows associated with accrued liabilities are fixed and carry little risk; it is very unlikely that the liabilities will not be honored."[10] GASB 25 "essentially assumes that those returns are as certain as benefit payments, at least in the long run."[11] CBO notes that the market-valuation approach provides a more transparent measure of pension obligations since it views the returns on assets as uncertain and therefore not suitable for valuing a guaranteed benefit. Currently, all local and state governments follow GASB's guidance in discounting their pension plans. The result is that pension plans across the country are underestimating their liabilities. While states report unfunded pension liabilities of $660 billion, when using MVL, the unfunded liability is over $3 trillion.[12]

For the period examined, 1990-2009, the New Jersey Treasury has assumed different discount rates to value pension liabilities.[13] Before 1992, a discount rate of 7 percent was used. In 1992, the Pension Revaluation Act (PRA) (L. 1992 C.41) changed the discount rate assumption to 8.75 percent. The higher assumed rate of return reduced the size of the liability on paper and allowed localities to reduce their pension contributions in FY 1992 and FY 1993 by $1.5 billion. The legislation was intended to help balance the FY 1993 budget and pay for unfunded cost-of-living adjustments (COLA) adopted in the 1970s.[14] In 2004, the discount rate assumption was reduced to 8.25 percent. First, this paper presents

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David Wilcox, "Discounting State and Local Pension Liabilities," American Economic Review Papers and Proceedings, 99 no. 2 (2009): 538–42.

[8] The yield on 15-year Treasury bonds was 3.96 percent in June 2011.

[9] Congressional Budget Office, "The Underfunding of State and Local Pension Plans," Economic and Budget Issue Brief, CBO, May 2011, 4, http://www.cbo.gov/doc.cfm?index=12084.

[10] Ibid.

[11] Ibid.

[12] The Pew Center on the States, "The Widening Gap: The Great Recession's Impact on State Pension and RetireeHealth Care Costs," April 2011, p. 1.

[13] A discount rate is used to place a value today on a stream of future payments or receipts expected. When a high discount rate is used, the value today of that future stream is less, and thus less is invested today to achieve the promised payout, and conversely, a low rate increases the value of that future stream necessitating an increase in contributions. In the case of public pensions, current accounting standards imply that money invested today will earn an expected rate of return and there is no uncertainty about those returns.

[14] Tom Bryan, "The New Jersey Pension System," in Pensions in the Public Sector, eds. Olivia S. Mitchell and Edwin C. Hustead, University of Pennsylvania Press, Philadelphia, 2001, p. 337.

the cost of pension liabilities using the state's own assumptions. Then, this paper recalculates the pension liability to arrive at the market valuation of the liability using a risk-adjusted discount rate.

While New Jersey's total unfunded pension liability is reported as $52 billion, using a market valuation of both pension liabilities and pension assets,[15] the true unfunded pension liability is $187 billion. Adding OPEB unfunded liabilities raises the total unfunded liability to $254 billion. This equates to over $59,000 per household in New Jersey.[16]

b. Pension Holidays

Other pension accounting practices, unique to the state of New Jersey, have reduced the perceived cost of pension benefits to local governments. Over the years, various state policies have adjusted the timing of pension payments. These include the "pension holiday" in which the state government allowed municipal employers to defer or reduce contributions to the pension system. In years when the local governments have made at least partial payments, the state has frequently skipped its payment to balance the budget.

c. The COLA Phase-in

Another policy that appears to reduce the cost of pensions includes the COLA phase-in, which permits governments to pay a portion of the COLA benefit cost. These adjustments change the timing of the municipality's pension contributions and temporarily reduce the payments necessary to fund the pension obligation, pushing some of the cost into the future. While intended to grant relief to local governments and make payments manageable, such adjustments may create fiscal illusion and lead municipalities to increase spending in other areas in the short-term to only later be confronted with more difficult budget choices as these financing policies expire and pension contributions rise.

[15] The state of New Jersey uses the actuarial value of assets, rather than the market value of assets, when calculating the unpaid accrued liability. As further explained in Appendix 3, the "smoothing" algorithm used to calculate actuarial value of assets persistently overestimates pension assets, thus this paper uses market valuation of assets.

[16] Calculated using the 2010 Annual Reports of the Actuary for PERS, PFRS, TPAF, SPRS, JRS, and OPEB. Per household is calculated with 2010 U.S. Census data. The difference in the actuarial versus market value of assets is over $17 billion.

d. The Benefit Enhancement Fund (BEF)

In addition to changing the timing of the employers' pension contribution, the state government increased benefits for public employees in 2001. According to L. 2001, c.133 also known as n/55, pensions for the PERS and TPAF plans were increased by 9.09 percent increasing pension liabilities by $4.2 billion. The enhancement was granted to retirees, past service for current employees, and for future service for current employees. The state agreed to pay for the municipality's portion of the enhancement by creating the Benefit Enhancement Fund (BEF), which contains excess assets earned by the pension fund. When the assets contained in the BEF are insufficient, the state government covers the state and local government's funding costs.[17] While the local government does not pay for this enhancement, the effect is also to make pension benefits appear less expensive on the local level than they actually are. According to officials, without the BEF, "It is likely that either programs would have been reduced, tax cuts would not have occurred and/or taxes would have been increased potentially at both the State and the local level."[18] This underscores an important point. While the burden of the payment was shifted to the state the amount of the benefit provided to local employees remains unchanged. It is simply shared with the state taxpayer, while the true size of the bill is obscured to policy makers, unions, and the public. Legislation passed in 2010 eliminated the 9-percent benefit enhancement for new employees but the state must continue to pay the increase to current employees. This presents the risk that, if the state's funding policy for financing the benefit enhancement changes, those costs could be passed on to local governments.

e. Other Post Employment Benefits (OPEB) Reporting

In the case of health-care benefits, until 2007 state and local governments were not required to report the costs or calculate the size of the liability associated with retiree health benefits and other insurance

[17] The management of the BEF has raised some concerns that it has been used to artificially lower the state's contribution to the pension system. According to a report by the New Jersey League of Municipalities, "When the "years of service" (n) over age 55 (n/55) was approved by the Legislature in 2001, specific assets were earmarked to fully fund the benefit for PERS and TPAF…. The accrued liability associated with n/55 was fully funded at the time of adoption. The assets in the local accounting of PERS for n/55 are still held in the Benefit Enhancement Fund, but the assets allocated to fund the state's liability and TPAF have been reallocated as a method of lowering the state's contribution on a temporary basis while increasing the overall accrued liability to be funded at a future date." See L. Mason Neely, "The Local Take on the Governor's Benefit Review Task Force Recommendations," New Jersey Municipalities, March 2006, http://www.njslom.org/magart0306_pg32.html.

[18] State of New Jersey Benefits Review Task Force, "The Report of the Benefits Review Task Force to Acting Governor Richard J. Codey", December 1, 2005 p. 11. http://www.state.nj.us/benefitsreview/final_report.pdf.

benefits, known as OPEB. [19] The result is that many state and local health-care benefits systems, including New Jersey, operate on a pay-as-you-go-basis. With the new accounting guidance GASB 45 in effect, the state of New Jersey reports a total unfunded health-care liability of $66 billion.[20] The new guidance provided by GASB 45 on reporting OPEB requires greater transparency of the long-term cost of health benefits as those costs are accrued. GASB 45 will help officials project the level of resources needed to fund health benefits for current employees when they retire.

On the local level, OPEB costs are not clearly defined in budgets but are rolled into health insurance costs for current employees, making it difficult to determine the health insurance benefits associated with current employees versus retiree benefits. New Jersey's municipal governments are not required to use GAAP accounting, and thus need not follow GASB's guidance when preparing their annual financial reports. As a result, local financial reports do not necessarily report the cost of OPEB.

This paper offers a more complete picture of the cost of benefits for current employees, benefits costs for retirees, and the size of those benefits and liabilities relative to local budgets. Using data from several sources this paper presents a personnel costs breakdown with a view towards making these costs useful for policy makers and the public.

This paper begins with an overview of average personnel costs in the state of New Jersey and then present a budgetary analysis of Garfield and Englewood Cliffs, New Jersey, to calculate the full on-budget cost of personnel benefits. The paper then factors in the costs associated with accrued liabilities for both pensions and health benefits for these municipalities. The paper conclude with recommendations for reforms that enhance the accuracy and transparency of fiscal reporting.

3. State-wide View: Calculating the Full Cost of a Public Employee in New Jersey

How much do personnel costs represent as a percent of budgets they are earned by employees in a given fiscal year? In addition to salary, a New Jersey employee's compensation includes pension

[19] David Zion and Amit Varshney, "You Dropped a Bomb on Me, GASB: Uncovering $1.5 Trillion in Hidden OPEB Liabilities for State and Local Government," Credit Suisse, Americas/United States, Equity Research Accounting and Tax, March 2007, http://online.wsj.com/public/resources/documents/DroppedB.pdf.
[20] State of New Jersey Postemployment Benefits Other than Pension Actuarial Valuation, July 20, 2010, http://www.state.nj.us/treasury/pensions/pdf/financial/gasb-43-aug2010.pdf.

benefits, health care insurance, life insurance, and the employer's contribution to legally required federal programs including Social Security, Medicare, Unemployment Insurance, and Workers' Compensation Insurance and OPEB. On a state-wide basis, these data are collected from several sources to arrive at an annual total for average compensation.

Benefit costs are included in the state's Annual Report of the Actuary.[21] One weakness in the data is that full-time and part-time employees are lumped together, lowering the measure of average salary. The number of part-time employees varies across occupational groups' pension plans. Some occupations contain more part-time employees than others. This limits comparisons among occupational groups on the basis of average salary. Thus, in addition to relying on the state's reported salary figures this paper provides an alternative salary estimate using U.S. Census and Bureau of Economic Analysis (BEA) and data for the state of New Jersey. While this paper can correct for part-time employees by using Census/BEA data, it cannot break out compensation by occupational group, obscuring important variation in compensation. Thus, this paper presents two tables with different salary estimates, first using Census/BEA data and then the state's data, which is broken out by occupational category. Before presenting the tables, key terms are defined. More detailed explanation for these calculations and the data sources are provided in Appendix 1.

a. Pensions: Reported Normal Cost

There are a few key measures used to determine the cost of pension benefits as a portion of budgets and of annual spending. (See Textbox) The Annual Required Contribution (ARC) is the annual amount the employer *should* contribute to ensure a pension plan is fully funded and has enough assets to pay obligations to employees in the system. The ARC consists of two components. The normal cost is the portion of the present value of pension-plan benefits accrued by active employees in a given year. The remainder of the ARC amortizes any unfunded liability for employees' past service over a period of 30 years. In the state-level analysis, this paper only presents the normal cost, expressed as the percent of payroll dedicated to benefits that are accrued for active employees to show what these pension costs represent on an annual budgetary basis. On the local level , this paper presents both portions of the ARC, the normal cost and the remaining unfunded liability.

[21] The five pension plans covered that have active employees are Public Employees Retirement System (PERS), Police and Firemen's Retirement System (PFRS), Teachers Pension Annuity Fund (TPAF), State Police Retirement System (SPRS), and Judicial Retirement System (JRS). See http://www.state.nj.us/treasury/pensions/financial-rprts-home.shtml.

The Annual Report of the Actuary reports the normal cost using a set of actuarial methods and assumptions. Legislative reductions are then applied to the normal cost, some of which allow partial or skipped payments, COLA costs to be phased-in, local benefit costs to be paid by the state and excess investment returns to offset contributions. These adjustments do not reflect a change in the cost of the benefits but rather in how and when they are paid. This paper focuses on the cost of the benefits, so this paper takes the normal cost as calculated by the state actuary, removing all adjustments that do not affect the underlying cost of the benefit. This includes removing interest charges due to delayed payments.

b. Pensions: Normal Cost, Risk-adjusted

The normal cost as reported is adjusted using the risk-adjusted discount rate or the yield on 15-year Treasury bonds in order to arrive at the Market Value of the Liability.

c. Non-Contributory Group Life Insurance program (NCGLI)

New Jersey offers life insurance to its employees accounted for in the pension systems' financial statements as a separate item.

d. Health Insurance: Health Benefits for Active Employees

The State Health Benefit Program Fund (SHBPF) provides medical benefits to active and retired New Jersey employees. There are three administrative components: SHBPF-state, SHBF-local, and SHBF-education. SHBPF-state covers state employees and is funded by the state. Local governments can opt to participate in SHBPF-local. Benefits are administered by the state and paid for by the local government. Teachers are eligible for SHBPF-education, which provides health benefits to qualified active and retired participants and is funded by the state government. Health insurance costs for active New Jersey employees are estimated using Bureau of Labor Statistics data (BLS).

e. Other Post Employment Benefits (OPEB): Health Benefits for Retirees

Upon retirement, the State Health Benefit Program Fund is classified as OPEB. Retired public employees must have 25 years of credited service or a disability retirement to qualify for OPEB. Retirees who do not meet this criterion may pay for health insurance themselves and their family members in order to

continue receiving benefits under the program. Upon retirement, local police and firefighters are awarded partially funded benefits after 25 years of service or after disability.[22]

The number reported is the normal cost per employee, that is, the annual cost for active state and local employees for OPEB. This cost is likely understated for full-time employees, as the actuarial analysis for OPEB appears to include part-time workers in their employee count, diluting the per-employee cost of full-time employees (as part-time employees are not eligible for OPEB).

f. Legally Required

This represents legally required employer costs associated with federal programs: Social Security, Medicare, Unemployment Insurance, and Workers' Compensation Insurance.

Findings

Using Census/BEA data for salary estimates, on average, New Jersey full-time state government employees earn $59,963 in annual salary. The average annual salary for a full-time local government employee is $63,851 in FY 2009. Factoring in benefits, the average annual compensation for a New Jersey state employee is $88,594. The average annual compensation for a full-time local employee in New Jersey is $93,331.

Next, this paper corrects the cost of the pension benefit by applying the risk-adjusted discount rate. This increases the average compensation of a state employee to $95,618. The average compensation for a local employee increases to $100,768. Applying a risk-adjusted discount rate increases the pension normal cost from 7.79 percent of state payroll to 19.51 percent of state payroll and from 7.87 percent of local payroll to 19.52 percent of local payroll. Taking pension costs at a risk-adjusted discount rate adds over $7,000 to the pension costs of the average state and local employee. Including benefits at a risk-adjusted rate adds an additional 60 percent and 58 percent, respectively, to the employee costs of state and local employees as compared to just salary costs.

[22] Members of the Teachers' Pension Annuity Fund (TPAF) who retire from a board of education or county college with 25 years of service or receive a disability retirement receive free post-employment medical coverage. Also members of PERS and members of the Alternative Benefit Program (ABP) which covers university professors, who retire from a community college or board of education after 25 years of service are eligible for free post-employment medical benefits, if the employer doesn't already provide this coverage. Ineligible members may continue in the program if they pay the cost of insurance and are enrolled in Medicare Part A or Part B.

Table 1: Average per Employee Compensation for New Jersey Public Employees, Census/BEA data, 2009

Average cost of compensation per active full-time employee, 2009	State	Local
Salary for full-time employees	$59,963	$63,851
Non-contributory Group Life Insurance	$379	$322
Health insurance	$10,284	$10,284
OPEB – normal cost post-retirement health insurance	$7,898	$8,099
Legally required (Social Security, Medicaid, Unemployment Insurance)	$5,397	$5,747
Average pension normal cost stated	$4,673	$5,028
Average pension normal cost discounted at Treasury rate	$11,698	$12,465
Pension normal cost as a percent of payroll	7.79%	7.87%
Pension normal cost discounted at Treasury Rate, as a percent of payroll	19.51%	19.52%
Total average compensation with stated pension costs	$88,594	$93,331
Total average compensation with pension liability discounted at Treasury Rate	$95,618	$100,768

As mentioned earlier, one problem with Census/BEA data is that while this paper can estimate the average salary per full-time employee, the BEA data does not allow examination of compensation by occupational group and, therefore, hides variation in compensation among different types of employees.

Drawing on data from New Jersey's Annual Report of the Actuary gives a more detailed picture of compensation by occupational group, as Table 2 shows. Average salary ranges from $32,958 for a local public employee to $166,193 for a member of the judiciary, though these figures include both full-time and part-time workers. The inclusion of part-time employees lowers average salary. It should also be noted that average salary will not be lowered by the same amount for each occupational group. For example, there are more part-time public employees than there are part-time police and firefighters.

Adding benefits to salary raises average total compensation across the state from a low of $58,111 for a local public employee to a high of an average of $245,505 for a member of the judiciary. Table 2 shows compensation by employee group for both state and local employees. This paper also includes an estimate for total compensation that factors in the normal cost for pensions using a risk-adjusted discount rate.

Table 2: Average per Employee Compensation for New Jersey Public Employees According to Occupation, Annual Report of the Actuary, 2009

Per employee costs	**PERS Public employees (State)**	**PERS Public employees (Local)**	**TPAF (Teachers)**	**PFRS Police and Fire (State)**	**PFRS Police and Fire (Local)**	**SPRS (State Police)**	**JRS (Judicial)**
Salary	$49,603	$32,958	$67,423	$66,439	$84,539	$95,248	$166,193
Group insurance	$317	$257	$244	$972	$1,017	$531	$2,047
Health insurance[23]	$10,284	$10,284	$10,284	$10,284	$10,284	$10,284	$10,284
OPEB	$7,898	$9,920	$6,278	$7,898	$9,920	$7,898	$7,898
Legally required (Social Security/Medicare)	$4,508	$3,062	$6,245	$6,308	$7,837	$8,613	$14,947
Average compensation without pension	$72,565	$56,385	$90,297	$91,572	$113,368	$122,533	$201,380
Pension as reported	$2,897	$1,726	$4,848	$11,032	$13,669	$17,662	$44,126
Average per employee compensation with pensions as reported	$75,463	$58,111	$95,145	$102,604	$127,037	$140,195	$245,505
Pension at risk-adjusted discount rate	$7,810	$4,824	$11,891	$25,005	$31,108	$37,385	$84,624
Average per employee compensation with pension at risk-adjusted discount rate	$80,376	$61,210	$102,188	$116,577	$144,476	$159,918	$286,003

[23] Health insurance costs assume 40 hour/week employment.

As Table 3 shows, on average, the state's normal costs for pensions represent 5 percent of payroll for local public employees and 16 percent of payroll for local police and firefighters. The normal cost for pensions is highest for the judiciary, representing 26.6 percent of payroll. Adjusting these calculations by applying the risk-free discount rate more than doubles the normal cost as a percent of payroll costs, which rises to between 14.6 percent for local public employees and 36.8 percent of payroll for local police and firefighters. The highest normal cost for pensions as a percent of payroll is again for judiciary members, at 50.9 percent of total payroll.

At a risk-free discount rate, the average normal cost for a PFRS-local member pension increases by $17,438. For a Judicial Retirement System (JRS) member, the average normal cost increases by $40,498. Across the five major pension systems, a risk-free discount rate adds over $3 billion in normal costs.

Table 3: Normal Cost for Pensions: State-wide Estimates Based on Annual Report of the Actuary, 2009

	PERS State	PERS local	TPAF	PFRS State	PFRS Local	SPRS	JRS
Average wages	$49,603	$32,958	$67,423	$66,439	$84,539	$95,248	$166,193
Total pension normal cost (Annual Report of the Actuary)	5.8%	5.2%	7.2%	16.6%	16.2%	18.5%	26.6%
Total pension normal cost for pensions using risk-free discount rate	15.7%	14.6%	17.6%	37.6%	36.8%	39.3%	50.9%

Typically, evaluation of public sector compensation tends to only focus on total salary. Excluding pension and other benefits hides a substantial amount of value in total compensation for public employees. When factoring in benefits, total compensation costs increase by between $28,152 for an average local public employee to $119,810 for an average member of the judiciary.

