



AN OVERVIEW OF THE PENSION/OPEB LANDSCAPE

Alicia H. Munnell and Jean-Pierre Aubry

CRR WP 2016-11

October 2016

Center for Retirement Research at Boston College
Hovey House
140 Commonwealth Avenue
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-0191
<http://crr.bc.edu>

Alicia H. Munnell is the Peter F. Drucker Professor of Management Sciences at Boston College's Carroll School of Management and director of the Center for Retirement Research at Boston College (CRR). Jean-Pierre Aubry is associate director of state and local research at the CRR. The research reported herein was supported by the Center's Partnership Program. The findings and conclusions expressed are solely those of the authors and do not represent the opinions or policy of the partners or the Center for Retirement Research at Boston College.

© 2016, Alicia H. Munnell and Jean-Pierre Aubry. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Introduction

It is impossible to discuss municipal finance without considering the cost of pensions and other post-retirement employee benefits (OPEB), the largest of which is retiree health insurance. These costs have received enormous press coverage, usually incorporating sweeping generalities about the burden of employee post-retirement benefits for the nation as a whole. Much is made of the bankruptcies in Vallejo, California (2008); Prichard, Alabama (2010); Central Falls, Rhode Island (2011); Stockton, California (2015); and Detroit, Michigan (2015). At the state level, the pension situation in Illinois, New Jersey, and Connecticut is often described as typical. No one mentions Delaware, Florida, Georgia, Tennessee, and North Carolina – states that have done a good job of providing reasonable benefits, paying their required contributions, and accumulating assets. The point is that the picture at the state and local level is extremely heterogeneous, so it is crucial to look at the numbers state by state and locality by locality.

This paper provides a comprehensive accounting of pension and OPEB liabilities for state and local governments and the fiscal burden that they pose. The analysis includes plans serving more than 800 entities: 50 states, 178 counties, 173 major cities, and 415 school districts related to the sample of cities and counties. The analysis apportions the liabilities of state-administered cost-sharing plans to participating local governments for a more accurate picture of which governmental entity is actually responsible for funding pension and OPEB liabilities. The cost analysis calculates, separately, pension and OPEB costs as a percentage of own-source revenue for states, cities, and counties. It then combines pension and OPEB costs to obtain the overall burden of these programs. Finally, it adds debt service costs to provide a comprehensive picture of government revenue commitments to long-term liabilities.

The discussion proceeds as follows. The first section establishes the framework for analysis, describing the role of new standards from the Government Accounting Standards Board (GASB 68) in allocating the liability in cost-sharing plans between states and localities. In order not to muddy the waters, wherever possible we have adopted assumptions similar to Michael Cembalest (2016) at JP Morgan. The second section presents 2014 pension data at the state and local level as a percentage of revenues. The third section shifts to OPEB costs and reports current and required payments for states, cities, and counties. The fourth section brings together pension and OPEB costs, and adds the cost of servicing debt for each level of government. The

final section concludes that the situation varies enormously among states, cities, and counties. Some look very bad, while others are managing their affairs effectively.

Establishing the Framework

Calculating the burden of pensions and OPEBs on government revenues requires several steps. The first is to follow GASB 68 and to reallocate to cities and counties their share of state liabilities and assets. The second is to select a particular measure of required contributions and the appropriate interest rate to discount promised benefits. The third is to select the appropriate revenue base for calculating the burden. As with Cembalest (2016), for both pensions and OPEBs, actual contributions are collected directly from government Comprehensive Annual Financial Reports (CAFRs) and government revenue and interest expense on debt come directly from the Census of Governments.

Applying GASB 68

In an effort to increase the visibility of pension commitments, GASB Statement 68 moves pension funding information from the footnotes of financial statements to the balance sheets of employers. It also requires employers that participate in so-called “cost-sharing” plans to provide information regarding their share of the state pension on their books.