The state does not currently report total compensation for employees. For a member of the public to know what the true costs are for public sector employees, this data must be gathered from a variety of sources. Though much of this data is reported in the state's actuarial reports, it can be of limited use for the public as presented. This paper relies on state and federally reported data to extract measures that are meaningful to the public.

This includes the annual costs associated with pension benefits and retiree health-care benefits that are accruing to active employees. In other words, what is the employer's annual "matching contribution" to fund these benefit systems for active employees? The research shows that the government's annual cost for pension benefits for active employees ranges from 15 percent to 51 percent of salary depending on the occupational group. The normal cost for OPEB adds between $6,278 to $9,920 per year to active employees' total compensation.[24]

4. Local Budget Case Study: What Are Personnel Costs as a Portion of Municipal Budgets?

A state-wide view provides only a general snapshot of employee costs and does not tell us what portion of local budgets is dedicated to personnel costs. These costs are important information for residents, employees, and local officials. Many public services are consumed on the local level where property taxes are levied to pay for them. To determine the proportion of local budgets dedicated to personnel cost, this paper undertakes a case study of two municipalities in Bergen County, New Jersey: Englewood Cliffs and Garfield. Six municipalities were originally selected in Bergen County based on variance in size and income. Open Public Records Act (OPRA) requests for budget data were filed with Garfield, Englewood Cliffs, Edgewater, Upper Saddle River, Paramus and Ridgefield. Only Garfield provided substantially all of the data requested. Englewood Cliffs provided enough data for a full analysis of the current situation, but less historical information to provide long-run trend data. The remaining municipalities either did not respond or provided insufficient data for analysis. This paper relies on budgetary data, annual financial statements and data obtained in Quarterly Pension Reports.

[24] This figure is likely understated as it appears the actuarial report for OPEB includes all employees, not just full-time employees who are eligible for OPEB. See Appendix 1 for details.

Bergen County is ranked 16th highest per capita income county in the country.[25] Englewood Cliffs is a small, upper income borough across the Hudson River from Manhattan. According to the U.S. Census, Englewood Cliffs has a population of 5,855 with a median household income of $112,292. Garfield is primarily middle-income with a median income of $50,917 and is the second largest city in the county with a population of 28,966.[26]

Personnel costs at the municipal level include salary, pension benefits, health care benefits, life insurance, and legally required benefits. In New Jersey, unionized public sector workers may negotiate over wages, hours, and working conditions with local government officials. Pension benefits and funding policy are determined by state statute. Health care benefits are negotiated at the local level and can be provided by either a local government through a locally administered plan, or the local government may opt to participate in the state's health insurance program (SHBP) which commits the local government to funding OPEB. Englewood Cliffs participates in the state's plan and offers OPEB to its employees. Garfield offers its own health insurance which, in this case, is the same benefit package that is provided by the state-run system.

While municipal budgets report total salary figures, pension costs are reported in the Annual Report of the Actuary. Pension funding policy in New Jersey has been erratic over a period of years due to policy changes made by state government that allowed local governments to reduce or skip their payments to the pension system. Thus, the amount reported on the municipalities' budget represents some portion of the Annual Required Contribution, or ARC, and not the full contribution needed to fund the system. In addition to reporting only a partial ARC, the budget does not provide a separate normal cost figure, that is, the cost associated with employees as they accrue benefits each year.

The health insurance line item in local budgets includes both insurance costs for active employees plus pay-as-you-go costs for OPEB for retired employees. Later in the analysis, the paper corrects for this by subtracting out the pay-as-you-go costs reported in the annual financial statements. The local employer also contributes to the employees' Social Security, Medicare, Unemployment Insurance, and Worker's Compensation as required by federal law. Budget data only breaks out Social Security/Medicare and Unemployment Insurance. Therefore, some legally required personnel costs, such as Worker's

[25] Associated Press, "N.J. Has Four of Nation's 20 Highest-income Counties,"*NJ.com*, May 20, 2009, http://www.nj.com/news/index.ssf/2009/05/nj_has_four_of_nations_20_high.html.
[26] U.S. Census Bureau American FactFinder, http://factfinder.census.gov.

Compensation are not captured, and the proportion of funds dedicated to Social Security and Medicaid are unknown. Table 4 provides 2009 budget data as reported by Garfield and Englewood Cliffs. This data combines costs for active and retired employees and is the information made available for the public to evaluate. Charts 1 and 2 display this budget data in graphical form.

Table 4: Reported Budget data for Garfield, New Jersey and Englewood Cliffs, New Jersey, 2009

FY 2009	Garfield	Englewood Cliffs
Total budget	$28,005,334	$12,308,170
Total salaries	$11,070,746	$5,557,740
Salary as a percent of budget [27]	**39.5%**	**45.2%**
Health insurance	$3,152,536	$959,239
Social Security	$350,647	$191,409
UI	$50,000	$0
PERS	$215,821	$64,920
PFRS	$752,414	$415,847
Total benefits	$4,521,418	$1,631,415
Total salary and benefits	$15,592,164	$7,189,155
Salary and benefits as a percent of budget	55.7%	58.4%

[27] While we only analyzed two municipalities, we believe they are representative. A recent study by the Rutgers Center for Executive Leadership in Government of 83 New Jersey municipalities found that, on average, salaries and wages "Inside-Cap" represented 39.4% of budget. In Garfield and Englewood Cliffs, salaries and wages "Inside-Cap" were 39.5% and 45.2% of their budgets, respectively. In terms of reported salary as a percent of budgets, Garfield seems to be typical of the average municipality in New Jersey.

Chart 1: Garfield, N.J. Budget FY 2009, as Reported

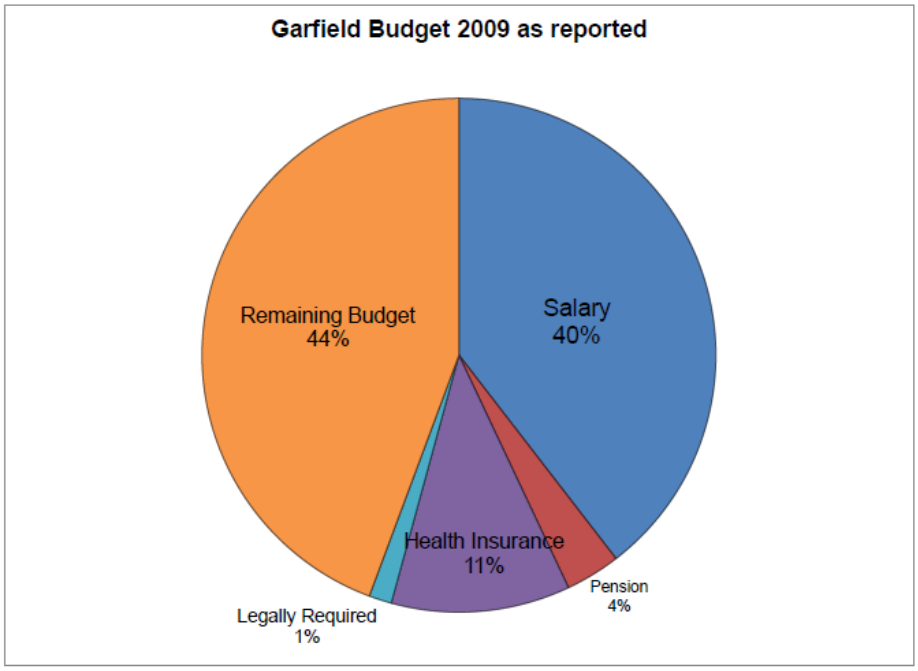
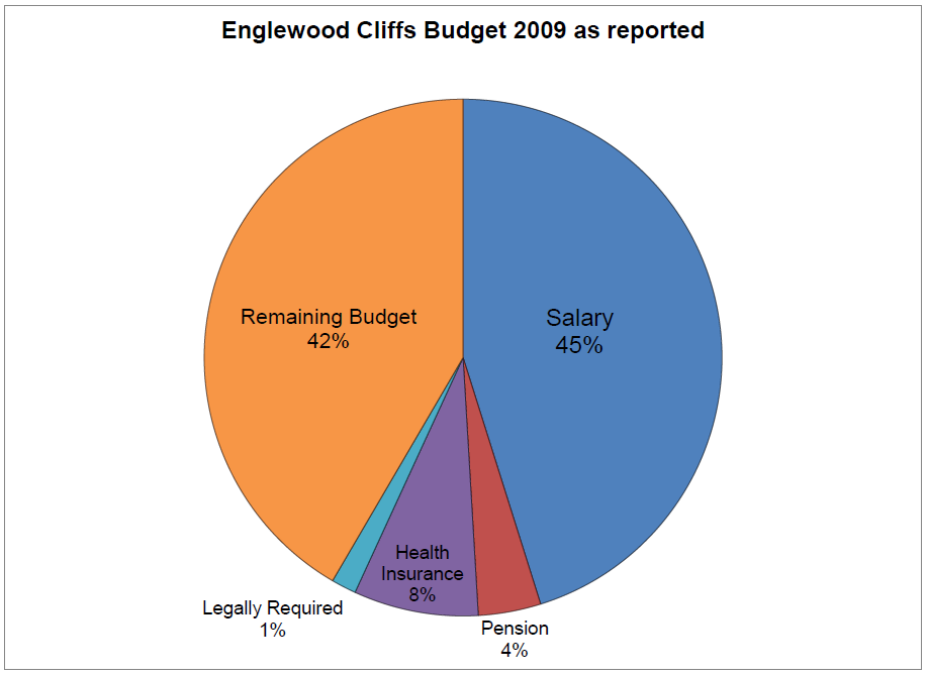


Chart 2: Englewood Cliffs, N.J. FY 2009 Budget, as Reported



As reported, these pension figures do not represent the full cost of pensions for current employees, but rather the municipality's elected contribution to the pension system. Thus, the next step is to calculate the normal cost of pension benefits for current employees for 2009. This figure excludes any unfunded accrued liabilities in the system and payments to current retirees. To arrive at the correct normal cost for pensions, this paper must eliminate certain policy adjustments made by the state that altered the timing of pension payments. The adjustments made to eliminate these policy effects are first described and the data are presented in Table 5.

1) Pensions: Normal Cost as Reported, Including State's Policy Adjustments

As reported by the state, the normal cost includes the effects of policy adjustments made to the timing and size of the local government's pension payment. These include the COLA phase-in and the Benefit Enhancement Fund.[28] The COLA phase-in allows local governments to pay 59.8 percent of the cost of the COLA in 2009. The BEF is a state fund that covers the cost of the 9-percent benefit enhancement granted in 2001. Each of these lowers the overall cost of the pensions to the local employer. Normal costs are expressed as a percent of salary and multiplied by payroll to provide the dollar value. In addition, New Jersey offers Non-contributory Group Life Insurance (NCGLI) to PERS and PFRS employees. The employer pays the full cost of the premium. Life insurance is accounted for in pension reporting and is captured within the PERS and PFRS line items in the municipal budget. This paper adds life insurance to the pensions total in Table 6.

2) Pensions: Corrected Normal Cost: State's Policy Adjustments Removed

This paper presents the normal cost of PERS and PFRS pensions, removing the effects of state policies that do not affect the underlying costs of the benefits. This includes removing the COLA phase-in, the effect of the Benefit Enhancement Fund and other transfers of costs from local to state to arrive at an unfettered normal cost of pension benefits. This paper removes the adjustments to accurately represent the costs of these benefits, not how or when they are paid for.

[28] See Chapter 6, P.L. 1990, Chapter 41, P.L. 1992, Chapter 8, P.L. 1993, Chapter 62, P.L. 1994, Chapter 133, P.L. 2001 and Chapter 366, P.L. 2001.

3) Pensions: Corrected Normal Cost: State's Policy Adjustments Removed and Discounted by Yield on 15-year Treasury bonds

This paper re-estimates the corrected normal cost above by applying the yield on 15-year Treasury bonds to arrive at the MVL. This discount rate is chosen to match the risk and timing of pension benefits and thus provides an accurate valuation of the liability.

Table 5: Factoring in Pension and Life Insurance Benefits for Current Employees - Three Separate Pensions Estimates, Expressed as Dollar Total and Percent of Budget

FY 2009	Garfield, New Jersey	Englewood Cliffs, New Jersey
Total budget	$28,005,334	$12,308,170
$ Total salary *(% of budget)*	$11,070,746 *(39.5%)*	$5,557,740 *(45.2%)*
What do pensions and life insurance add?		
Estimate 1: Pension normal cost as reported +NCGLI *(% of budget)*	$1,061,194 *(3.8%)*	$527,624 *(4.3%)*
Estimate 2: Pension normal cost removing policy effects + NCGLI	$1,278,512 *(4.6%)*	$631,877 *(5.1%)*
Estimate 3: Pension normal cost removing policy effects, discounted at Treasury rate + NCGLI	$2,907,082 *(10.4%)*	$1,386,282 *(11.3%)*

Adding salary to Estimates		
Salary + Estimate 1 (% of budget)	$12,131,940 *(43.3%)*	$6,085,364 *(49.4%)*
Salary + Estimate 2	$12,349,258 *(44.1%)*	$6,189,617 *(50.3%)*
Salary + Estimate 3	$13,977,828 *(49.9%)*	$6,944,022 *(56.4%)*

Next in Table 6, combining data from the municipal budget and the annual financial report, this paper add in the cost of health insurance for active employees. The normal cost of OPEB accrued in the current year for active employees is also added. This paper also factors in the employer's cost for legally required benefits, which are reported directly from the municipalities' budgets. [29]

Table 6: Factoring in Health Care Benefits and Legally Required Costs for Current Employees

2009	Garfield, New Jersey	Englewood Cliffs, New Jersey
Total budget	$28,005,334	$12,308,170
$ Total salary *(% of budget)*	$11,070,746 *(39.5%)*	$5,557,740 *(45.2%)*
Total estimated full-time employees	152	47
Total PERS and PFRS employees	214	60

[29] Legally required costs are likely underestimated. According to the Bureau of Labor Statistics, these represent 9 percent of salary on average for state and local employees.

What does health insurance for current employees add?	$2,291,748 *(7.3%)*	$710,545 *(3.9%)*
Cost of health insurance per employee	$15,077	$15,118
What does OPEB for current employees add?	$2,052,215 *(7.3%)*	$575,387 *(4%)*
Cost of OPEB per employee	$9,590	$9,590
Total health care costs for current employees	$4,343,963 *(15.5%)*	$1,285,932 *(10.4%)*
What do legally required benefits add?	$400,647 *(1.4%)*	$191,409 *(1.6%)*
Total health care, OPEB and legally required	$4,744,610 *(16.9%)*	$1,477,341 *(12%)*

Table 7 presents the total compensation for an average employee in Garfield and Englewood Cliffs, when fully accounting for the normal cost of pension benefits, health care insurance, the normal cost of OPEB, legally required benefits and life insurance. Charts 3 and 4 display this data in graphical form.

Table 7: Total Salary, Pensions, Health Care and Other Benefits for Current Employees

2009	Garfield, N.J.	Englewood Cliffs, N.J.
Total budget	$28,005,334	$12,308,170
$ Total salary, *(% of budget)*	$11,070,746 *(39.5%)*	$5,557,740 *(45.2%)*
Pensions (Estimate 3: corrected and discounted at Treasury rate)	$2,907,082 *(10.4%)*	$1,386,282 *(11.3%)*
Health insurance for current employees	$2,291,748 *(8.2%)*	*$710,545* *(5.8%)*
OPEB for current employees	$2,052,215 *(7.3%)*	*$575,387* *(4.7%)*
Legally required benefits	$400,647 *(1.4%)*	*$191,409* *(1.6%)*
Salary plus all benefits	$18,722,,438 *(66.9%)*	*$8,421,364* *(67%)*

Chart 3: Garfield, N.J. Budget FY 2009 Including Full Cost of Active Employees

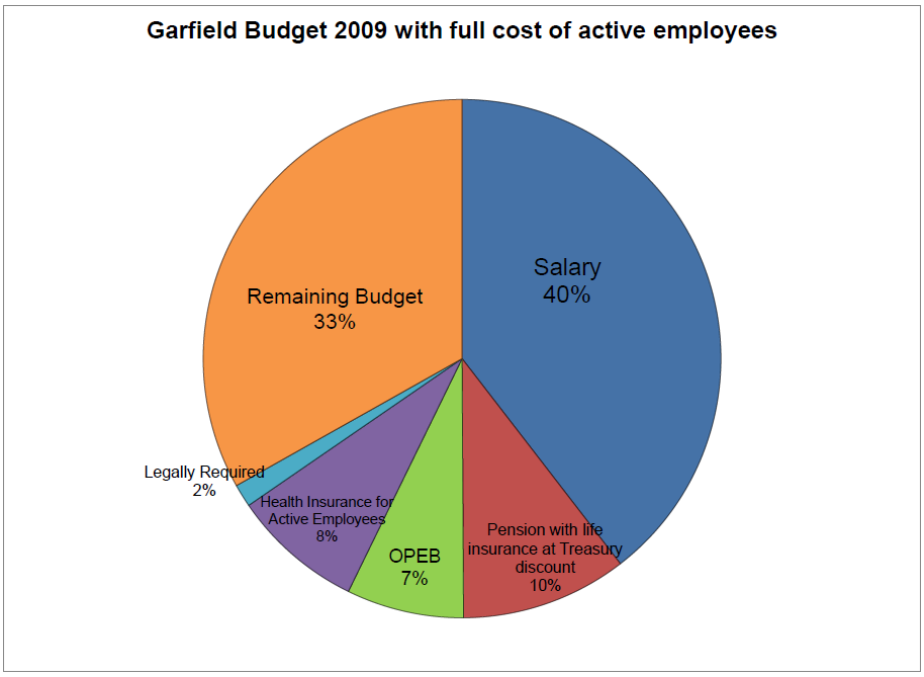
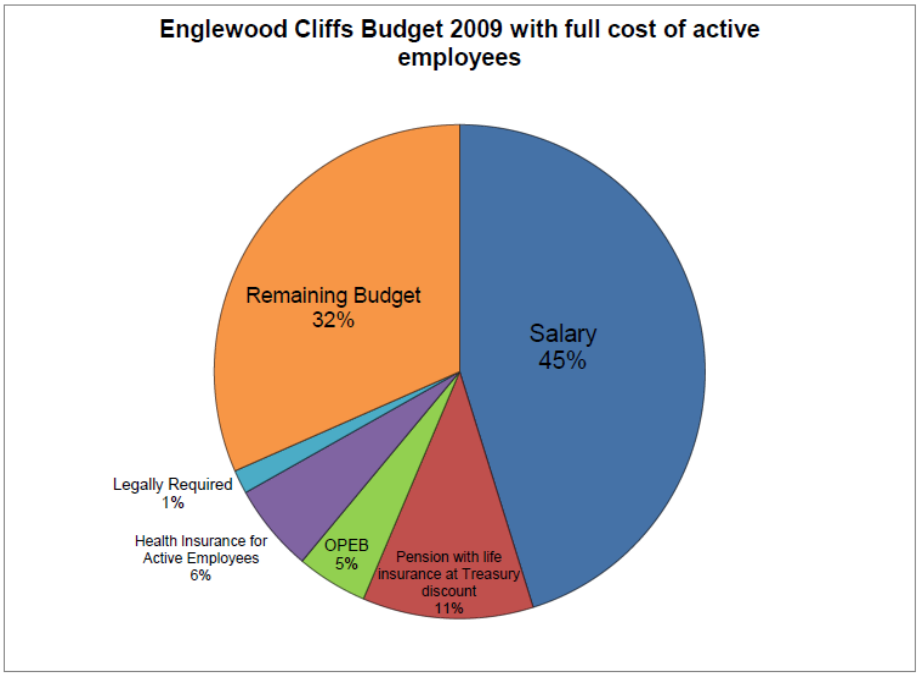


Chart 4: Englewood Cliffs, N.J. FY 2009 Budget Including Full Cost of Active Employees



The analysis of municipal governments presents a similar picture to the analysis of state compensation. While there is a tendency to consider only average salary, factoring in benefits adds a significant amount to the overall tab for personnel costs at the local level, thus requiring greater budgetary resources. While salary represents 40 percent of Garfield's 2009 budget, pensions at a risk-adjusted discount rate add a further 10 percent and health-care benefits for active employees add 8.2 percent. OPEB—the normal cost for retiree health benefits accrued by active employees—adds 7.3 percent. When factoring in all benefits, active employee compensation costs swell to 67 percent of the budget. So far this analysis has only considered the costs associated with active employees and does not include any unpaid accrued liabilities and costs associated with retirees.