A “cost-sharing” plan is a type of multiple-employer plan; the other type is an agent plan. In agent plans, assets are pooled for investment purposes but the plan maintains separate accounts so that each employer’s share of the pooled assets is legally available to pay benefits for only its employees. In cost-sharing plans, the pension obligations, as well as the assets, are pooled, and the assets can be used to pay the benefits of any participating employer. For employers participating in agent plans, their share of the plan has always appeared in the notes of their financial statements, so the only change is moving that information into the balance sheet. In contrast, until 2015, employers participating in cost-sharing plans did not report their share, so including their share of state plan assets and liabilities on the balance sheets is a major change.

Figure 1 illustrates the flow of pension payments from city governments to various pension plans to which they contribute. The story would be similar for counties. For most city governments, pension payments include contributions to city-administered plans (often covering general employees and/or police and fire); contributions to non-teacher plans administered at the

state level; and, very occasionally, contributions to state teacher plans. Generally, teacher plans receive their contributions from school districts, which raise their own revenue. An analysis of school district programs is presented in Appendix A because these programs do not fit easily into the fiscal format presented below.¹

The government financial reports for 2015 include the share of pension liabilities for entities participating in cost-sharing plans. The exercise presented below, however, uses 2014 data because that is the latest year available for many cities and counties. As a result, we estimate the allocation based on a city's or county's Annual Required Contribution (ARC) for a given state plan as a percentage of the plan's total ARC. If ARC information is not available, the apportionment is based on the ratio of a city's actual contributions to the state plan's total actual contributions. More than half the cities (104 of the 173) and counties (97 of the 178) in our sample participate in cost-sharing state plans and are affected by GASB 68. Figure 2 shows the impact of the new GASB 68 reporting on the distribution of pension liabilities. Of course, when GASB 68 shifts the recognition of liabilities from the states to the cities and counties, it reduces the unfunded liability for the states by a corresponding amount. Both the pension and OPEB data presented below attribute the liabilities and the assets to the governmental entities ultimately responsible for payment.

Calculating the Expense of Pensions and OPEBs

Calculating the annual pension and OPEB burden requires three steps. The first is selecting an interest rate for discounting future benefit promises. The second is defining the contribution concept. The final step involves adjusting the reported data to align with the selected concepts.

Choosing a discount rate. In 2014, the nominal, long-term return assumption used by state and local pension plans averaged 7.6 percent, ranging from 6.25 percent to 8.50 percent. (The following discussion does not get into the debate by some financial economists that sponsors should use a riskless rate to discount promised benefits.) Figure 3 shows that during the 1955-2014 period, the average rolling 10- and 30-year nominal returns for a hypothetical

¹ These types of direct contributions made by the city or school district to the pension plan are represented by the solid lines in the Figure. Occasionally, cities transfer funds to the school district, which is represented by the dotted line in the Figure.

portfolio (65 percent stocks/35 percent bonds) exceeded the long-term return assumption by at least 100 basis points. Therefore, the average long-term nominal return assumption appears quite reasonable based on history, particularly over longer periods. But, many investment experts suggest that future equity returns could be considerably below historical averages (see Table 1), and returns on bonds are at historically low levels. To be conservative and consistent with the Cembalast (2016) analysis, we have adopted a nominal return of 6 percent.

Selecting the concept. For both pensions and OPEBs, the annual required payment consists of two components – one to cover costs of benefits accruing in the current year (the normal cost) and another to amortize the plan’s unfunded actuarial liability. Two problems arise, however. First, many plans do not pay their required contribution, either as a policy choice or because their plan is subject to a statutory contribution rate that is less than the full required contribution. Second, in a number of cases the amortization payment is structured in such a way that the unfunded liability will never be paid off. Specifically, sponsors set the amortization payment as a fixed percentage of future payrolls – assumed to grow annually – and then reset the amortization payment each year as the 30-year amortization period rolls forward. Another alternative, followed by nearly half of the plans in our sample, is to use a closed 30-year amortization period but “start over” periodically by resetting the 30-year period midway through – just as the required payments begin to escalate substantially. While this approach produces better outcomes than relying on an open 30-year amortization period, it still does not produce full funding.