4) What is the Effect of Unpaid Accrued Liabilities for Pensions and OPEB on Garfield's Budget?

Up until this point the focus of this paper has been on the costs that are being accrued on a yearly basis for current workers. This paper has presented only a portion of the ARC, known as the normal cost. Thus, this paper's estimate of the fiscal impact of employee costs on the budget is incomplete. The second component of the ARC is the amortized payment against the unpaid accrued liability.

What is the benefits liability for Garfield and Englewood Cliffs? That is, what is the impact of pension and health-care obligations that have accrued for both past and present service for both active and retired employees? The size of unpaid accrued liabilities is important information for a municipal government since it indicates the municipalities' level of indebtedness. Accrued pension benefits are generally considered to be contractual obligations while health-care benefits are not, making at least a portion of this long-term obligation as binding as debt. Knowing the size of these liabilities is important information for officials, workers, and the public when debating current budgetary priorities which affect current and future spending.

While the annual financial reports for Garfield and Englewood Cliffs clearly state municipal debt held as bonds, the accrued pension and OPEB liabilities of the municipalities are not disclosed. This is surprising given that pension liabilities are potentially as binding as General Obligation bond liabilities. In this last section, this paper factors in the cost of these liabilities and compares this to the current budgets of Garfield and Englewood Cliffs.

The unpaid accrued liability is simply the difference between the accrued liability and the assets saved. Similar to the calculation performed in the previous section, this paper updates the accrued liability to reflect a risk-free discount rate.

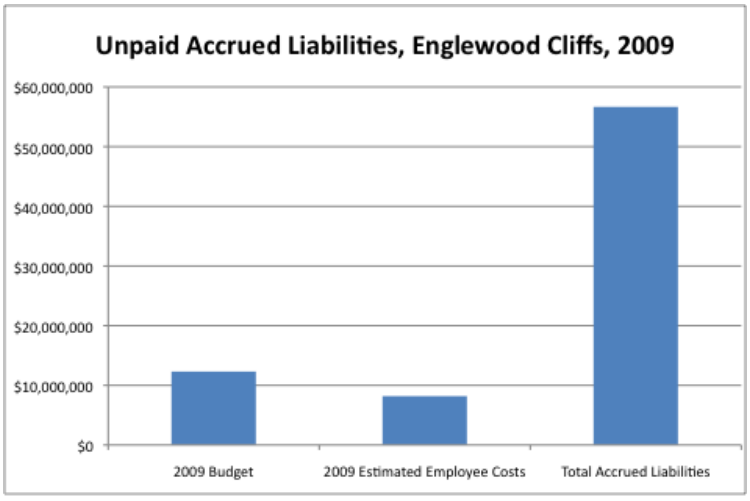
The State of New Jersey uses the actuarial value of assets, rather than the market value of assets, when calculating the unpaid accrued liability. The actuarial value of assets is calculated using a "smoothing" algorithm that is intended to gradually reflect positive or negative changes in market valuation, preventing sudden changes in funding ratios and required contributions.

However, as further explained in Appendix 3, the New Jersey smoothing algorithm allows for persistent overestimation of pension assets. As of the 2010 actuarial analysis, the five major pension plans in New Jersey had an actuarial valuation that is $17 billion—or 24 percent—higher than the market value of assets. This analysis uses market value of assets to determine the unpaid accrued liability for pensions.

The undervaluation of liabilities and overvaluation of assets allows for a lower unpaid liability, which creates a lower ARC, or annual contribution. After correcting for the discount rate and the market value, this arrives at a state-wide unpaid accrued liability for local PERS and PFRS as a percent of payroll. This paper estimates each municipality's liability by applying this to the local PERS and PFRS payroll.

For OPEB liabilities, since no assets have been saved, this paper simply takes the average accrued liability per employee and multiply it by the number of PERS and PFRS employees in each municipality. No adjustments are made to either the liability or asset values for OPEB.

Chart 5 and Chart 6: Comparison of the Budgets and Total Accrued Liabilities of Garfield and Englewood Cliffs, N.J



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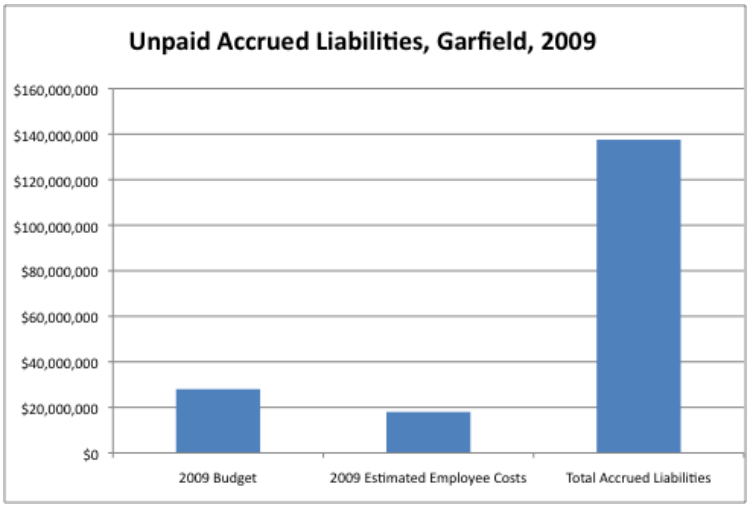


In 2009, this paper estimates that Garfield had $137 million in total unpaid accrued liabilities, with approximately $87 million in unpaid pension liabilities and $49 million in unpaid OPEB liabilities, as shown in Chart 5 and Chart 6 The ratio of unpaid liability to budget is 4.9 in Garfield and 4.6 in Englewood Cliffs.

This paper amortizes this liability over 30 years, using the same amortization method as the state, to arrive at an amortized payment of $4.6 million (17 percent of budget) for Garfield and $1.9 million (16 percent of budget) for Englewood Cliffs. Including this payment with this paper's earlier updated normal cost gives an updated ARC using a risk-free discount rate. Chart 7 reflects the full payment of this ARC.[30]

[30] This still does not reflect all the unpaid liabilities due to employee benefits. According to the municipalities' financial statements, Garfield has over $2.8 million in accrued costs for unpaid leave while only saving $420 thousand. Englewood Cliffs has over $2.1 million with no reported savings.

Chart 7: Garfield, N.J. FY 2009 Budget with Full Cost of Active Employees and Accrued Liability Payment

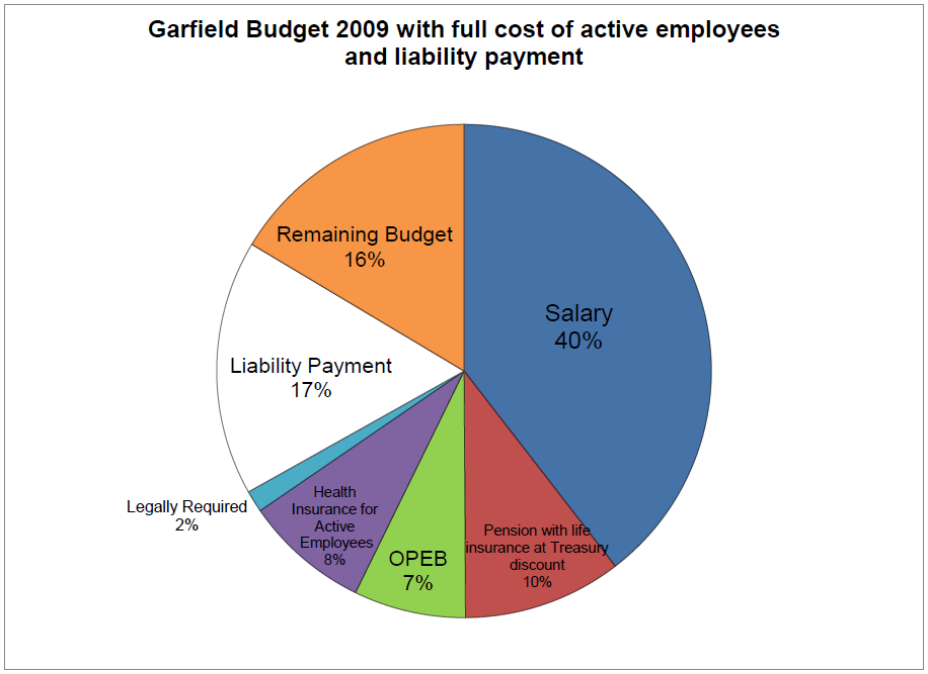
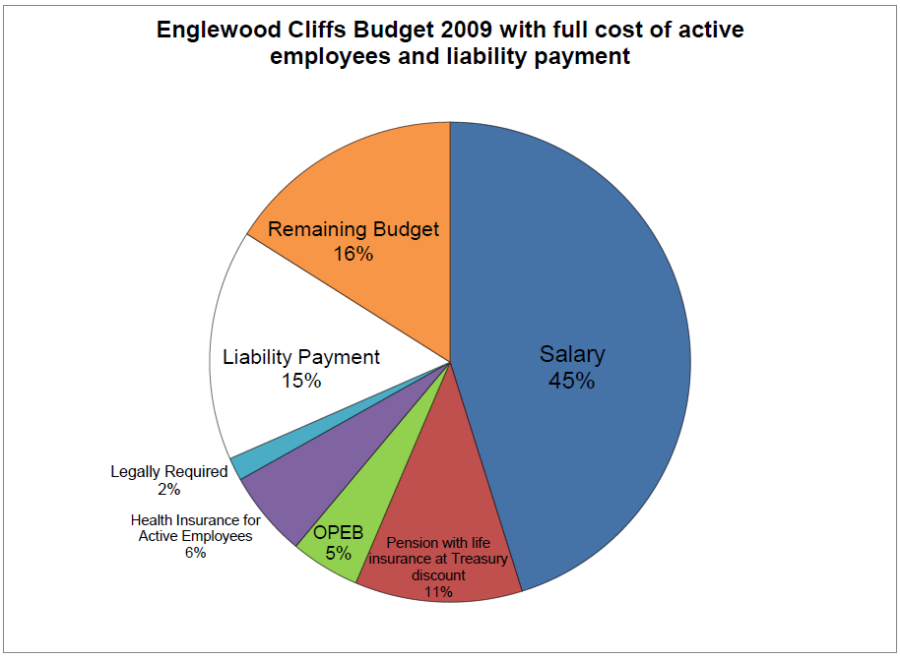


Chart 8: Englewood Cliffs, N.J. FY 2009 Budget with Full Cost of Active Employees and Liability Payment



These figures can be further broken down by occupational group for public employees (PERS) and police and firefighters (PFRS) as shown in Charts 9 and 10.

Chart 9: Garfield, N.J. FY 2009 Budget with Active and Accrued Employee Costs According to occupational group

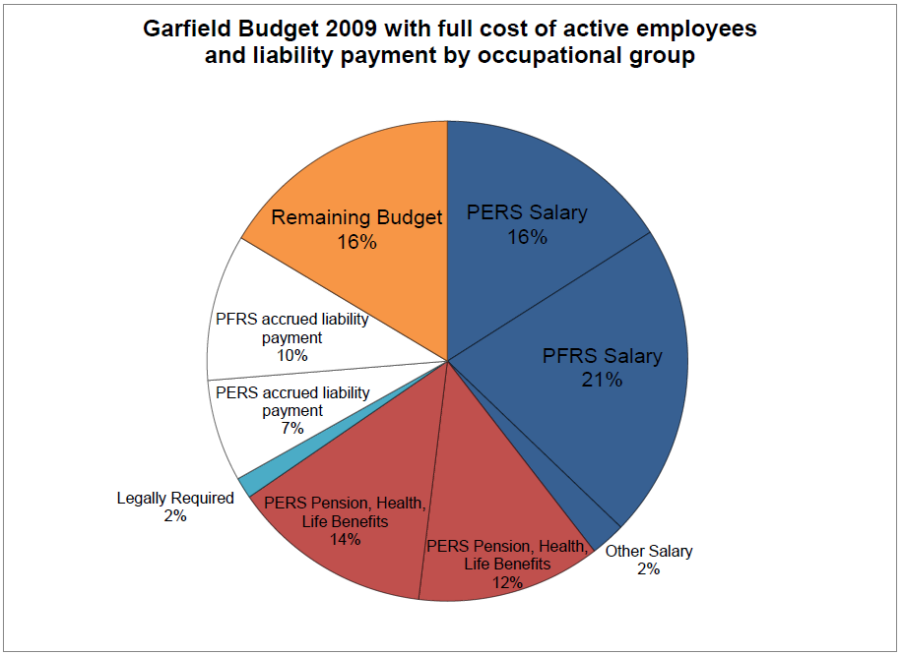
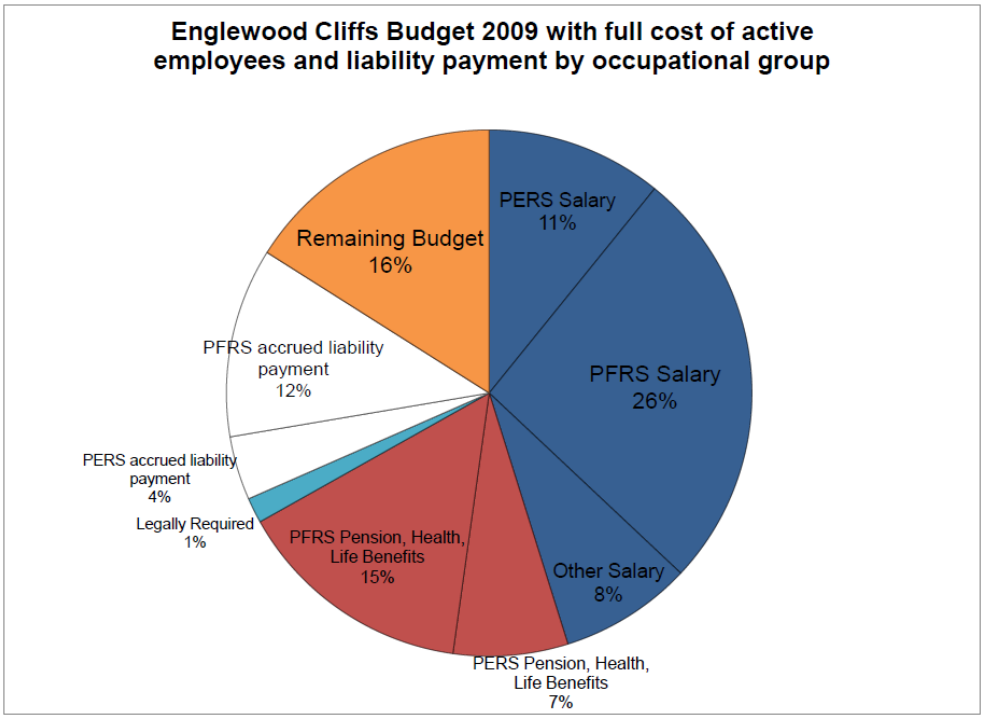


Chart 10: Englewood Cliffs, N.J. FY 2009 Budget with Active and Accrued Employee Costs According to Occupational Group



Incorporating the full ARC at a risk-free discount rate results in a 50 percent and 44 percent increase in personnel costs as compared to budget, for Garfield and Englewood Cliffs, respectively, as Chart 11 and Chart 12 show.

Chart 11: Comparison of Garfield, N.J. FY 2009 Budget to Total Employee Costs

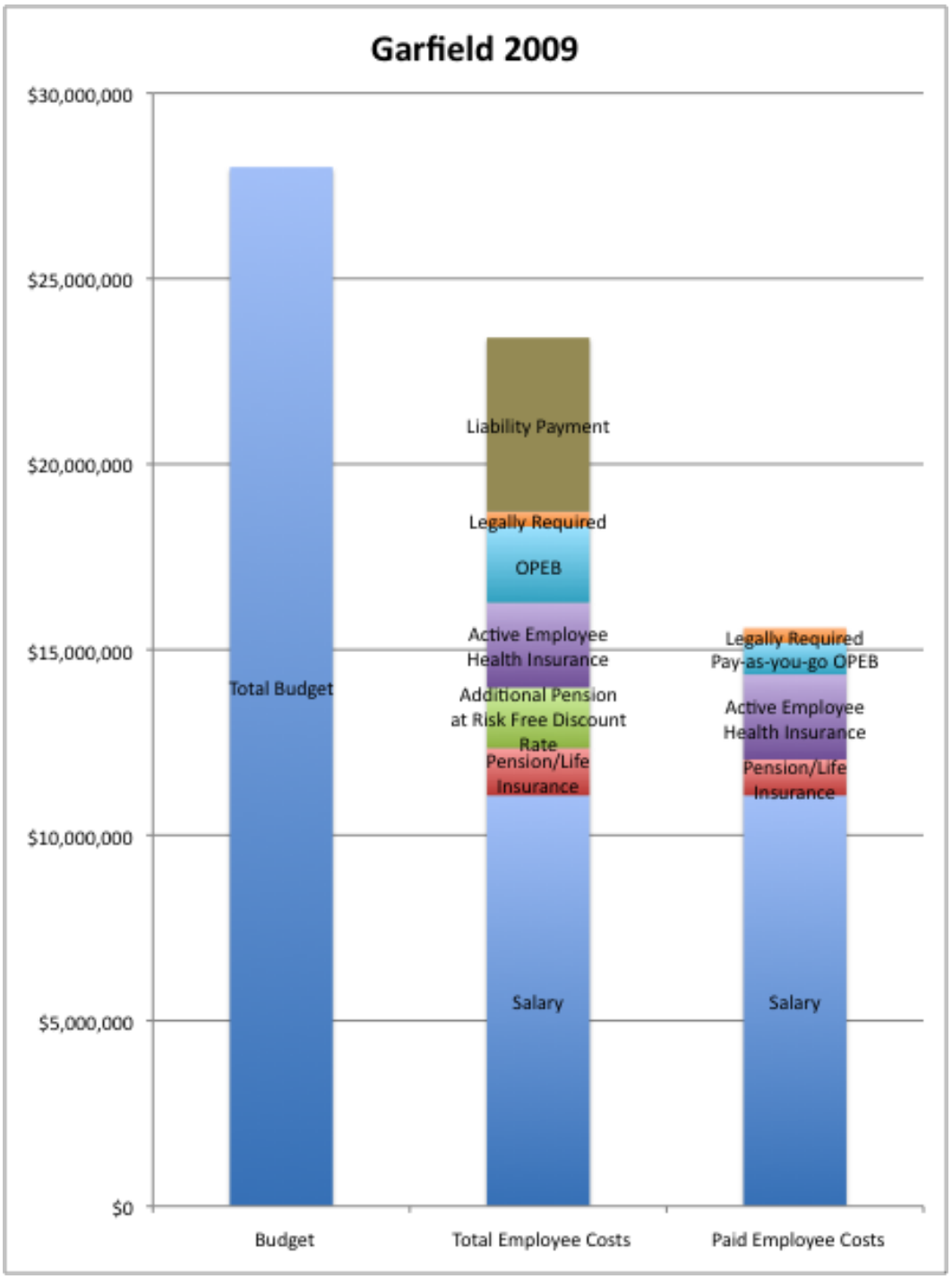
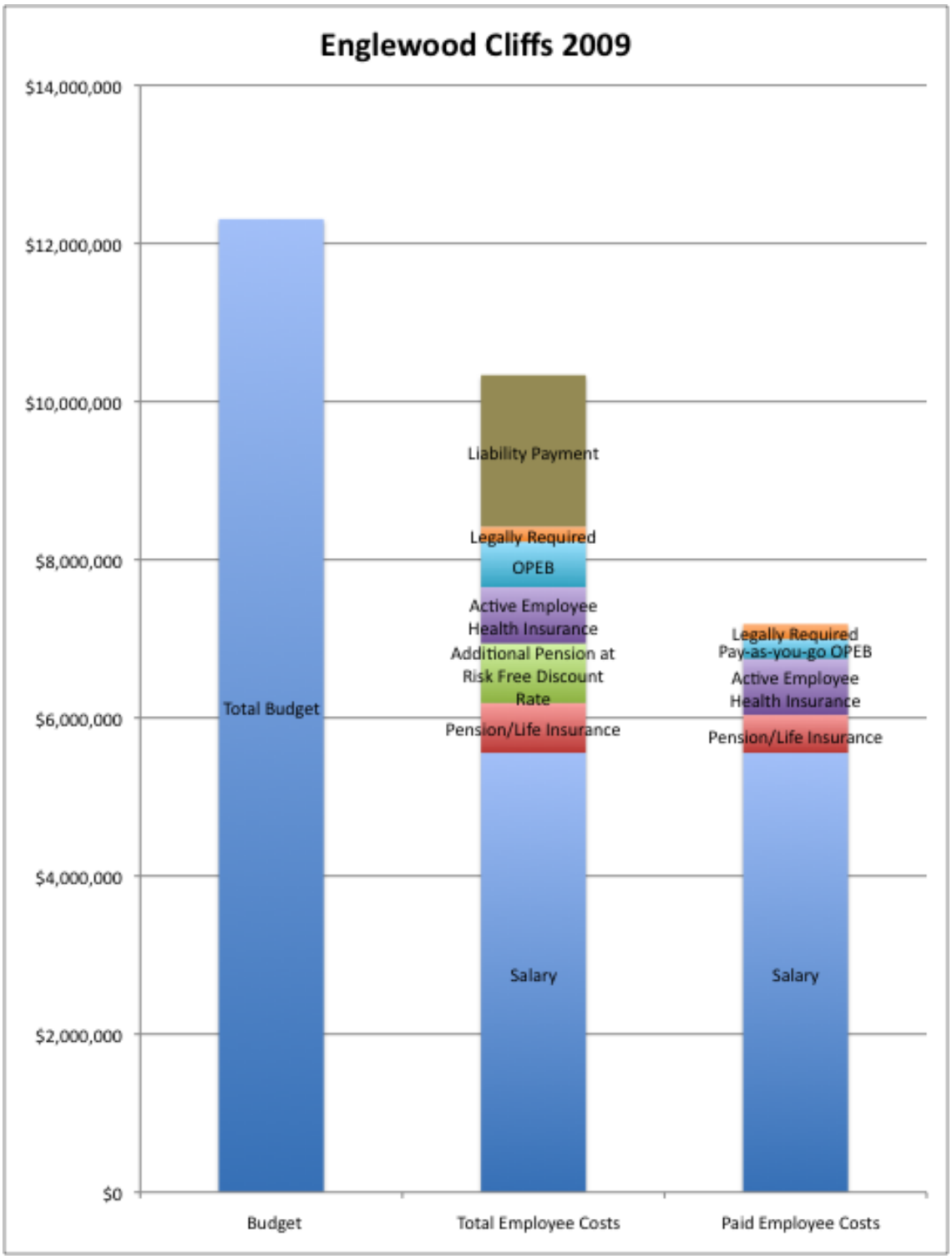