Thus, the pension expense can be measured in a number of ways: 1) how much plans actually contribute; 2) the plan’s annual ARC; and 3) a required contribution that will actually pay off the unfunded liability. To be consistent with a recent analysis by Cembalest (2016), we have adopted options 1 and 3 – “actual” and “required,” where required is defined as the normal cost plus a 30-year amortization of the unfunded liability in level dollar payments.

Adjusting the reported data. The goal is to recalculate the pension and OPEB ARCs to reflect a 30-year level-dollar amortization of the UAAL at a 6-percent discount rate. The first step is to separate the ARC into the normal cost and amortization payment components, because the adjustments affect each component differently. For many of the major plans, data on the two components are readily available through the Public Plans Database. In cases where the government is participating in a cost-sharing state pension plan for which data are available, the

government's ARC is assumed to reflect the proportion of normal costs to amortization payment for the state plan as a whole. When plan data are not available, the funded ratio and interest rate are used to estimate the amortization payment, with the remaining amount being attributed to normal costs. The results of this approach show that the normal cost amounts to about a third of the pension ARC and about half of the OPEB ARC.

Once the ARCs have been separated into their normal-cost and amortization-payment components, each portion is adjusted separately. The normal cost is adjusted using an actuarial rule-of-thumb that assumes a 22-percent increase in the normal cost for each 1-percent change in the discount rate. The adjustment for the amortization payment involves three steps: 1) re-discounting the accrued liability using an actuarial rule-of-thumb that assumes a 12.5 percent change for each 1-percent change in the discount rate; 2) calculating a new UAAL using the actuarial assets and the re-discounted liability; and 3) calculating an amortization payment for the new UAAL assuming a 6-percent interest rate and 30-year amortization period. The adjusted normal cost and amortization payments are then re-combined to get a new required contribution – one that will actually pay off the unfunded liability.

Our results for *states* align closely with Cembalest (2016); Cembalest (2016) did not address cities or counties. A few discrepancies remain, however, due to the following four factors (listed in order of impact): 1) our method for parsing out the normal cost and amortization payment is based on actual plan data, while Cembalest (2016) backs out the results using a multi-step process; 2) we adopt a 6-percent discount rate for all pension plans, even those using a lower rate for reporting; 3) our adjustments to the normal cost and amortization are based on actuarial rules-of-thumb rather than the duration and yield curve; and 4) our pension and OPEB data are based on 2014 reported data, rather than 2015.

Selecting the Appropriate Revenue Base

The final step is to select the appropriate revenue base. The decision is more difficult than it first appears, because each level of government receives not only revenues it raises itself but also transfers from higher levels of government, and it pays money to lower levels. Thus, one could use either own-source revenues or net revenues (own-source plus net transfers). At the state level, the decision is relatively easy; the money the states receive from the federal government roughly equals the amount the states pay to counties, cities, and school districts.

That is, own-source and net revenues are roughly the same (see Table 2). For consistency with Cembalest (2016), we use own-source revenues at the state level. In addition to revenue from own-sources, this measure includes other general revenue, interest on the general fund, and liquor store profits.

Deciding on a revenue base for counties, cities, and school districts is more difficult, because these entities get, on average, 33 percent, 20 percent, and 55 percent of their revenues from other governments. For counties and school districts, most of the money comes from the state; for cities, a substantial share also comes from the federal government. Using own-source revenue as the denominator overstates the drain on the locality's total resources, but provides a sense of the tax increase required if pension or OPEB costs come in higher than expected. The following analysis reports costs as a percentage of own-source revenues in the text, but the results based on net revenues (own-source plus net transfers) are presented in Appendix B.

Pension Contributions as a Percentage of Own-Source Revenues

The data for this analysis include pension and OPEB liabilities from 50 states, 178 counties, 174 major cities, and 415 school districts related to the sample cities and counties. By payrolls, the sample accounts for 100 percent of states, 46 percent of counties, 43 percent of cities, and 26 percent of school districts (see Figure 4). Only about 40 percent of the pension liabilities in state-administered plans are the responsibility of state government; the other 60 percent are the responsibility of the local governments.

Figure 5 shows current and required (with a 6-percent discount rate and level-dollar amortization over 30 years) pension contributions as a percentage of own-source revenues by state. The states are ranked by their final standing once pension, OPEB, and interest cost have been combined, so they are not in perfect descending order. Nevertheless, the costs vary dramatically from a high of 29 percent of own-source revenues in Illinois to a low of 1 percent in Nebraska. Note, however, that the costs are below 10 percent of revenues in all but nine states and below 5 percent of revenues in 24 states.

Figure 6 presents current and required pension contributions for counties. As discussed above, these costs are a high percentage of own-source revenues in part because own-source revenues account for only two thirds of total county resources. However, even reducing these percentages by a third still leaves many California counties with substantial costs (see Appendix

B, Figure 20). Given that the money to pay county pension costs must come from either the state or county own-source revenues, it is interesting to calculate combined pension costs for California, Maryland, and Virginia – three states where counties play a major role. That is, the numerator includes the current and required pension costs for the state and the counties in that state, and the denominator includes the state own-source revenues and the counties' own-source revenues. This constructed state/county pension cost burden is compared with the state pension cost alone (see Figure 7). The calculation highlights the importance of considering counties in those states where they play a significant role.

Figure 8 presents for cities the actual and required pension payment as a percentage of own-source revenues. Of the 50 largest cities, eleven – Chicago, San Jose, Miami, Houston, Baltimore, Portland, Omaha, Boston, Tucson, Phoenix, and Las Vegas – faced pension contributions in excess of 20 percent of own-source revenues. On the other hand, 18 of the 50 had required pension contributions of less than 10 percent.

The county and city calculations raise an issue that does not arise at the state level. The vast majority of cities and counties function independently from their associated school districts, with the school district maintaining separate administration and finances. However, 51 of the over 350 cities and counties in our sample do include a school district. For example, in Maryland and Tennessee, most of the county governments operate school systems. In New York City and Boston, the school districts are part of the city government. Given that school districts account for nearly half of local government finances, their inclusion in some local governments but not others will distort measures of costs across municipalities. Therefore, for local governments that include school districts, we separate school district costs and revenue from that of the local governments. While pension and OPEB costs for the school district and its parent government are reported separately in the parent-government's financial report, separate revenues must be estimated. Our decision is to allocate revenues based on payrolls. For example, in the 2014 Census, the City of Boston reports that just over 45 percent of its total payroll is for education professionals, so 45 percent of the city's finances are allocated to the school district, leaving 55 percent for the city itself. Pension and OPEB costs for the local government and school district are then reported relative to the newly apportioned finances. It is unclear the extent to which this ad hoc adjustment distorts the final results.

The overall picture emerging from the pension exercise is that required pension payments are an extraordinarily large percentage of own-source revenues for a small percentage of states, counties, and cities, but many governmental entities appear to have their pension costs under control. Pensions, however, are just one component of the required payments facing governments. In addition, most state and local governments provide other post-employment benefits (OPEBs), the largest of which is retiree health insurance.²

OPEB Contributions as a Percentage of Own-Source Revenues

Retiree health plans have received increased attention in recent years due to rapidly rising health costs and new reporting guidelines from the GASB. These GASB 45 guidelines, which were released in 2004 and became effective in 2007, require states and localities to change the way they account for the cost of retiree health plans from a cash to an accrual basis, essentially applying to OPEB plans the standards used for pensions.³ Specifically, public sector employers must regularly report for their retiree health plans the actuarial accrued liability, the actuarial value of assets, the unfunded liability, the funded ratio, and the ARC payment. Soon, GASB 75 will supersede GASB 45, and narrow the allowable actuarial cost methods that can be used for reporting liabilities as well as require the liability of cost-sharing OPEB plans to be apportioned to participating employers.⁴

Although GASB 45 does not *require* sponsors to establish trust funds or move toward full funding, it provides an incentive to fund by allowing them to use a higher rate to discount future benefit promises once they set up a trust and commit to paying the ARC.⁵ That is, with funding, the actuary can discount obligations by the expected long-term return on plan assets rather than the lower short-term rate used for plans without funding.