Chart 12: Comparison of Englewood Cliffs, N.J. FY 2009 Budget to Total Employee Costs



5. Recommendations

The lack of transparency in reporting employee costs means that public employees, voters, and officials do not have the information to make informed decisions as unpaid liabilities accrue.

1) More Accurate and Accessible Reporting

Broadly speaking, employee costs should be fully paid as they are incurred and those paying should be the parties receiving the services of those employees. Local government employee costs should be paid by the local taxpayers. Through deferrals and transfers, employment costs are effectively subsidized by either future or non-local taxpayers. This leaves the parties empowered to over-consume, as they do not bear the full cost of their decisions. By deferring costs, the unpaid liability grows until the solvency of the benefit system reaches a crisis point, as is seen now.

Governments should provide their citizens with an employee-compensation report at the state and local levels that clearly delineates the full costs for different components of compensation, breaking out costs for full-time and part-time employees, occupational groups, as well as retiree costs. The goal is to present the full costs of the benefits, regardless of how or when they are paid. These reports should indicate the percentage of these costs paid, and by which parties. This report should also contain the current levels of unpaid liabilities at the local level, and should be posted online. During compensation negotiations with employees or unions, projections of future costs should also be made available to see the effect of particular changes in compensation.

2) Incentivizing Accuracy and Transparency

Given the myriad problems with accounting for government employee costs, one might wonder if a fundamental change would not be the best approach to achieve greater accuracy. Perhaps a structural shift could align the incentives of the parties involved with accurate reporting. In most private industry, those who pay for the benefits and those who service the benefits are separated. The typical firm pays other firms to deliver the benefits they have promised employees.

This arrangement ensures two significant improvements from that seen within government: 1) benefits are fully paid for up-front and 2) prices of benefits are set using a competitive market. This is in stark contrast to setting the price of benefits through a combination of politics and a governmental accounting board and then allowing for the payment of those costs to be deferred into the future. It is

only because government both gives benefits and services those benefits years later that it can avoid paying the full cost up-front, accruing “benefit debt.”

Accounting for streams of payments that occur far into the future is an inherently complex task that requires many assumptions to be made. Many times these assumptions are changed to serve short-term political needs rather than accuracy. This is not a surprise given the incentives of the parties involved, as changes that negatively affect accuracy are not usually noticed for many years and voters rarely examine the assumptions of state actuaries. On the other hand, immediate gains can be achieved through policies that trade lower costs today for higher unpaid liabilities in the future. This usually continues until the burden becomes so great that a crisis forces examination. Only by aligning the incentive for accuracy with the personal incentives of the parties involved can a long-term solution be achieved.

Retaining the delivery of long-term benefits within the government will keep the forces in place that work against accurately estimating and paying for benefits. However, within that inherently inferior system, improvements could still be made. Actuarial reports currently provide calculations to, in essence create the “bill” due to various governments for their pension and retirement health benefits. This includes using actuarial assumptions as directed by the state and changing the costs due to “legislative reductions.” Actuarial reports should also present the costs of benefits under more accurate actuarial assumptions, including calculating the Market Value of the Liability based on the 15-year Treasury bond yield. These costs should be presented without the legislative reductions that only affect the time and place of payment, rather than the underlying cost of the benefits. Such a fiscal report should also present the costs under these various assumptions, so that voters and officials can see the significant impact in dollars of what may seem to be minor actuarial details.

Conclusion

How much do employee benefits cost governments as they are earned by active employees? What is the yearly “match” that governments should make to fund the true value of an employee’s pension and health benefits? These are straightforward questions that do not have clear answers given the current state of accounting in New Jersey municipalities and at the state level. The only component of compensation that can be easily determined is total salary across groups of employees, with average salary difficult to ascertain given the aggregation of full-time and part-time employees.

Costs of various benefits are either not reported or presented with assumptions and adjustments that obscure the true cost. At the state level, with benefit costs at an estimated 58 percent to 60 percent of salary, a large portion of government employee compensation is shrouded from public view. At the local level, budgets do not break out costs of active employees nor do they state what portion of benefit costs accrued in a particular year were paid for.

The actuarial assumptions behind pension liability and payment calculations are also misleading. A high assumed discount rate hides over $3 billion in pension costs per year in the five major pension systems in New Jersey. Adjusting the discount rate to match the risk of the liability adds over $1.6 million in pension costs per year in Garfield. On the asset side, New Jersey's smoothing algorithm overstates accumulated assets by over $17 billion. The combination of correcting for understated liabilities and overstated assets more than doubles the stated unpaid liability of New Jersey from $119 billion to $254 billion.

Policy decisions that transfer or defer these employment costs further conceal the full costs of employment decisions made at the state and local level. The combination of incomplete reporting, incorrect accounting, and poor policy mean that voters, politicians and other decision-makers do not see the full impact of governmental decisions. As costs are being accrued they are not being recognized, and thus are not paid for in full.

This paper has broken out benefits spending by active employees and retirees to show the ongoing yearly costs associated with benefits and the liability for these benefits relative to a municipality's budget. The outcome of incorrect accounting and poor policy is to defer the payment of employment costs, further adding to the unpaid liability. Currently at over four-and-a-half times the size of the local budgets this paper examined, these unpaid liabilities are a burden and a risk. Adding the amortized cost of these liabilities to the full cost of active employees consumes 84 percent of the budgets of both Garfield and Englewood Cliffs.

Both Garfield and Englewood Cliffs provide more budget data than several other municipalities this paper queried in the state. This is a good start to improving government transparency. The combination of national government accounting standards, state actuarial assumptions and accounting conventions, and local accounting practice have produced fiscal information that does not reflect the true size of the pension and health care benefits offered to public sector workers. This information deficit leaves policy

makers, the unions they negotiate with, and the public poorly informed about the fiscal realities they face in the near term.

Only with better accounting practices can governments hope to make more fiscally sustainable choices.

Glossary: Accounting Terms

Actuarial Value of Assets – The value of assets determined by "actuarial smoothing," which recognizes market gains and losses in asset investments typically over a five-year period. This technique is used to soften fluctuations in the market thus keeping the employer's annual pension contributions relatively even.

Actuarial Accrued Liabilities – The future value of pension liabilities as determined by actuarial assumptions. These assumptions include the selection of a discount rate used to measure the present value of the future obligation. This rate is currently selected to match the expected rate of return on fund assets.

Normal Cost – The annual cost of benefits accrued in the current year to active employees. This can be thought of as the employer's annual match to the employees' retirement or health plan in retirement.

Annual Required Contribution (ARC) – The annual amount required to fully fund the pension system, including both the normal cost or the cost of benefits accrued in the current year by active employees plus the cost of funding any remaining liability for employees' past service.

Discount rate – The rate of interest used to convert a future value into a present value by removing the interest earned over the period.

Market Value of the Liability – The future value of pension liabilities discounted using an interest rate that matches the risk of the liability.

Appendix 1: Description of Calculations

General Notes

Budget Data

All budget data is actual expenditure data from that particular year, not budgeted expenditures. This is gathered from budget documents the year following the year of interest. For example, the 1990 budget data is collected from the 1991 budget document, which lists actual expenditures in 1990.

Budget Fiscal Year Versus Actuarial Fiscal Year

The actuarial reports for pension and OPEB use a fiscal year ending on June 30th, while the municipalities use a calendar year budget. For this reason, two years of normal cost were averaged for each budget year. For example, in 2009, the pension normal costs from the 2009 (covering July 2009 to June 2010) and the 2008 (covering July 2008 to June 2009) actuarial reports were averaged to determine a 2009 budget year normal cost.

Normal Cost Using Valuation Year Rather than Payment Period

In the actuarial reports, there is a difference between the year of valuation and the year of payment for normal costs. The valuation year is not always stated clearly in the actuarial reports, but appears to be the upcoming year. For example, the 2010 actuarial report would cover the valuation year starting July 1, 2010 to June 30, 2011. The payment period varies by pension system. For example, in the 2010 PERS actuarial report, the payment period is set as July 2011 to June 2012, while the PFRS sets the payment period as July 2012 to June 2013. Some of the actuarial calculations also charge interest at the discount rate to reflect a delay in payment. However, this is not consistently applied across the systems. We chose to use the valuation year to apply the normal costs to budget data as it follows our goal to show the value of the benefits earned, as well as allowed us to use a consistent year of actuarial reports across the systems.

Removing Policy Effects from Normal Cost

The Annual Report of the Actuary reports the normal cost using a set of actuarial methods and assumptions. Legislative reductions are then applied to the normal cost, some of which allow partial or skipped payments, COLA costs to be phased-in, local benefit costs to be paid by the state and excess investment returns to offset contributions. These adjustments do not reflect a change in the cost of the benefits, but rather in how and when they are paid for. We are interested in the cost of the benefits, so we take the normal cost as calculated by the state actuary, removing all adjustments that do not affect the underlying cost of the benefit. Since we are using valuation year to determine which actuarial data to apply to budget years, we also removed all interest charges from the normal cost.

This does not mean all legislative reductions were removed. One reduction we found affected both who pays as well as the underlying cost of the benefit. Chapter 366, P.L. 2001 transferred costs from the local government to the state as well as increased the employee contribution for pension benefits. The former adjustment does not affect the cost of the benefit, just who pays for it, while the latter does decrease the cost of the benefit (increasing employee contributions means the benefit is less expensive for the employer). In this case, we removed the transfer of cost, but not the effect of the increased employee contribution.

Normal Cost Presentations

At the state aggregate level, normal cost is presented two ways, 1) as stated, with only legislative reductions that affect the underlying cost of the benefit and 2) at a risk-adjusted discount rate.

At the local level, normal cost is presented in an additional way: as stated, with all legislative reductions. This is because we want to show the affect of benefit costs on the budget as they would be accounted for by the local government.

Discount Rate Calculations

To recalculate a liability at a new discount rate, we take the following steps:

1) Take the present value of the discount rate and project it out 15 years forward using the existing discount rate. 15 years is generally considered the midpoint in payments for pension benefits. [1]

2) Take the number from step 1, which is a liability due in 15 years and recalculate present value using the new discount rate.

Normal Cost Calculations at the New Discount Rate

To estimate the normal cost at the new discount rate we use the reported normal cost before any policy effects. We divide this by the active employee accrued liability to get a ratio of normal cost to accrued liability. This ratio represents the number of years of service accrued in the pension plan for active employees at the rate of accrual that occurred in that year. We take this ratio and multiply it by the accrued liability at the Treasury rate to estimate the normal cost at the Treasury rate.

Unpaid Accrued Liability Against Market Value of Assets

We calculate the unpaid accrued liability of pension and OPEB liabilities as follows.

i. Unpaid Accrued Liability at Treasury Discount Rate against Market Value of Assets – Pension

The pension actuarial reports provide the accrued liability as well as the market value of the pension assets to pay for these liabilities. The difference of the two is the unpaid accrued liability. We adjust this calculation as follows.

A) Discount the liability at Treasury rate

To discount the accrued liability at the Treasury rate rather than at the 8.25 percent chosen by the state, we project the reported liability 15 years forward at 8.25 percent and then discount it back to the present at the Treasury rate. This gives us the accrued liability for active employees at the Treasury rate.

B) Calculate Unpaid Accrued Liability against Market Value of Assets

[1] M. Barton Waring, "Liability Relative Investing, "Journal of Portfolio Management 30 (4). Also, Robert Novey-Marx and Joshua D. Rauh, "The Intergenerational Transfer of Public Pension Promises, September 2008, Chicago GSB Research Paper No. 8-13, http://papers.ssrn.com/sol3/papers.cfm?abstract id=1156477

The state actuary calculates the unpaid liability against the "Actuarial Value" of assets rather than the market value. This actuarial value is meant to smooth the valuation of assets over time in relation to the market value. However, as shown in Appendix 3 this smoothing mechanism consistently overstates the value of assets as compared to the market value. We simply replace the actuarial value of assets with the market value of assets when calculating unpaid accrued liability

ii. Unpaid Accrued Liability of OPEB

Our calculation of the accrued liability of OPEB is more straightforward, as the state uses a 4.5 percent discount rate and there are no accumulated assets to offset the liability. We do not correct the discount rate as it is close to the Treasury rate. As for assets, since no assets are saved and benefits are covered in a "pay as you go" manner, the unpaid accrued liability is simply the accrued liability.

Per hour compensation data usage

For some calculations, national per hour compensation data for union and non-union state and local government employees was used and then weighted by the unionization rate in New Jersey.

Per hour health insurance and legally required costs for union and non-union state and local government employees was retrieved from Chris Edwards, "Public Sector Unions and the Rising Costs of Employee Compensation," Cato Journal, 2010; Bureau of Labor Statistics, Unpublished data, June 2009.

The unionization rate for public sector employees in New Jersey is calculated by James Sherk based on Bureau of Labor Statistics data.

Estimate of Active Employee Health Insurance Costs Is Likely Understated

National BLS data was used to estimate per employee health insurance costs for the statewide figures. We believe this likely understates the health insurance costs. For example, the national BLS data weighted by unionization rate estimates a per full-time employee cost of $10,284. Using local budgets and financial statements, we estimate a per full-time employee cost of over $15 thousand for both Garfield and Englewood Cliffs.

Calculation Details

Section III

Table 1;Average per employee compensation for New Jersey public employees, state versus local, BEA/Census data, 2009

i. Salary

The U.S. Census provides an estimate of Full Time Equivalent (FTE) state and local government employees by state, divided into state and local categories. Combining this with BEA data on aggregate earnings by state and local government employees allows us to estimate the average salary for a state and local government full time employee in New Jersey. 2009 data was used.

ii. Non-Contributory Group Life Insurance

The state of New Jersey also offers a Non-Contributory Group Life Insurance program (NCGLI) to public employees which is accounted for in the pension systems' financial statement and reported as a separate item.

For the state aggregate life insurance estimate, the life insurance costs of the PERS state, PFRS state, SPRS and JRS employee groups were summed and divided by the number of employees in those systems, to calculate a per employee cost.

For the local aggregate life insurance estimate, the same calculation was performed with the PERS local, PFRS local and TPAF employee groups.

Data was retrieved from the 2009 actuarial reports.

iii. Health insurance

We estimate health insurance costs for active New Jersey employees by using Bureau of Labor Statistics data (BLS) for 2009. BLS provides health insurance per-hour costs for both union and non-union government employees. Hourly data is converted into yearly data and weighted by the public sector unionization rate in New Jersey. We believe this understates the costs in New Jersey, see the general notes for details.

iv. OPEB

We take OPEB cost on a per employee basis by dividing the total normal cost by the number of active employees. This is preferred to calculating OPEB normal cost as a percent of payroll as the value of the benefit is not a function of salary. The figures used are provided by the State of New Jersey Postemployment Benefits Other Than Pension Actuarial Valuation report for 2010.

The Annual Report of the Actuary provides the normal cost of OPEB for three categories: state, education/state and local.

For the state aggregate compensation figure, the state category OPEB cost was used.

For the local aggregate figure, an average of the state/education and local OPEB cost was used. PERS local, PFRS local and TPAF groups are aggregated into the local aggregate, which requires both the state/education and local OPEB costs to be combined. Local governments can choose whether their PERS and PFRS employees receive OPEB, as well as whether these benefits are administered through the SHBPF or through a separate plan. We couldn't find any data on participation rates at the local level for OPEB. For this reason, it's not possible to know how to weight the OPEB costs of TPAF members versus PERS and PFRS members within the local aggregate. A simple average of the two normal costs was used.

v. Legally required

For legally required employer costs associated with Social Security, Medicare, Unemployment Insurance and Workers' Compensation Insurance we rely on BLS national data for unionized and non-unionized state and local government employees reported as a percent of salary. Union and non-unionized workers' legally required costs are both 9 percent of salary. We weight this data by the rate of unionization in New Jersey. 2009 BLS data was used.

vi. Pension normal cost, as stated, without policy effects

We are trying to present the accurate cost of the benefits as calculated by the state actuaries. Normal cost is presented as calculated by the state actuaries, without reductions that affect only who and when they are paid for. See general notes for details.

For the state aggregate normal cost estimate, the normal costs of the PERS state, PFRS state, SPRS and JRS employee groups were summed and divided by the summed payroll of those groups to calculate a normal cost percentage for all state employees.