The data for the OPEB analysis span the same sample of over 800 government entities used in the pension analysis. The provision of OPEB benefits, however, is much less centralized

² OPEB costs also include dental, vision, life insurance, disability, and long-term care.

³ Implementation of GASB 45 was phased in over a three-year period, with the largest governments – those with total annual revenues of \$100 million or more – required to report their liabilities in their FY2008 financial statements; see U.S. Government Accountability Office (2009). Also relevant is GASB 43, *Financial Reporting for Postemployment Benefit Plans Other Than Pensions*, which was released shortly before GASB 45.

⁴ Like GASB 67 and 68 have already done for pensions, GASB 74 and 75 will also introduce a blended discount rate and require unfunded liabilities to be reported on the plan sponsor's balance sheet for OPEBs.

⁵ Technically, setting up a trust is sufficient for the use of a higher discount rate under GASB 45. However, the use of the more favorable rate only applies to the extent that accumulated resources are estimated to be sufficient to fund required payments.

than that of pensions. In the case of pensions, state-administered plans cover not only state employees, but also nearly all teachers and about 70 percent of local government employees (generally those in smaller cities and towns). The 30 percent of local employees who are not covered by state pension plans are covered primarily by large city or county plans. Thus, a sample that includes all state-administered plans and a reasonable number of major city and county plans will cover most state and local pension liabilities.

Such is not the case with retiree health care plans. State-administered OPEB plans are often limited to state employees, excluding both local government employees and teachers. Thus, it is important to explore the extent to which both large and small local governments and school districts provide their own retiree health insurance.⁶ Large local governments and school districts are included in our sample; small ones are not. If one were attempting to account for total OPEB costs, it would be necessary to make estimates for these excluded entities.

A comprehensive estimate of OPEBs shows that two-thirds of the liabilities are at the local level, whereas for pensions two thirds are at the state level. Second, unfunded OPEB benefits amount to 28 percent of unfunded pension benefits – when pension benefits are calculated with an interest rate comparable to OPEBs. And, finally, while OPEB liabilities are large, several factors, such as greater flexibility in adjusting benefits and increasing retirement ages, limit their potential drain on state and local resources.⁷

For the current analysis, where the focus is states, large counties, and large cities, complete OPEB data are available. Figures 9-11 show – for states, counties, and large cities – current and required OPEB payments as a percentage of own-source revenues. States with large required pension payments also tend have large OPEB costs – the four of the five costliest states in terms of OPEB also have pension costs that are over 10 percent of revenues. At the county and city level, the high costs are more evenly distributed among the entities shown. On balance, required OPEB costs equal about a third of required pension costs.

Pension, OPEB, and Interest Payments as a Percentage of Own-Source Revenues

The final section pulls together current and required payments for pensions and OPEBs, and adds interest payments. The interest expense comes directly from the Census of

⁶ Prior research explored retiree health for teachers at the state level only (Clark 2010).

⁷ For further discussion, see Kearney et al. (2009) and Clark (2009).

Governments. The only adjustment made is that, when school districts are combined with either cities or counties, interest expense is allocated based on education and non-education payrolls. Following Cembalest (2016), contributions at the 15-percent and 25-percent level are bold lines reflecting thresholds where concerns start to be raised and where the government's situation becomes untenable, respectively.

The results for states are shown in Figure 12. The good news is that 36 states have required payments below 15 percent of own-source revenues and 23 of those states face payments below 10 percent. The bad news is that five states – Illinois, Connecticut, and New Jersey, Hawaii, and Kentucky – face required payments in excess of 25 percent of revenues and Massachusetts, Rhode Island, and Delaware face payments in excess of 20 percent. Figure 13 breaks down the required payment into pensions, OPEB, and interest; pensions and OPEB swamp interest across the board. This pattern is not surprising given that U.S. states have about \$500 billion of bonds supported by state tax collections and \$0.5-\$1.5 trillion of unfunded liability depending on the interest rate used to discount the benefits.

Figures 14 and 15 present the results for counties and cities, respectively. Even accounting for the fact that own-source revenues are only 67 percent of county and 80 percent of city net revenues, costs are extremely high. Eight counties in California have costs in excess of 30 percent of own-source revenues. In terms of cities, Chicago, Detroit, San Jose, Miami City, Houston, Baltimore, Wichita, and Portland lead the list, all with costs in excess of 40 percent of revenues.

The question of course is what the worst-off states, counties, and municipalities can do to improve their situation. Four options exist. One is to pray for higher returns. Unfortunately returns would have to be consistently in the 10-15 percent range for the next 30 years to solve the problem – an unlikely outcome given today's financial markets. A second option is to raise taxes to meet the required commitments. Unfortunately, many of the states with the greatest burden already have relatively high taxes. A third option is to cut other spending by 10 to 20 percent. A final option is to raise employee contributions far beyond what they are already contributing to their plans. Clearly, those governments in the worst shape face an enormous challenge.

Conclusion

The cost of pensions and OPEBs has become a front-burner issue in any discussion of municipal finance. While news headlines emphasize cases of jurisdictions in extreme financial distress, the key takeaway from this paper is that the picture at the state and local level is extremely heterogeneous. Therefore, a full understanding of the issue requires looking at the numbers state by state and locality by locality. It is also important to capture localities comprehensively, including cities, counties, and school districts.

Based on a large sample of states and localities, the analysis finds that required pension payments are an extraordinarily high percentage of own-source revenues – more than 20 percent – for a handful of states, counties, and cities, but most jurisdictions have their costs under control. Adding in OPEB costs, of course, raises the total spending requirements but the overall story remains similar. For example, eight states face costs in excess of 20 percent of own-source revenues, but 23 states have costs below 10 percent. Cities, counties, and school districts also show considerable variation.

The small minority of jurisdictions facing dire circumstances have only unpalatable options: some combination of raising taxes, cutting spending, and/or hiking employee contributions. Unfortunately, these jurisdictions tend to have less flexibility in making major fiscal changes and raising employee contributions runs the risk of making it harder to recruit and retain top-notch workers. In short, these governments face an enormous challenge.

References

- Bogle, John C., and Michael W. Nolan. 2015. "Occam's Razor Redux: Establishing Reasonable Expectations for Financial Market Returns." *The Journal of Portfolio Management* 42(1): 119-134.
- Cembalest, Michael. 2016. "The ARC and the Covenants, 2.0: An Update on the Long-term Credit Risk of US States." *Eye on the Market* (May 19). New York, NY: J.P. Morgan.
- Cembalest, Michael. 2014. "The ARC and the Covenants: Assessing the Ability of States to Service Debt, Pension and Retiree Health Care Costs in a World of Finite Resources." *Eye on the Market: Special Publication* (June 5). New York, NY: J.P. Morgan.
- Clark, Robert L. 2010. "Retiree Health Plans for Public School Teachers After GASB 43 and 45." *Education Finance and Policy*, Fall, 438-462.
- Clark, Robert L. 2009. "Will Public Sector Retiree Health Benefit Plans Survive? Economic and Policy Implications of Unfunded Liabilities." *American Economic Review*, May, 533-537.
- French, Kenneth. 2015. "Index Portfolios formed on B/M, E/P, CE/P, and D/P." Available at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
- Governmental Accounting Standards Board (GASB). 2015. *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*. Statement No. 75. Norwalk, CT.
- Governmental Accounting Standards Board (GASB). 2012. *Accounting and Financial Reporting for Pensions- An Amendment of GASB Statement No. 27*. Statement No. 68. Norwalk, CT: GASB.
- Governmental Accounting Standards Board (GASB). 2004. *Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions*. Statement No. 45. Norwalk, CT: GASB.
- Governmental Accounting Standards Board (GASB). 2004. *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*. Statement No. 43. Norwalk, CT: GASB.
- GMO. 2016. "GMO Quarterly Letter." (First Quarter). Boston, MA.
- Goldman Sachs. 2016. "The Last Innings." New York, NY.
- Kearney, Richard C., Robert L. Clark, Jerrell D. Cogburn, Dennis M. Daley, and Christina Robinson. 2009. *At a Crossroads: the Financing and Future of Health Benefits for State and Local Government Retirees*. Report prepared for the Center for State and Local Government Excellence. Washington, DC.