For the local aggregate normal cost estimate, the normal costs of the PERS local, PFRS local and TPAF employee groups were summed and divided by the summed payroll of those groups to calculate a normal cost percentage for all local employees.

vii. Pension normal cost, risk-adjusted

See the general notes on how normal cost at Treasury rate was estimated based on accrued liability.

For the state aggregate normal cost estimate, the normal costs at the Treasury discount rate of the PERS state, PFRS state, SPRS and JRS employee groups were summed and divided by the summed payroll of those groups to calculate a normal cost percentage for all state employees.

For the local aggregate normal cost estimate, the normal costs at the Treasury discount rate of the PERS local, PFRS local and TPAF employee groups were summed and divided by the summed payroll of those groups to calculate a normal cost percentage for all local employees.

Table 2: Average per employee compensation for New Jersey public employees, according to occupation, Annual Report of the Actuary

i. Salary

The actuarial report lists total payroll and total number of employees. We divide payroll by employees to get average salary. This includes part-time workers.

ii. Group Life Insurance

Total cost was divided by number of employees to calculate a per employee cost. Figures are directly from actuarial reports.

iii. Health insurance

Same as Table 1.

iv. OPEB- normal cost

We take OPEB cost on a per employee basis by dividing the total normal cost by the number of active employees. This is preferred to calculating OPEB normal cost as a percent of payroll as the value of the benefit is not a function of salary. The figures used are provided by the State of New Jersey Postemployment Benefits Other Than Pension Actuarial Valuation report for 2010.

The Annual Report of the Actuary provides the normal cost of OPEB for three categories: state, education/state and local. The actuarial report also provides an employee count for each of those

categories by pension fund. A large number of PERS employees are classified under education/state. It is unclear if these employees would be classified as state or local employees by the pension system.[2]

For the PERS state occupational group OPEB normal cost, the state category of normal cost from the OPEB actuarial report was used. For the PERS local occupational group OPEB normal cost, the local category of normal cost from the OPEB actuarial report was used.

The OPEB categories used for the other employee groups are as follows: TPAF (state/education), PFRS state (state), PFRS local (local), SPRS (state), JRS (state).

v. Legally required

Same as Table 1, but applied to the average salary as calculated in Table 2.

Increases at risk-free discount rate

This calculation is addressing the change in the cost of the benefits from the state actuarial assumptions to using a Treasury discount rate. Normal cost increases across the pension system were calculated by taking the sum of the additional normal cost at Treasury rate across the five pension systems. This was done by taking the normal cost as calculated by the state actuary, without policy effects (see general notes for details), and subtracting that from the normal cost at Treasury rate.

Table 3: Normal cost for pensions: state-wide estimates

Normal cost percentage is calculated by taking the normal cost and dividing it by payroll. This table compares the normal cost as calculated by state actuaries, without policy effects, to the cost we estimate at Treasury rate.

Section IV

Data Sources: Local Budget Analysis

Englewood Cliffs and Garfield provided the most complete set of budgetary and financial data allowing us to fully estimate personnel costs. The data retrieved from the municipalities falls into three categories: Annual Budgets, Annual Financial Statements and Quarterly Pension Report data. The table below lists the data retrieved and it's use.

Data Source	Years	Data Points
Budget[3]	Garfield: 1991, 1996, 2000, 2002, 2004, 2006, 2008, 2010 Englewood Cliffs: 1996, 2000, 2002, 2004, 2006, 2008, 2010	Total Expenditures, Total Salary Expenditures, Benefit Expenditures

[2] The sum of PERS employees in the state and state/education groups greatly exceeds the total number of PERS employees listed as "state" employees by the pension plan. For that reason, it appears that some of the employees classified by the pension plan as "local" are classified by the OPEB report as "education/state".

Annual Financial Statements	Garfield: 2009 Englewood Cliffs: 2009	Pay-as-you-go OPEB costs
Quarterly Pension Report for PERS and PFRS [4]	Garfield: 1995, 1999, 2001, 2003, 2005, 2007, 2009 Englewood Cliffs: 2005, 2007. 2009	Total number of employees in PERS and PFRS, total salary in PERS and PFRS

Table 4: Reported Budget Data, Garfield, N.J. and Englewood Cliffs, N.J., 2009

i. Salary

Total salary data was provided in the municipal budget. These are reported directly.

ii. *Pensions: Costs as reported*

The budgets of Garfield and Englewood Cliffs have line item costs for contributions made to PERS and PFRS. This figure represents contributions towards the municipality's ARC, which includes normal costs and accrued liability payments attributed to pension benefits as well as life insurance payments. These components of the ARC are not broken out in the budget.

iii. Health Insurance:

Englewood Cliffs participates in the SHCBP-local. Garfield does not participate in the state-administered health plan and offers its own locally-administered plan to employees. However, Garfield's plan exactly mimics the benefits offered under the state-run plan.

The health insurance line item in the budget includes both insurance costs for active employees plus pay-as-you go costs for OPEB for retired employees. Because of this, the on-budget costs presented below are not an accurate account of just active employee costs.

iv. Legally required

The local employer contributes to the employees' Social Security, Medicare, Unemployment Insurance coverage and Worker's Compensation insurance as required by federal law. Budget data only breaks out Social Security (which can include Medicare payments) and Unemployment Insurance. Therefore, some legally required personnel costs are not captured by this analysis.

Table 5: Factoring in pension and life insurance benefits for current employees. Three separate pensions estimates, expressed as dollar total and (percent of budget)

i. *Pensions: Normal Cost as reported, including state's policy adjustments, with Life Insurance*

[4] Garfield provided a yearly summary of the Quarterly Pension Report data, listing total salary and number of employees in each year. Englewood Cliffs provided the quarterly reports directly. Yearly salary was calculated by summing each quarter's total salary. Number of employees was calculated by taking the average of the number of employees in each quarter.

The Annual Report of the Actuary provides the normal cost for each occupational group's pension plan. We multiply this percentage by the aggregate salary figures provided in the Quarterly Pension Reports. The normal cost is first reported directly from this source.

New Jersey offers non-contributory Group Life Insurance (NCGLI) to PERS and PFRS employees. The employer pays the full cost of Group Life insurance premium for employees. PERS employees must also enroll in Contributory Group Life Insurance and contribute 0.5 of 1 percent of their salary for the first year of service, and may cancel their participation thereafter.[5] Life insurance is accounted for in the state's pension financial reporting and is captured within the PERS and PFRS line items in the municipal budget. To simplify the presentation we add life insurance to the pensions total in Table 6. Life insurance adds a very small amount to the total.

Table 6: Factoring in health care benefits and legally required costs for current employees

i. Total estimated full-time employees

Health insurance benefits are only provided to full-time employees. We were unable to find a precise definition of the criteria that constitutes the qualification of "full-time". However, a notice from the Division of Local Government Services indicated that the Chapter 2, P.L. 2010 legislation changed the definition of full-time from 20 to 25 hours per week.[6]

Since number of hours or "full-time" status employees is not provided by either the budget or pension documents, we estimated full-time status by using salary information provided by datauniverse.com. Employees with a salary in 2009 over $30,000 were assumed to qualify as "full-time" and receive health benefits.

ii. Health Insurance Cost

Since we are interested in current costs for active employees, we subtract the pay-as-you-go OPEB costs as reported by the annual financial statements from the total budgeted health insurance costs. We perform this analysis since the health insurance costs provided in municipal budgets do not break out health insurance costs due to active employees versus retired employees. Doing this allows us to separate health insurance costs for active employees, as well as by occupational group. We do this for years 2007 and 2009. Prior to 2007, health insurance costs were extrapolated using the estimate for 2007 and the national health insurance growth rate for state and local government employees. [7]

To estimate health insurance costs by employee group, we divide the total health insurance cost by our estimate for the total number of full-time employees to arrive at a per full-time employee cost in each municipality. We then multiply this by the estimate of full-time employees in PERS and PFRS to arrive at an aggregate health insurance cost for active PERS and PFRS employee groups.

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[5] http://www.state.nj.us/treasury/pensions/epbam/exhibits/ann-rpts/2005/pers.pdf p. 25.

[6] New Jersey Department of Community Affairs, Division of Local Government Services, Local Finance Notice (LFN 2010-12), May 18, 2010

[7] U.S. Department of Health and Human Services, Medical Expenditure Panel Survey, "Premiums and Contributions of Plans of Employees Enrolled at State or Local Governments, All Governments, Average Single and Family growth rate", 1996-2009 http://www.meps.ahrq.gov/mepsweb/data_stats/MEPSnetIC.jsp

iii. OPEB

The State of New Jersey's Postemployment Benefits Other Than Pension Actuarial Valuation provides the normal cost for state and local employees for OPEB benefits, which is expressed on a per employee cost. The "Local" occupational group in the OPEB actuarial analysis was used.

The State only provides an analysis of OPEB costs from 2007 forward. The reason is that until 2007, governments were not required to report OPEB benefits in their financial reports. GASB rule 45 requires that beginning in 2007 governments account for OPEB as employees earn these benefits, moving budgets from a cash to an accrual basis in calculating health benefits.[8] Previously, state and local governments used a pay-as-you-go method in which OPEB costs were recognized on a cash-basis only when the employee retired and began collecting benefits.[9] The new rule requires greater transparency of the long-term cost of health benefits as those costs are accrued. GASB 45 is an important reform which will help officials project the level of resources needed to fund health benefits for current employees.

Prior to budget year 2007, OPEB costs were extrapolated using the OPEB cost for 2007 and the national health insurance growth rate for state and local government employees. [10]

The SHBP defines that retirement health benefits are only available for full time employees with 25 years of service. In the OPEB actuarial analysis, the number of employees in each occupational group is reported, but no detail is provided as to what those employee numbers capture. It is not stated as to whether they are only full-time employees or all employees. This is a key detail, as we must apply the per employee normal cost to either all employees or to just our estimate of full-time employees.

We assume the employee numbers used in the OPEB actuarial analysis to be all employees, because for state-only occupational groups entirely covered by the OPEB report[11] (local governments opt-in for state

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[8] GASB rule 45 "requires governments to report the costs and obligations incurred as a consequence of receiving employee services, for which benefits are owed in exchange. The normal cost component of annual expenses is the portion of the present value of estimated total benefits that is attributed to services in the current year. The annual expense also includes an amortization component representing a portion of the Unfunded Actuarial Accrued Liability (UAAL) which relates to past service costs. Estimated benefit costs associated with projected future years of service are not reported", See: http://www.gasb.org/project_pages/gasb_st45_basic_q&a.pdf

[9] David Zion and Amit Varshney, "You Dropped a Bomb on Me, GASB: Uncovering $1.5 Trillion in Hidden OPEB Liabilities for State and Local Government," Credit Suisse, Americas/United States, Equity Research Accounting and Tax, March 2007. http://online.wsj.com/public/resources/documents/DroppedB.pdf

[10] U.S. Department of Health and Human Services, Medical Expenditure Panel Survey, "Premiums and Contributions of Plans of Employees Enrolled at State or Local Governments, All Governments, Average Single and Family growth rate", 1996-2008. 2008 was used because the data is missing for year 2007. http://www.meps.ahrq.gov/mepsweb/data_stats/MEPSnetIC.jsp

[11] It is assumed that the following state employee groups are all eligible for OPEB benefits: JRS, PFRS State, SPRS, TPAF and PERS state. The active employee numbers listed by the OPEB and pension reports (2009) respectively are as follows: JRS (OPEB – 422, pension - 432), PFRS state (OPEB – 7,697, pension – 7,572), SPRS (OPEB – 3,108, pension – 3,030), TPAF (OPEB – 159,059, pension – 144,492). As discussed earlier, the PERS state occupational

run health benefits), the number of employees listed by the OPEB report closely matches or exceeds the number of employees listed by the pension's annual report of the actuary. Since the pension plans include some part-time employees, its assumed that the OPEB report likewise includes part-time employees in their employee numbers.

We present the "per employee" normal cost of OPEB or the cost of benefits being earned by current employees. We multiply this by the number of employees in the PERS and PFRS pension systems supplied by the Quarterly Pension Report data.

The state actuarial report on OPEB estimates retirement health care costs for local governments who participate in the SHBP. Englewood Cliffs participates in the SHBP, while Garfield administers their own health insurance, but exactly mimics the benefits provided by the SHBP. For this reason, we are able to use the actuarial calculations provided by the state actuary for local governments and apply them to Garfield. This approach assumes that Garfield's employee characteristics mimics other local governments covered by the SHBP.

iv. Legally Required Costs

Legally required costs captures the budgetary line items for Social Security and Unemployment Insurance. Medicare is often captured under the Social Security line item. This does not fully capture all legally required costs, as it does not capture Workers Compensation Insurance, which is not broken out in the budget. Additionally, for many years the Unemployment Insurance line item in the Garfield (1995, 1999) and Englewood Cliffs (2001, 2003, 2005, 2007, 2009) budgets is zero. This likely reflects the funding of their unemployment insurance and not the costs incurred in that year.

The BLS estimates legally required costs for state and local government employees nationwide to be 9 percent of salary. Due to the level of aggregation in national data, we did not feel comfortable using that figure to estimate legally required costs and preferred a more conservative approach of using the line-item data for legally required categories provided in the budgets. This approach likely understates the cost. For reference, the legally required costs we report in 2009 for Garfield and Englewood Cliffs were 3.6 percent and 3.4 percent of salary respectively.

Section V

See general notes on how we calculated the unpaid accrued liability against market value of assets.

For pension unpaid accrued liabilities, we take the unpaid accrued liability at a Treasury discount rate for PERS local and PFRS local, and divide it by covered payroll to calculate the unpaid accrued liability as a percentage of payroll. This is a statewide figure. We apply it to the municipalities by multiplying this percentage against the payroll figures of PERS and PFRS employees. The 2009 actuarial reports were used as they list the liabilities and assets as of July 1, 2009, and we are applying it to budget year 2009.

For OPEB unpaid accrued liabilities, we take the unpaid accrued liabilities for the local category and divide it by the number of local employees, to calculate the average unpaid liability per local employee statewide. We prefer to do this on a per employee basis rather than as a percentage of payroll because the benefit cost is not a function of salary. We multiply this per employee unpaid liability by the total

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group as defined by the pension report does not have a clear counterpart in the OPEB report, as large numbers of PERS employees are spread between the state, state/education and local groupings.

number of PERS and PFRS employees provided by the municipality to get a total unpaid OPEB liability. The 2010 actuarial report was used as it provides liabilities as of July 1, 2009.

To calculate a yearly payment on the unpaid liability, we mimic the state's method for amortization, but use the Treasury rate as the discount rate. The state uses a level percent amortization method that amortizes over 30 years with an assumption of a 4 percent increase in payroll.

$17 billion more in actuarial valuation when compared to market valuation (24 percent increase) – See Appendix 2 for 2010 data.

The 50 and 44 percent increase in personnel costs is calculated by taking our estimate of the total employee costs, subtracting the employee costs paid (Table 4) and dividing by the employee costs paid (Table 4).

Conclusion

$1.6 million in additional pension costs at risk-adjusted discount rate in Garfield was calculated by taking the additional normal costs at Treasury rate as compared to the state calculated normal cost (without policy effects). This is 9.16 percent for PERS and 20.54 percent for PFRS (the average of actuarial years 2008 and 2009). This additional normal cost percentage was multiplied by the PERS and PFRS payroll figures for Garfield in 2009.

The increase in benefit costs is calculated by taking the costs of active employee benefits as calculated and subtracting it by the benefit costs paid, then dividing it by the benefit costs paid.

Appendix 2: Additional Data

Spending Trends in Garfield

Table 4: Reported Budget Data for Garfield, New Jersey, 1990-2009

	1990	1995	1999	2001	2003	2005	2007	2009
Total budget	$17,272,071	$19,664,273	$23,167,764	$26,921,112	$20,881,451	$23,502,423	$26,069,133	$28,005,334
Total salaries	$4,062,623	$6,193,367	$7,420,378	$8,294,115	$9,289,543	$9,737,570	$10,518,638	$11,070,746
Salary as a percent of budget	**23.5%**	**31.5%**	**32.0%**	**30.8%**	**44.5%**	**41.4%**	**40.3%**	**39.5%**
Health insurance	$7,034	$999,404	$1,132,357	$1,468,268	$2,041,546	$2,489,485	$2,706,021	$3,152,536
Social Security	$48,000	$249,494	$324,000	$304,286	$342,947	$388,480	$413,408	$350,647
UI	$15,000	$0	$0	$30,000	$30,000	$100,000	$60,000	$50,000
PERS	$166,538	$39,255	$3,526	$12,102	$0	$34,886	$177,088	$215,821
PFRS	$321,049	$226,357	$528,098	$188,695	$0	$295,990	$891,888	$752,414
Total benefits	$557,621	$1,514,510	$1,987,981	$2,003,351	$2,414,493	$3,308,841	$4,248,405	$4,521,418
Total salary and benefits	$4,620,244	$7,707,877	$9,408,359	$10,297,466	$11,704,036	$13,046,411	$14,767,043	$15,592,164
Salary and benefits as percent of budget	**26.7%**	**39.2%**	**40.6%**	**38.3%**	**56.0%**	**55.5%**	**56.6%**	**55.7%**

Table 5: Factoring in Pension and Life Insurance Benefits for Current Employees - Three separate Pensions Estimates, Expressed as Dollar Total and Percent of Budget

Garfield, N.J.	**2001**	**2003**	**2005**	**2007**	**2009**
Total budget	$26,921,112	$20,881,451	$23,502,423	$26,069,133	$28,005,334

$ Total salary, (% of budget)	$8,294,115 (30.8%)	$9,289,543 (44.5%)	$9,737,570 (41.4%)	$10,518,638 (40.3%)	$11,070,746 (39.5%)
What do pensions and life insurance add?					
Estimate 1: Pension normal cost as reported +NCGLI (% of budget)	$267,859 (1.0%)	$643,578 (3.1%)	$854,979 (3.6 %)	$961,186 (3.7%)	$1,061,194 (3.8%)
Estimate 2: Pension normal cost removing policy effects + NCGLI	$822,858 (3.1%)	$924,470 (4.4%)	$1,069,450 (4.6%)	$1,187,884 (4.6%)	$1,278,512 (4.6%)
Estimate 3: Pension normal cost removing policy effects, discounted at Treasury rate + NCGLI	$1,998,338 (7.4%)	$2,239,568 (10.7%)	$2,531,745 (10.8%)	$2,724,824 (10.5%)	$2,907,082 (10.4%)
Adding salary to estimates					
Salary + estimate 1 (% of budget)	$8,561,974 (31.8%)	$9,933,121 (47.6%)	$10,592,549 (45.1%)	$11,479,824 (44.0%)	$12,131,940 (43.3%)
Salary + estimate 2	$9,116,973 (33.9%)	$10,214,013 (48.9%)	$10,807,020 (46%)	$11,706,522 (44.9%)	$12,349,258 (44.1%)

Salary + estimate 3	$10,292,453 (38.2%)	$11,529,111 (55.2%)	$12,269,315 (52.2%)	$13,243,462 (50.8%)	$13,977,828 (49.9%)

Table 6: Factoring in Health Care Benefits and Legally Required Costs for Current Employees

Garfield, N.J.	2001	2003	2005	2007	2009
Total budget	$26,921,112	$20,881,451	$23,502,423	$26,069,133	$28,005,334
$ Total salary, (% of budget)	$8,294,115 (30.8%)	$9,289,543 (44.5%)	$9,737,570 (41.4%)	$10,518,638 (40.3%)	$11,070,746 (39.5%)
Total full-time employees	142	148	152	164	152
What does health insurance for current employees add?	$1,071,173 (4.0%)	$1,408,828 (6.7%)	$1,710,950 (7.3%)	$2,046,111 (7.8%)	$2,291,748 (8.2%)
Cost of health insurance per employee	$7,543	$9,519	$11,256	$12,476	
$15,077 Total PERS and PFRS employees	202	210	218	231	214
What does OPEB for current employees add?	$1,215,814 (4.5%)	$1,594,998 (7.6%)	$1,957,919 (8.3%)	$2,299,545 (8.8%)	$2,052,215 (7.3%)
Cost of OPEB per employee	$6,019	$7,595	$8,981	$9,955	$9,590

Total health care costs for current employees	$2,286,988 (8.5%)	$3,003,826 (14.4%)	$3,668,870 (15.6%)	$4,345,656 (16.7%)	$4,343,963 (15.5%)
What do legally required benefits add?	$334,286 (1.2%)	$372,947 (1.8%)	$448,480 (2.1%)	$473,408 (1.8%)	$400,647 (1.4%)
Total health care, OPEB and legally required	$2,621,274 (9.7%)	$3,376,773 (16.2%)	$4,157,350 (17.7%)	$4,819,064 (18.5%)	$4,744,610 (16.9%)

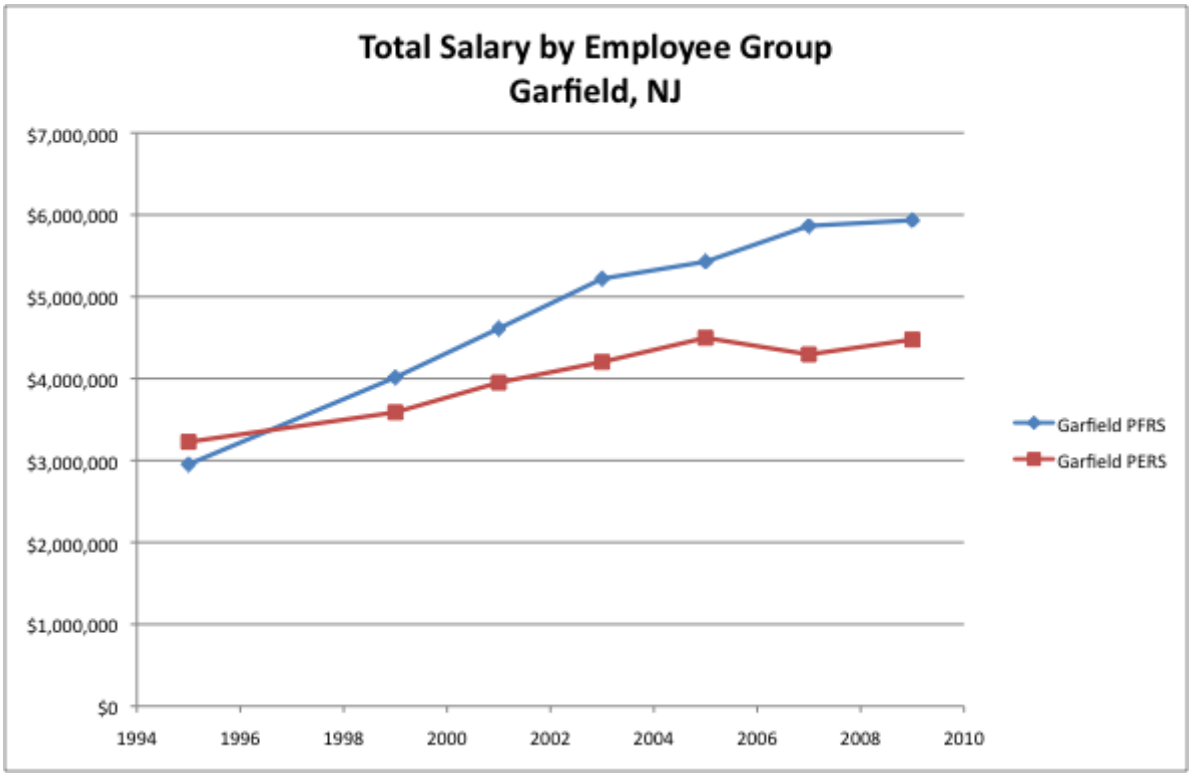
Table 7: Total Salary, Pensions, Health Care, and Other Benefits for Current Employees

Garfield, N.J.	**2001**	**2003**	**2005**	**2007**	**2009**
Total budget	$26,921,112	$20,881,451	$23,502,423	$26,069,133	$28,005,334
$ Total salary, (% of budget)	$8,294,115 (30.8%)	$9,289,543 (44.5%)	$9,737,570 (41.4%)	$10,518,638 (40.3%)	$11,070,746 (39.5%)
Pensions (Estimate 3: corrected and discounted at Treasury rate)	$1,998,338 (7.4%)	$2,239,568 (10.7%)	$2,531,745 (10.8%)	$2,724,824 (10.5%)	$2,907,082 (10.4%)
Health insurance for current employees	$1,071,173 (4.0%)	$1,408,828 (6.7%)	$1,710,950 (7.3%)	$2,046,111 (7.8%)	$2,291,748 (8.2%)
OPEB for current employees	$1,215,814 (4.5%)	$1,594,998 (7.6%)	$1,957,919 (8.3%)	$2,299,545 (8.8%)	$2,052,215 (7.3%)
Legally required benefits	$334,286 (1.2%)	$372,947 (1.8%)	$488,480 (2.1%)	$473,408 (1.8%)	$400,647 (1.4%)

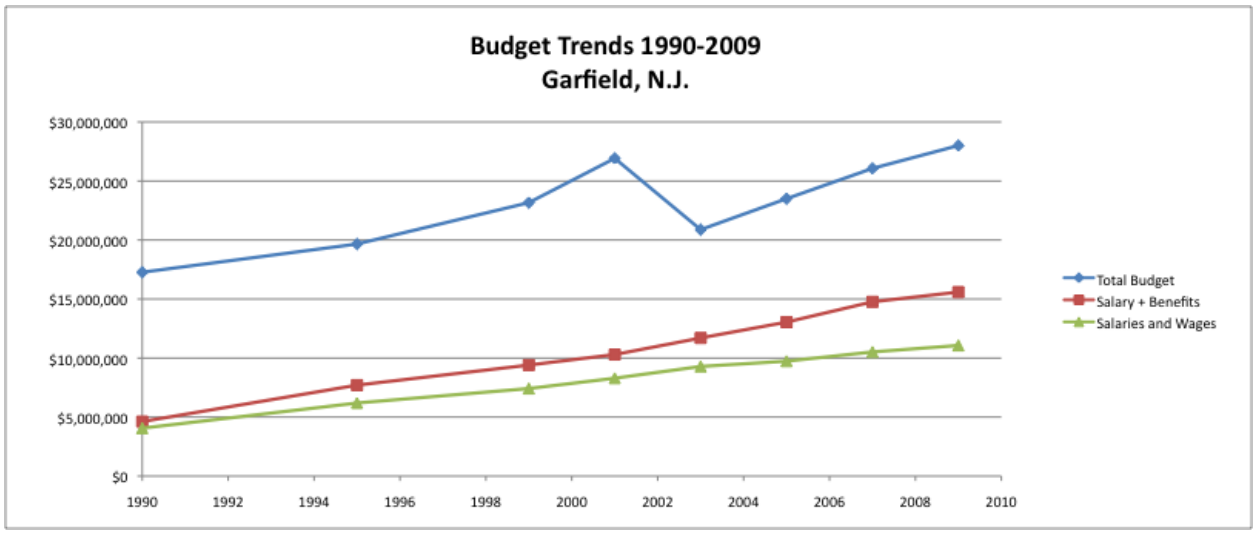
Salary plus all benefits	$12,913,726 (48.0%)	$14,905,884 (71.4%)	$16,426,665 (69.9%)	$18,062,525 (69.3%)	$18,722,438 (66.9%)

Chart

The charts below are built strictly with budget data. No estimated data is used.

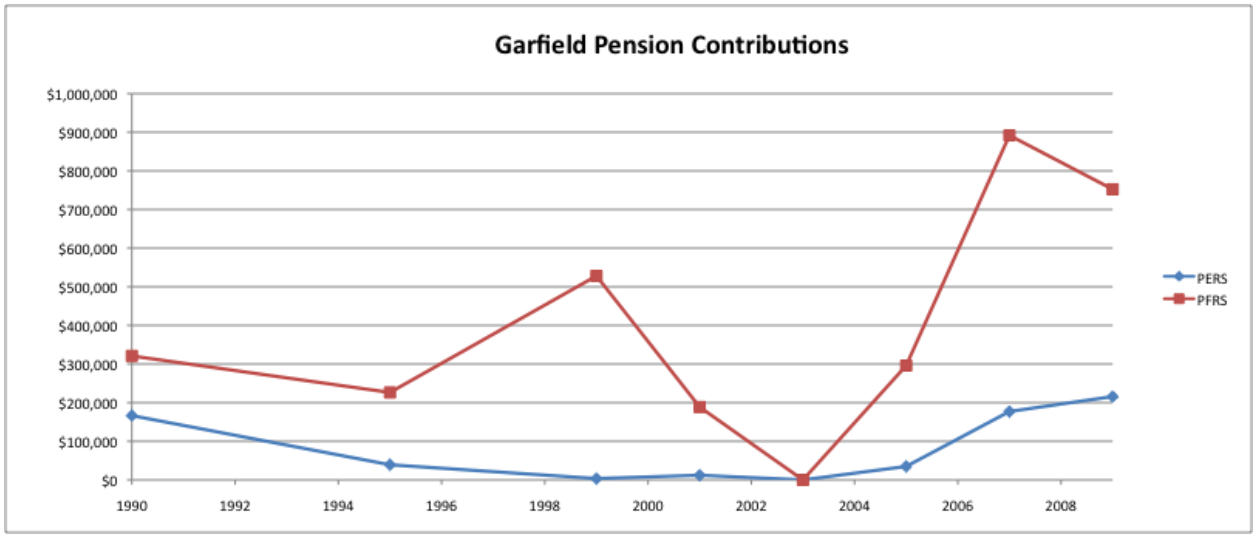


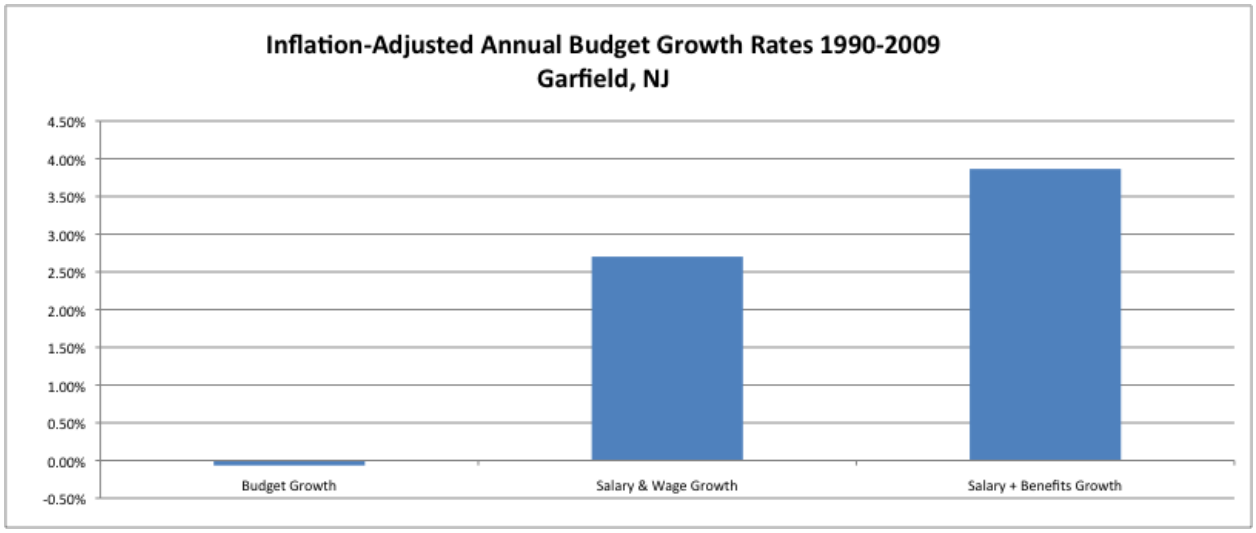
Budget Trends



PERS v. PFRS

Pension Contributions: Garfield, N.J.





Spending trends in Englewood Cliffs

Englewood Cliffs, N.J. Reported personnel costs

	1995	1999	2001	2003	2005	2007	2009
Total budget	$7,523,585	$7,496,084	$8,227,119	$9,240,092	$10,992,885	$12,440,463	$12,308,170
Total salaries	$2,901,110	$3,319,107	$3,738,611	$4,164,592	$4,919,491	$5,466,747	$5,557,740
Salary as a percent of budget	**38.6%**	**44.3%**	**45.4%**	**45.1%**	**44.8%**	**43.8%**	**45.2%**
Employee group health	$357,520	$347,981	$447,561	$648,670	$908,199	$1,034,317	$959,239
Social Security	$81,316	$103,549	$113,807	$133,088	$147,681	$179,824	$191,409
UI	$4,246	$149	$0	$0	$0	$0	$0
PERS	$6,454	$0	$0	$0	$8,017	$43,041	$64,920
PFRS	$156,147	$323,219	$116,551	$0	$138,934	$495,085	$415,847
Total benefits	$605,682	$774,898	$677,919	$781,758	$1,202,830	$1,752,266	$1,631,415
Total salary and benefits	$3,506,791	$4,094,005	$4,416,530	$4,946,350	$6,122,321	$7,199,013	$7,189,155
Salary and benefits as percent of budget	**46.6%**	**54.6%**	**53.7%**	**53.5%**	**55.7%**	**57.9%**	**58.4%**

Table 5: Factoring in Pension and Life Insurance Benefits for Current Employees - Three Separate Pensions Estimates, Expressed as Dollar Total and Percent of Budget

Englewood Cliffs, N.J.	**2005**	**2007**	**2009**
Total budget	$10,992,885	$12,440,463	$12,308,170
$ Total salary, (% of budget)	$4,919,491 (44.8%)	$5,446,747 (43.8%)	$5,557,740 (45.2%)
What do pensions and life insurance add?			

Estimate 1:Pension normal cost as reported +NCGLI	$434,176 (3.9%)	$480,234 (3.9%)	$527,624 (4.3%)
Estimate 2: Pension normal cost removing policy effects + NCGLI	$539,663 (4.9%)	$590,499 (4.7%)	$631,877 (5.1%)
Estimate 3: Pension normal cost removing policy effects, discounted at Treasury rate + NCGLI	$1,258,341 (11.4%)	$1,337,181 (10.7%)	$1,386,282 (11.3%)
Adding salary to Estimates			
Salary + Estimate 1	$5,353,667 (48.7%)	$5,926,981 (47.6%)	$6,085,364 (49.4%)
Salary + Estimate 2	$5,459,153 (49.7%)	$6,037,246 (48.5%)	$6,189,617 (50.3%)
Salary + Estimate 3	$6,177,832 (56.2%)	$6,783,927 (54.5%)	$6,944,022 (56.4%)

Table 6: Factoring in Health Care Benefits and Legally Required Costs for Current Employees

Englewood Cliffs, N.J.	2005	2007	2009
Total budget	$10,992,885	$12,440,463	$12,308,170
$ Total salary, (% of budget)	$4,919,491 (44.8%)	$5,446,747 (43.8%)	$5,557,740 (45.2%)
Total full-time employees	53	53	47

What does cost of health insurance add for current employees?	$649,236 (5.9%)	$719,605 (5.8%)	$710,545 (5.8%)
Cost of health insurance per employee	$12,250	$13,577$15,118	
Total PERS and PFRS employees	69	68	60
What does OPEB for current employees add?	$619,708 (5.6%)	$676,922 (5.4%)	$575,387 (4.7%)
Cost of OPEB per employee	$8,981	$9,955	$9,590
Total health care costs for current employees	$1,268,945 (11.5%)	$1,396,528 (11.2%)	$1,285,932 (10.4%)
What do legally required benefits add?	$147,681 (1.3%)	$179,824 (1.4%)	$191,409. (1.6%)
Total health care, OPEB and legally required	$1,416,625 (12.9%)	$1,576,351 (12.7%)	$1,477,341 (12.0%)

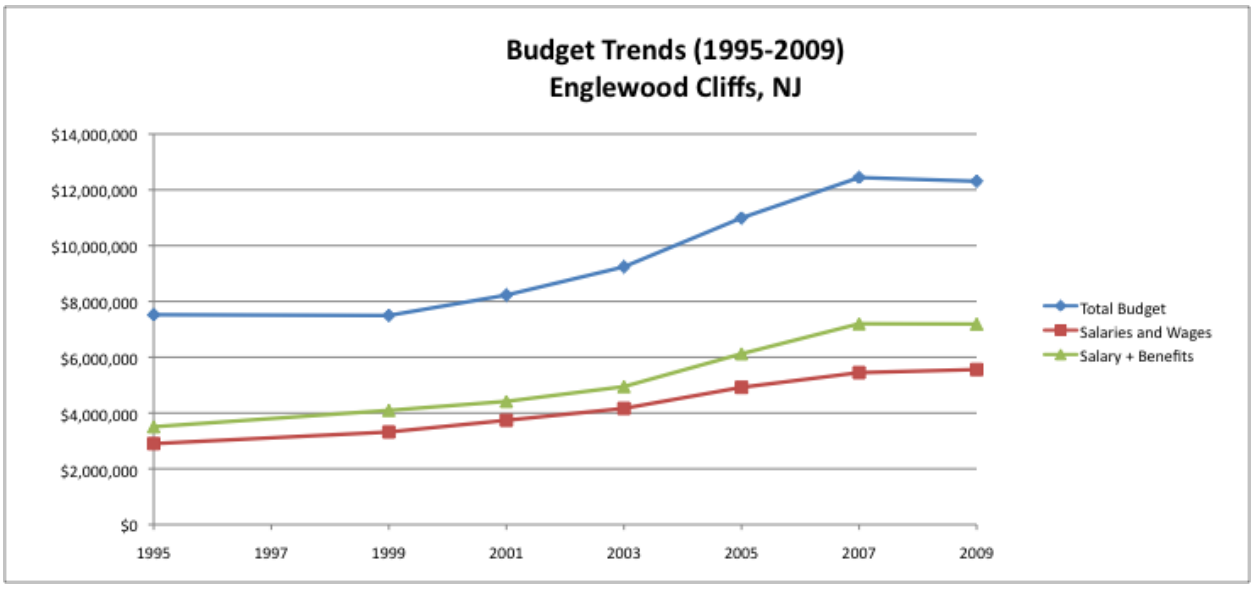
Table 7: Total Salary, Pensions, Health Care and Other Benefits for Current Employees

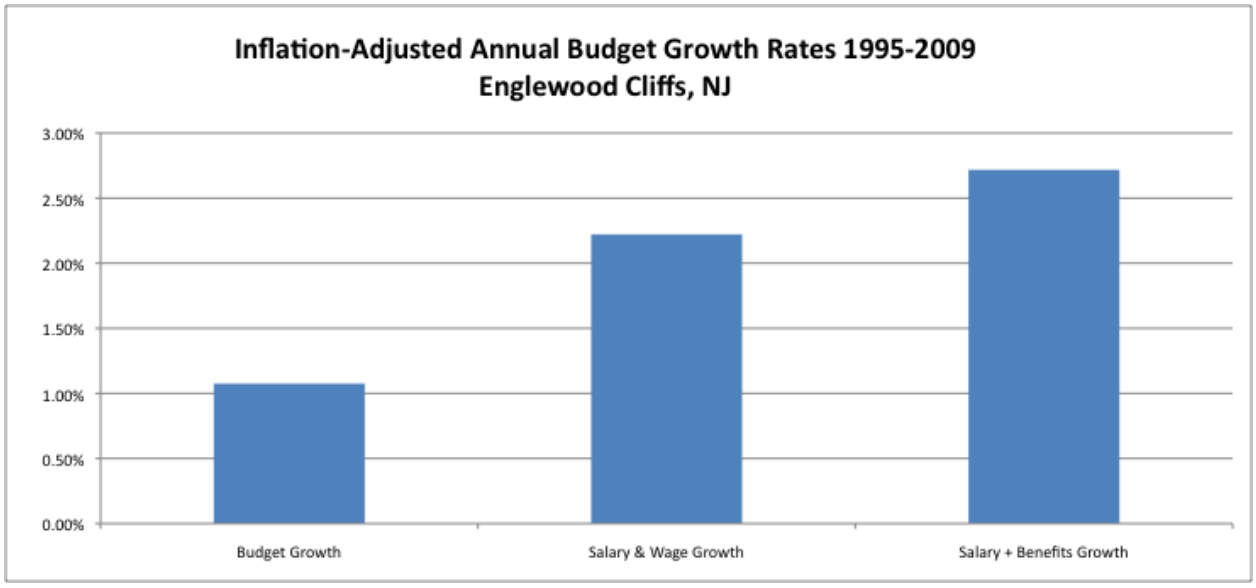
Englewood Cliffs, N.J.	**2005**	**2007**	**2009**
Total budget	$10,992,885	$12,440,463	$12,308,170