McKinsey Global Institute. 2016. “Diminishing Returns: Why Investors May Need to Lower Their Expectations.” New York, NY.

Morningstar. 2015a. “What Market Experts Are Saying About Returns.” Chicago, IL.

Morningstar, Inc. 2015b. *Ibbotson Stocks, Bonds, Bills, and Inflation (SBBI) Classic Yearbook*. Chicago, IL.

Munnell, Alicia H. and Jean-Pierre Aubry. 2016. “The Impact of GASB 68: How Will State Unfunded Liabilities Affect Major Cities?” *State and Local Pension Plans Issue in Brief* 47. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Munnell, Alicia H. Jean-Pierre Aubry, and Caroline V. Crawford. 2016. “How Big a Burden Are State and Local OPEB Benefits?” *State and Local Pension Plans Issue in Brief* 48. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Research Affiliates. 2016. “Expected Returns.” *Asset Allocation*. Newport Beach, CA.

U.S. Census Bureau. 2012. Washington, DC.

U.S. Census Bureau. 2012. “Government Employment and Payroll.” Washington, DC. Available at: <http://www.census.gov/govs/apes/>

Table 1. *Expected Nominal Returns for U.S. Equities from Selected Financial Firms, 2015-16*

Firm	Average annual nominal returns (%)	Horizon (years)
Bogle and Nolan ^a	7.0%	10
Charles Schwab	6.3	10
Goldman Sachs	4.7-5.5	5
GMO	-0.1	7
McKinsey	Slow growth: 6.0 – 6.5 Growth recovery: 8.0 – 9.0	20
Morningstar ^b	6-7	Next few decades
Research Affiliates ^c	3.2	10

^aThe authors are both affiliated with Vanguard’s Bogle Financial Markets Research Center.

^bJosh Peters, Morningstar Director of Equity-Income Strategy.

^cResearch Affiliates projects a 1.2 percent real equity return; the projection is converted to a nominal value by adding 2 percent inflation.