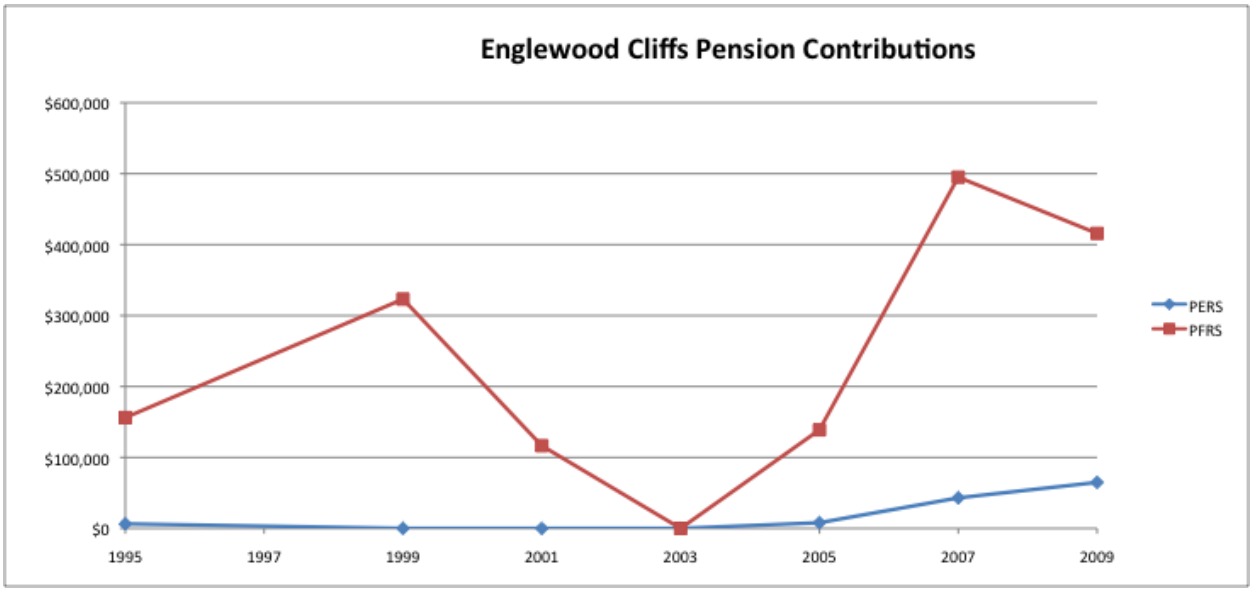
$ Total salary, (% of budget)	$4,919,491 (44.8%)	$5,446,747 (43.8%)	$5,557,740 (45.2%)
Pensions (Estimate 3: corrected and discounted at Treasury rate)	$1,258,341 (11.4%)	$1,337,181 (10.7%)	$1,386,282 (11.3%)
Health insurance for current employees	$649,236 (5.9%)	$719,605 (5.8%)	$710,545 (5.8%)
OPEB for current employees	$619,708 (5.6%)	$676,922 (5.4%)	$575,387 (4.7%)
Legally required benefits	$147,681 (1.3%)	$179,824 (1.4%)	$191,409 (1.6%)
Salary plus all benefits	$7,594,457 (69.1%)	$8,360,279 (67.2%)	$8,421,364 (68.4%)

Charts

Unfunded Accrued Liabilities, New Jersey, 2010




Inflation-Adjusted Annual Budget Growth Rates 1995-2009
Englewood Cliffs, NJ
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
Budget Growth
Salary & Wage Growth
Salary + Benefits Growth


Englewood Cliffs Pension Contributions
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
1995
1997
1999
2001
2003
2005
2007
2009
PERS
PFRS

Accrued Unfunded Pension Liabilities, New Jersey, as of July, 1 2010

	PERS	PFRS	SPRS	JRS	TPAF
Actuarial Value of Assets	$28,735,207,271	$23,464,481,781	$2,019,350,048	$329,030,387	$33,136,475,630
Market Value of Assets	$23,038,341,994	$19,785,551,526	$1,656,194,924	$261,523,992	$25,763,644,836
Present Value of Liabilities at 8.25% Discount Rate	$46,373,945,066	$34,064,273,640	$2,926,276,672	$619,927,765	$56,591,368,744
Unfunded Liability using Actuarial Value of Assets	$17,638,737,795	$10,599,791,859	$906,926,624	$290,897,378	$23,454,893,114
Unfunded Liability using Market Value of Assets	$23,335,603,072	$14,278,722,114	$1,270,081,748	$358,403,773	$30,827,723,908
Total Unfunded Liability using Actuarial Value of Assets	$52,891,246,770				
Total Unfunded Liability using Market Value of Assets	$70,070,534,615				
Present Value of Liabilities at Treasury Rate	$85,054,746,821	$62,477,500,371	$5,367,102,607	$1,137,013,446	$103,794,588,403

Unfunded Liability at Treasury Rate using Market Value of Assets	$62,016,404,827	$42,691,948,845	$3,710,907,683	$875,489,454	$78,030,943,567
Total Unfunded Liability at Treasury Rate using Market Value of Assets	$187,325,694,377				

Accrued Unfunded OPEB Liabilities, New Jersey, as of July 1, 2009

	OPEB
Actuarial Value of Assets	$0
Market Value of Assets	$0
PV of liabilities	$66,792,900,000
Unfunded liability using Actuarial Value of Assets	$66,792,900,000
Unfunded liability using Market Value of Assets	$66,792,900,000

Total Pension and OPEB at treasury discount rate for pension and using market value of assets	$254,118,594,377		
New Jersey		Pension/OPEB unfunded liability per	Just Pension unfunded liability per
2010 population	$8,791,894	$28,904	$21,307
2009 households	$3,152,877	$80,599	$59,414

Appendix 3: New Jersey Pension Asset Smoothing

Overview

New Jersey pension accounting uses an "actuarial value" of assets to determine unfunded liabilities rather than the market value of assets (MVL). An inflated actuarial value will decrease the Annual Required Contribution (ARC) due to governments causing unfunded liabilities to accrue even when they are making their full pension contribution.

The actuarial value of assets is calculated using a "smoothing" algorithm that is intended to gradually reflect positive or negative changes in market valuation, preventing sudden changes in funding ratios and required contributions.

Actuarial versus Market Valuation

The difference in accounting for actuarial versus market values is in how investment returns are handled. With a market valuation, the return is simply the real return on those market assets. In an actuarial valuation, an expected rate of return is used, and then the difference between the expected and the actual asset value is "smoothed" in.

The components used to calculate actuarial value in New Jersey are:

A_0=Actuarial value of previous year
A_1=Actuarial value of current year
M_1=Market value of current year
r = Expected rate of return = 8.25%
s = Smoothing factor = 20% of difference of market and expected actuarial value

In general, the formula is as follows:
$A_1 = A_0$ + expected gain + smoothing adjustment based on market value

Specifically, this is:
$A_1 = A_0 + A_0*r + s*(M_1-(A_0 + A_0*r))$

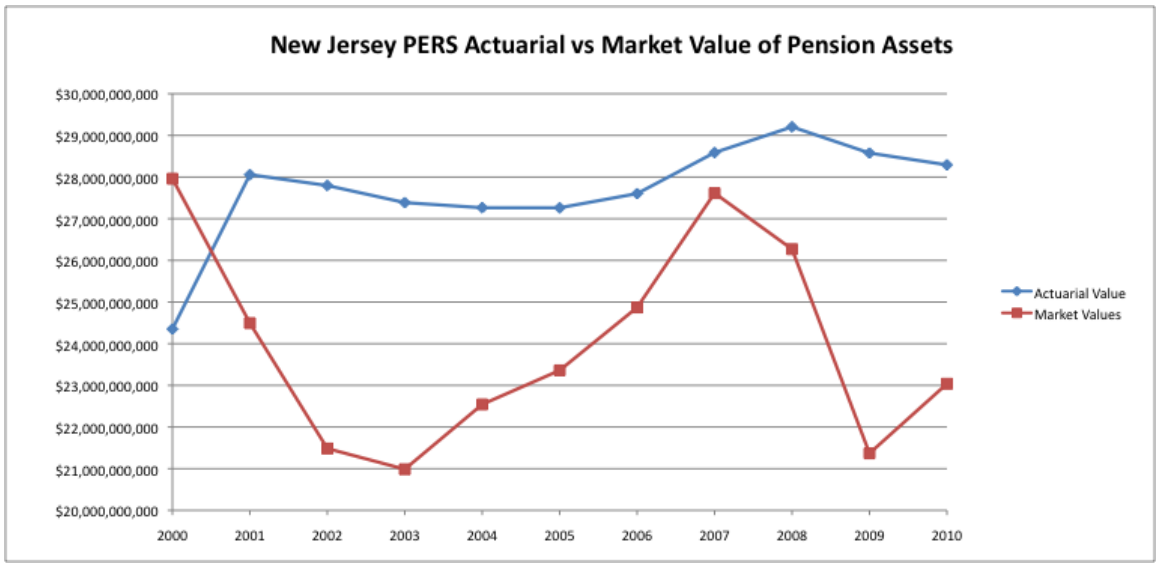
Substituting the current expected rate of return and adjustment factor for New Jersey gives:
$A_1 = A_0 + A_0*.0825 + .2*(M_1-(A_0 + A_0*.0825))$

Additionally, in both market and actuarial valuations, there is an accounting for asset inflows and outflows due to contributions, benefit payments, and other adjustments.

An Examination of 11 Years of PERS Data

The State of New Jersey published actuarial reports for PERS since 2000.[1] The last 11 years of actuarial and market values of assets for PERS is shown on the graph below.

[1] Department of the Treasury, State of New Jersey, "Archived Actuarial Reports," 2011, http://www.state.nj.us/treasury/pensions/actuarial-rpts-archive.shtml.

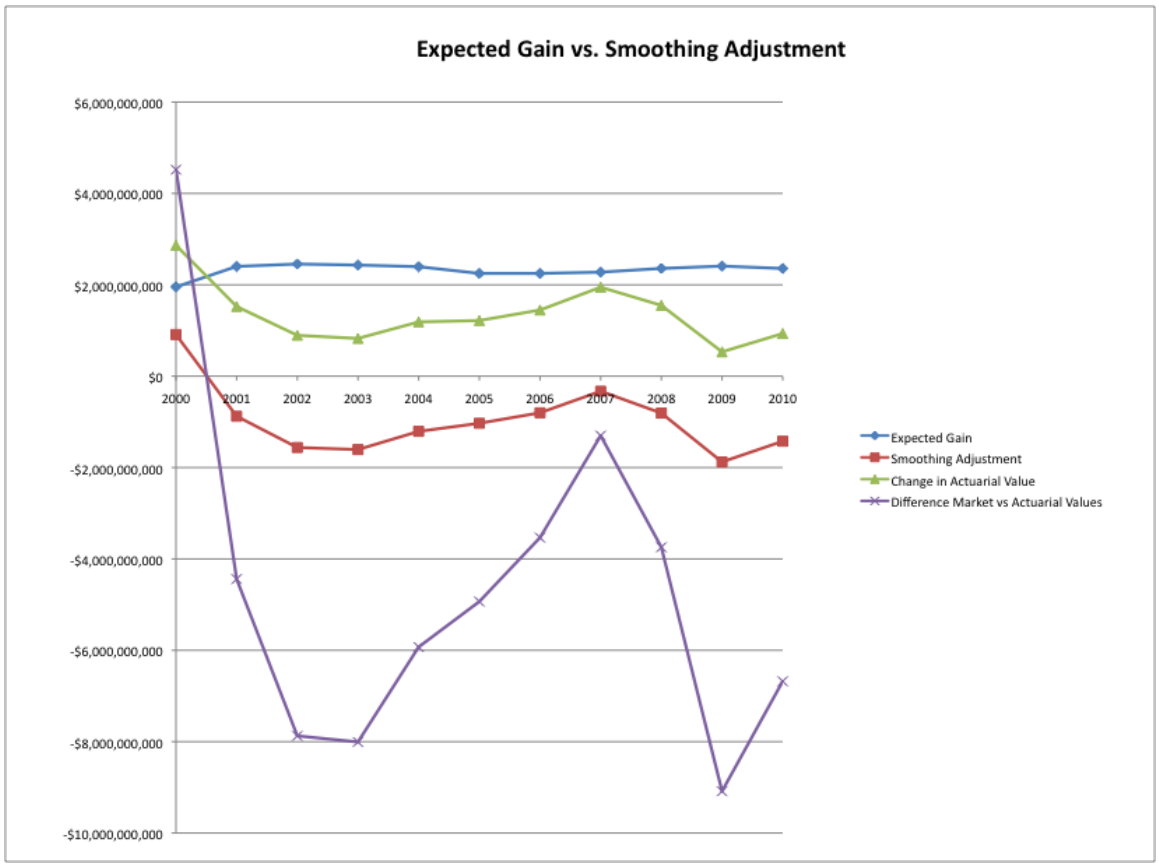


The only year where market values exceeded actuarial values was 2000. As actual asset inflows/outflows can affect the valuations, looking just at asset values can mask the affect of the core actuarial valuation algorithm. It is useful to look directly at the components of the algorithm as we do below.

In the following chart, the blue line represents the expected gain, which was 8.75 percent until 2004 and 8.25 percent since. The red line represents the smoothing adjustment, which has been negative in every year since 2001, as actuarial values have always exceeded market values.

The green line is the output from the formula described previously, which determines the change in the actuarial value from year to year. Since 2000, the market value has been below the actuarial value by as much as $9 billion. Yet the change to the actuarial value, which is simply the sum of the blue and red lines, has always been positive.

The purple line shows the difference between actuarial and market values of assets.



Even given large differences in actuarial and market values, the change in actuarial value based on the expected gain and smoothing adjustment remains positive.

What would the difference in actuarial and market values have to be to cause the actuarial value to decrease? Put another way, in a situation where the actuarial value is above the market value, when will the smoothing adjustment outweigh the expected gain? Going back to the formula:

Expected gain = A_0*.0825
Smoothing adjustment=.2*(M_1-(A_0+A_0*.0825)) = .2*(M_1-(A_0*1.0825)) = .2M_1-.2165A_0

To compare the magnitudes of the two factors, we take the negative of the smoothing adjustment. It will be a negative number when the actuarial value is above market value.

When will the expected gain be more than the smoothing adjustment?

A_0*.0825 > -[.2M_1-.2165A_0]
A_0 < 1.5M_1

As long as the actuarial value does not exceed the market value by more than 50 percent, the adjustment to the actuarial value will be positive.

This is illustrated in the data. In 2008, the expected actuarial value was over $30 billion while the market value was $21 billion, a $9 billion difference. The actuarial value was 43 percent higher than market value so the adjustment to the actuarial value stayed positive ($531 million), due to the expected gain ($2.4 billion) outweighing the smoothing adjustment (-$1.9 billion).

In a typical situation where actuarial values are overstated, the effect of the smoothing adjustment is to slow the growth of the actuarial value but not actually decrease the actuarial value. Only if actuarial values become vastly overstated will a negative adjustment occur. The initial graph of the data is misleading in this regard, as negative real outflows of assets to pay for benefits were the cause of the flat/negative trend in the actuarial values, not the actuarial valuation algorithm.

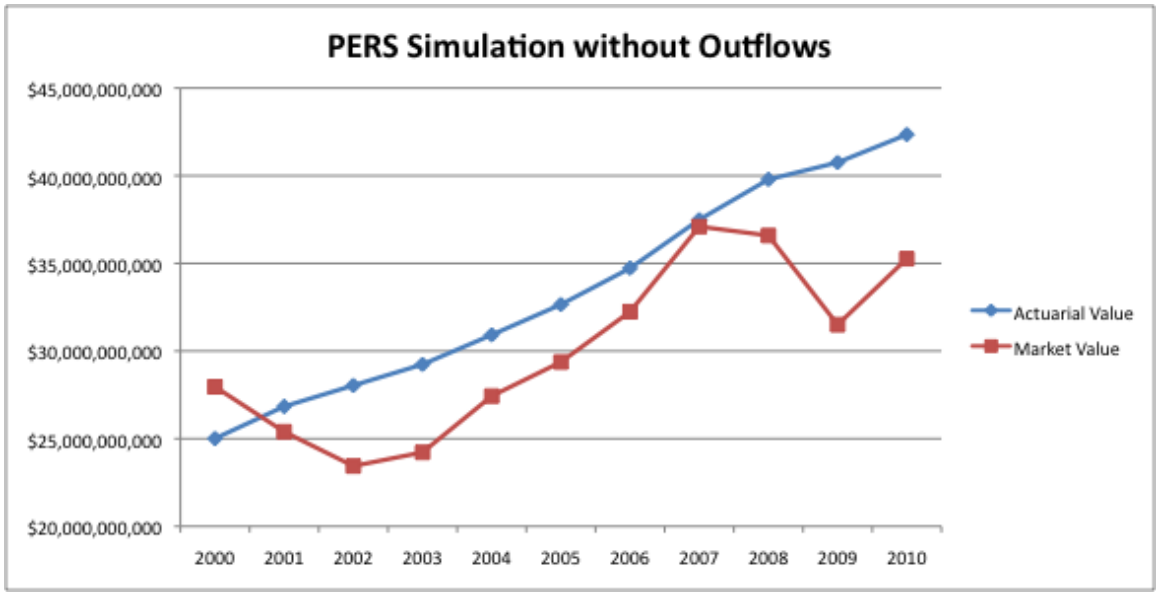
In the next section we will remove asset outflows to see a clearer picture of the core actuarial valuation calculation.

The Effect of Net Outflows on the Valuations

Factors other than investment return affect the asset valuations. Asset inflows and outflows due to contributions, benefit payments, and other adjustments also affect asset values.

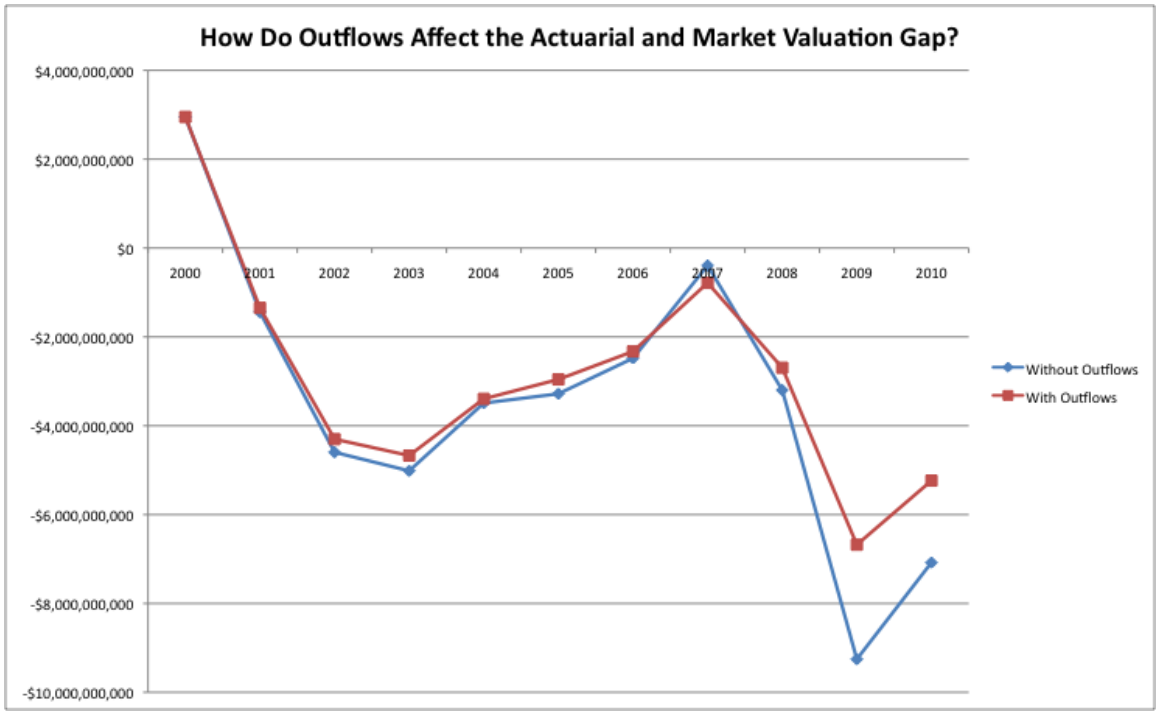
Since 2000, PERS has experienced negative net outflows of assets due to benefit payments being higher than contributions. These outflows mask the effect of the actuarial valuation algorithm. We remove outflows to simulate just the core components of the actuarial valuation: the expected gain and the smoothing adjustment.

We start with PERS actuarial and market values from 2000 and use the same market return rates as were achieved by PERS since 2000.



This illustrates the previous principle that the actuarial value continues to grow, even when the market value is far below actuarial value.

The difference between actuarial and market values with and without net outflows are similar. We add back in the real outflows from 2001 onwards to compare the net difference between actuarial and market values with and without net outflows.

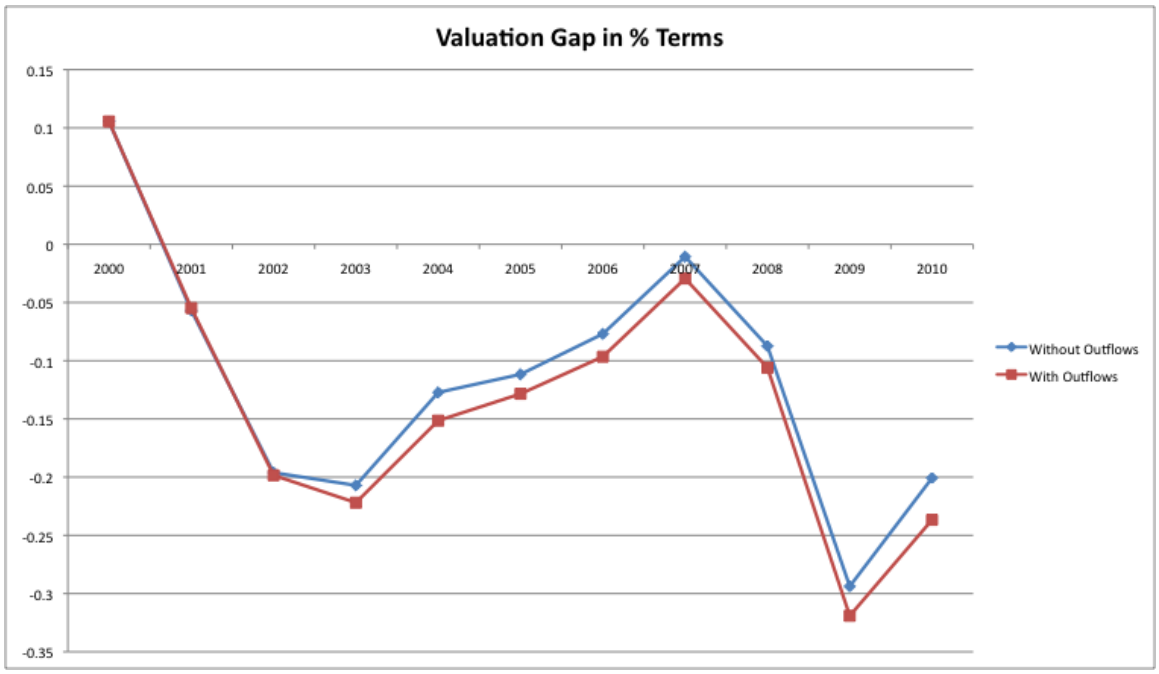


Removing outflows generally makes the gap between actuarial and market values larger. In this way, outflows often mitigate the problems of the actuarial asset overvaluation.

To understand why, it is useful to step back and think about why the gap exists. The reason is that expected returns differ from actual returns. Without outflows, there are more assets to apply these returns to, making the gap larger. While the smoothing adjustment grows as well, it does not grow enough to offset the gains from the larger asset pools.

In some cases, removing outflows can make the gap smaller. The first such case occurs when market values are below actuarial values and market returns are higher than expected returns. This occurred in 2007, when market returns were 15 percent. The second case occurs market values are above actuarial values and market returns are lower than expected returns. This did not occur during this time period. In both cases, the return on the “extra” assets provided without outflows serves to close the gap between actuarial and market values.

However, when taking the gap as a percentage of market valuation, outflows make it larger.



Without outflows the gap between actuarial and market values is $7,079,481,899. Actuarial values are 20 percent higher than market values. Adding the real outflows from 2001 onwards gives a valuation gap of -$5,235,340,458, which is 23.7 percent higher than market values.

Compare this to the real gap of $6,678,944,250, or 29 percent of market values, seen by PERS today. Why is the real gap so much larger in percentage terms? The actuarial and market values of assets do not carry over from year to year consistently in the PERS actuarial reports, causing jumps in values that are not related to the actuarial valuation algorithm. The largest jump is seen between the 2000 and 2001 reports. In 2000, the actuarial valuation is listed as $24,312,734,508. In the 2001 report, the 2000 valuation is listed at $27,453,373,168. This large jump is due to Chapter 133, P.L. 2001, which revalued the actuarial valuation retroactive to the June 30, 1999 market value. This jump caused much of the larger gap seen in the real data.

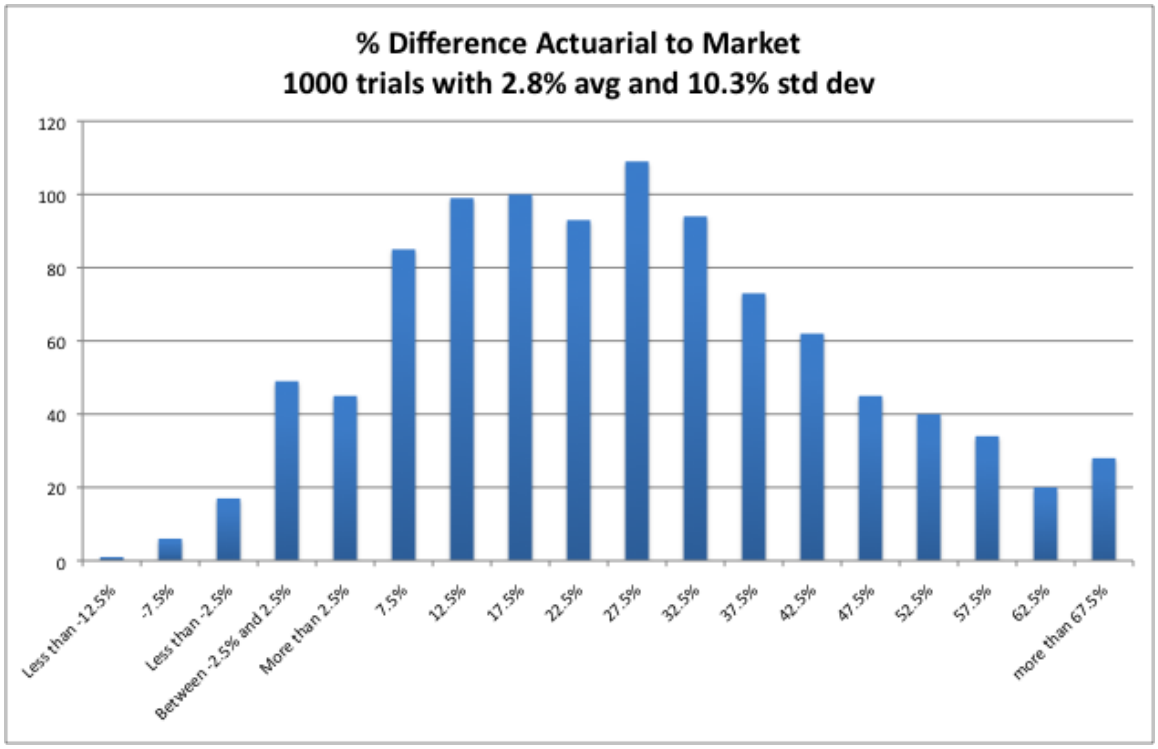
Monte Carlo Simulations

The average market return achieved by the PERS assets since 2000 was 2.8 percent, with a standard deviation of 10.3 percent. We ran a Monte Carlo simulation with 1,000 trials using randomized returns on a normal distribution with the above-average and standard deviation.

In this Monte Carlo simulation, the average difference in actuarial and market valuation was $7,658,426,901 with a standard deviation of $4,827,985,789. This is close to the $7,079,481,899 gap seen previously when using real market returns. This indicates that the results seen in the past 11 years are not the result of an unusual sequence of returns, but rather they are the expected result of a market underperforming expectations.

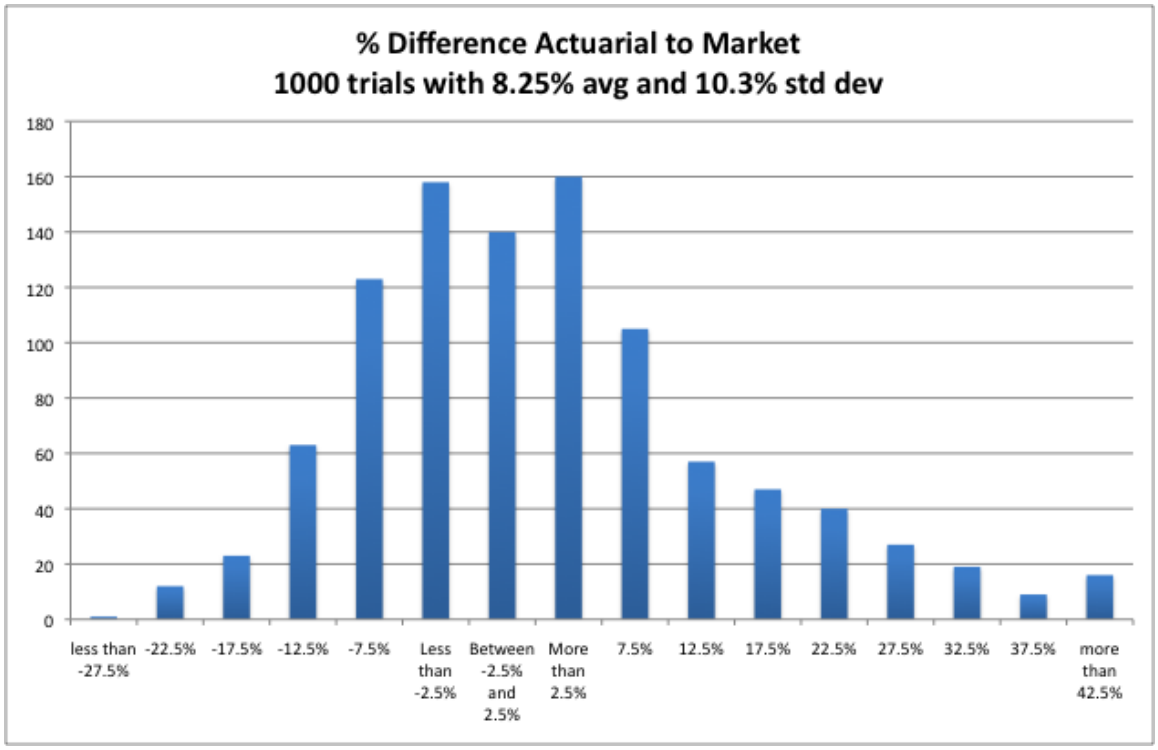
The chart below details the distribution of actuarial valuations by percentage difference to market valuation. For reference, using the real returns (without outflows) seen since 2000 resulted in a 20 percent gap between actuarial and market values.

A negative percentage means that the market valuation was higher than the actuarial valuation.



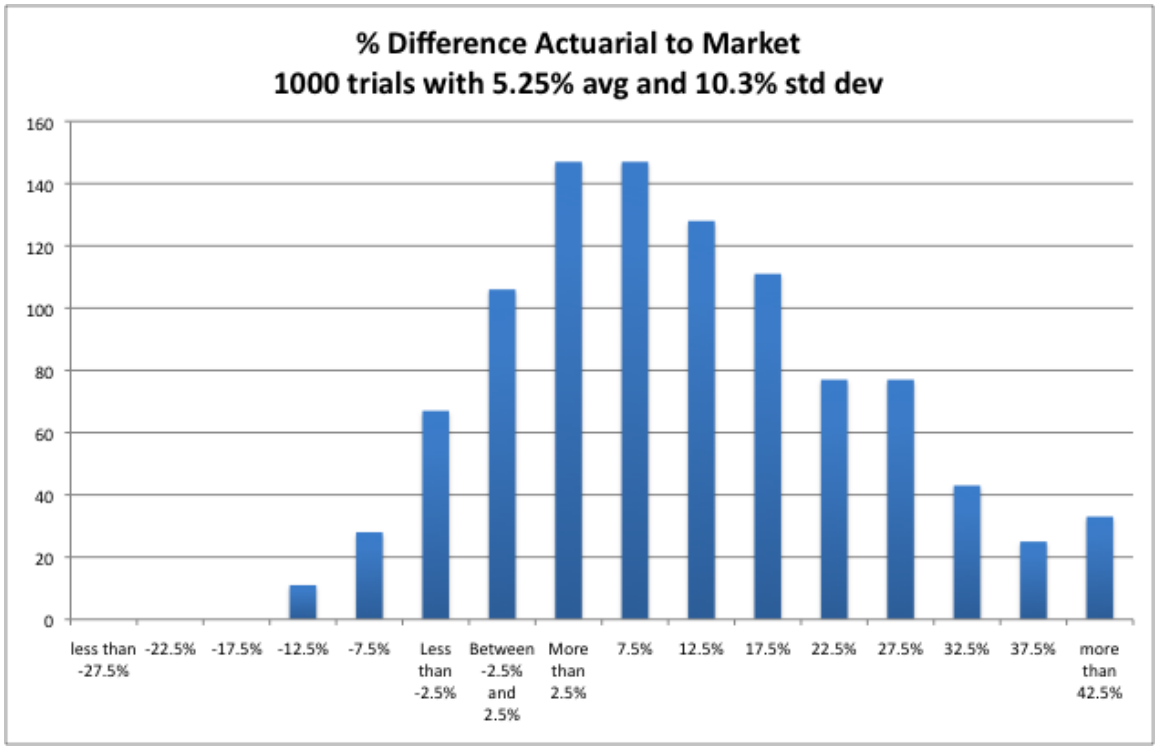
The 20 percent gap seen previously falls a bit below the middle of the distribution, with 581 of the trials showing a gap greater than 22.5 percent. The average difference is 23.5 percent overvalued, with a 13.6 percent standard deviation.

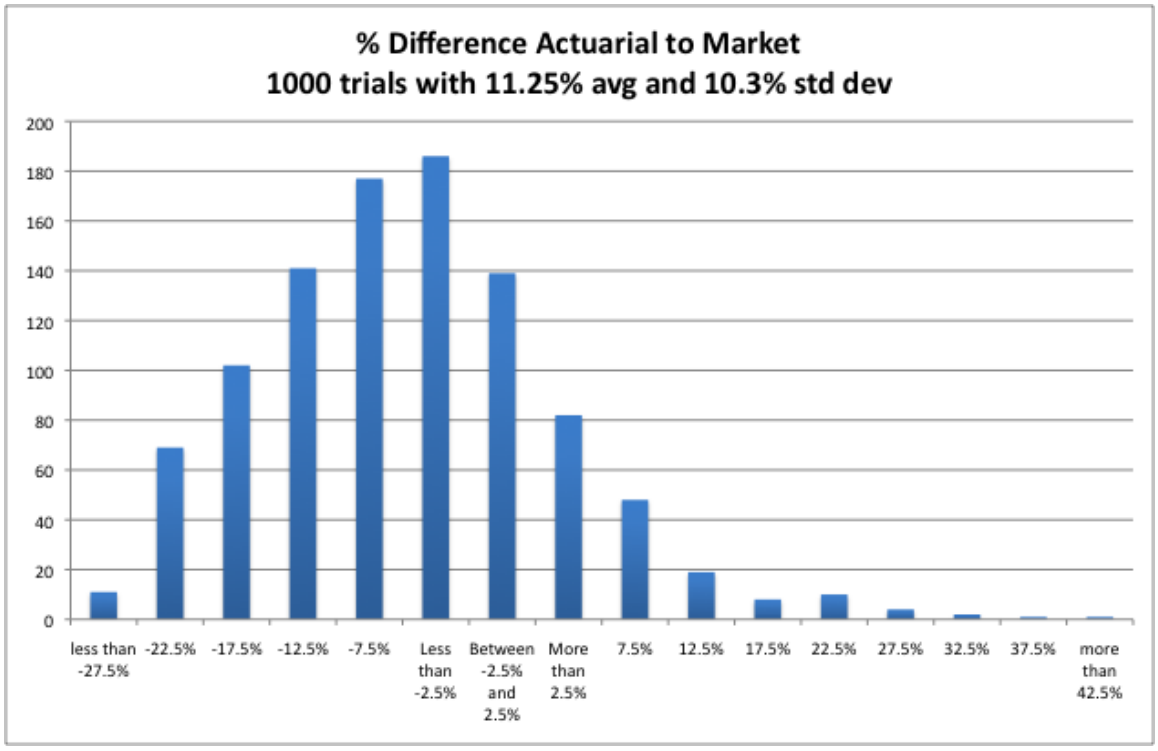
The next simulation features the same standard deviation, but with an average return of 8.25 percent, equal to the expected return of the actuarial valuation algorithm. This would mimic a market with the same volatility seen since 2000, but with a higher average return.



Even at the expected rate of return, the actuarial valuation algorithm will favor overvaluing actuarial assets, sometimes greatly so. In the distribution above, 480 trials were 2.5 percent or more overvalued compared to 380 that were 2.5 percent or more undervalued. Additionally, there are far more highly overvalued trials than undervalued. The average was 0.6 percent undervalued with a 13.9 percent standard deviation.

Additional simulations were run with an average market return 3 percent below and 3 percent above the expected rate of 8.25 percent.





With a 5.25 percent average market return, actuarial assets are, on average, 12.3 percent overvalued with a 12.5 percent standard deviation. When the average market return is increased to 11.25 percent, actuarial values are, on average, 9.9 percent undervalued with a 13.7 percent standard deviation.

When comparing the distributions in these two scenarios, it's clear that the algorithm favors greater overvaluation rather than undervaluation in similar above and below market return settings.

Conclusion

The actuarial valuation algorithm used by New Jersey has allowed actuarial asset values to remain far above market values for a decade. This has shrunk required contributions, causing an unpaid liability to accrue even when governments pay their full contribution.

The actuarial valuation algorithm will not negatively adjust unless it becomes more than 50 percent overvalued, meaning that overvaluation can persist for many years. Through a variety of Monte Carlo simulations of market settings, the algorithm consistently favors overvaluation.