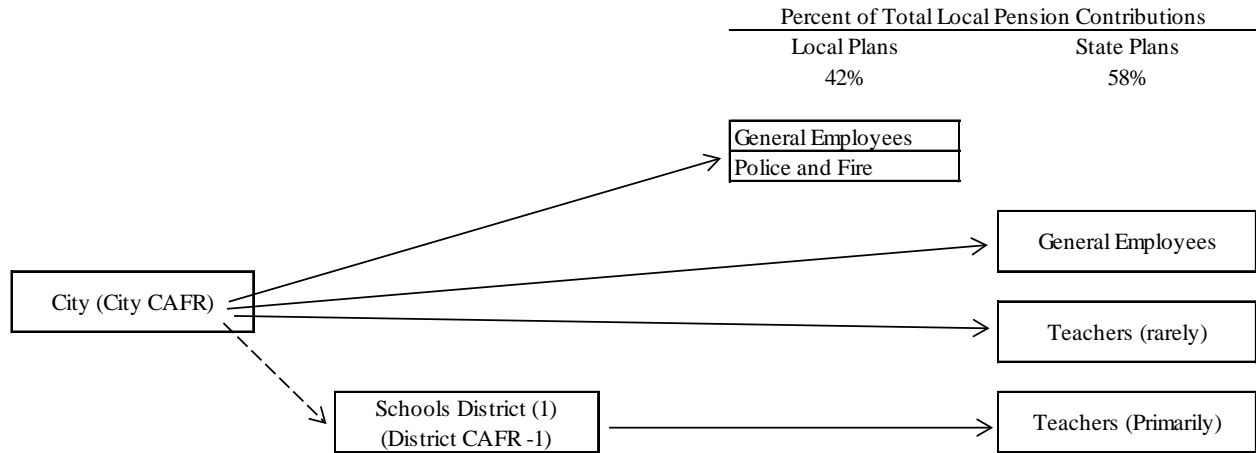
Sources: Bogle and Nolan (2015); GMO (2016); Goldman Sachs (2016); McKinsey Global Institute (2016); Morningstar (2015a); Research Affiliates (2016).

Table 2. *Sources of Total Net Revenue, by Level of Government, 2014*

Level of government	Intergovernmental transfers			Outflows	Net transfers	Own-source revenue
	Inflows from:					
	Federal	State	Local			
State	42.2%	0.0%	1.1%	40.2%	3.1%	96.9%
County	3.8	30.4	2.5	3.7	32.9	67.1
City	6.8	13.1	3.1	2.7	20.3	79.7
School district	1.1	51.8	3.7	1.6	54.9	45.1
Total	20.5	16.5	2.3	18.6	20.6	79.4

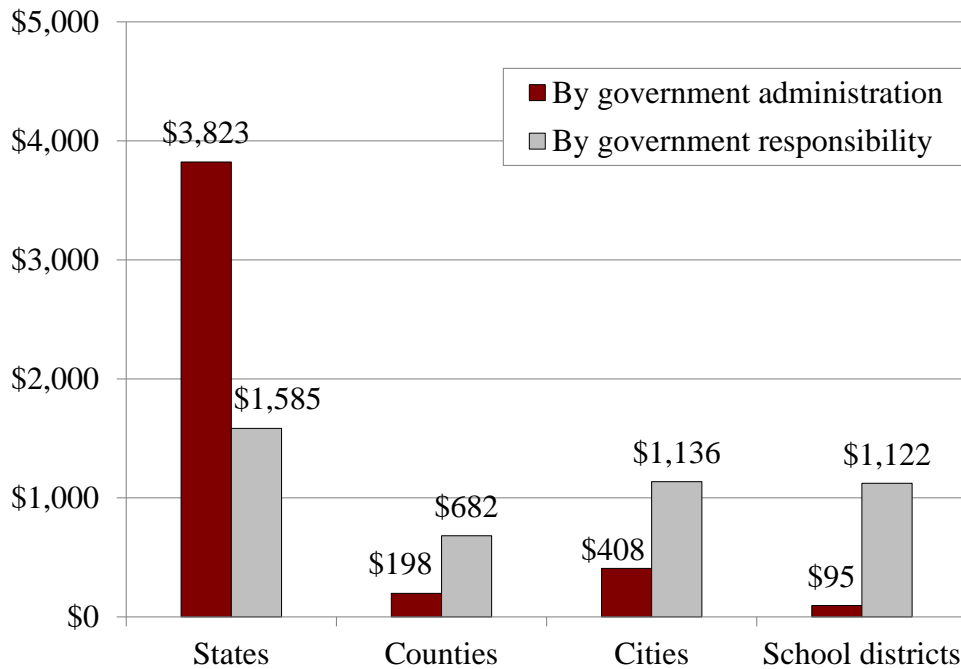
Source: U.S. Census Bureau (2014).

Figure 1. Contributions from Cities and Towns to Pension Plans



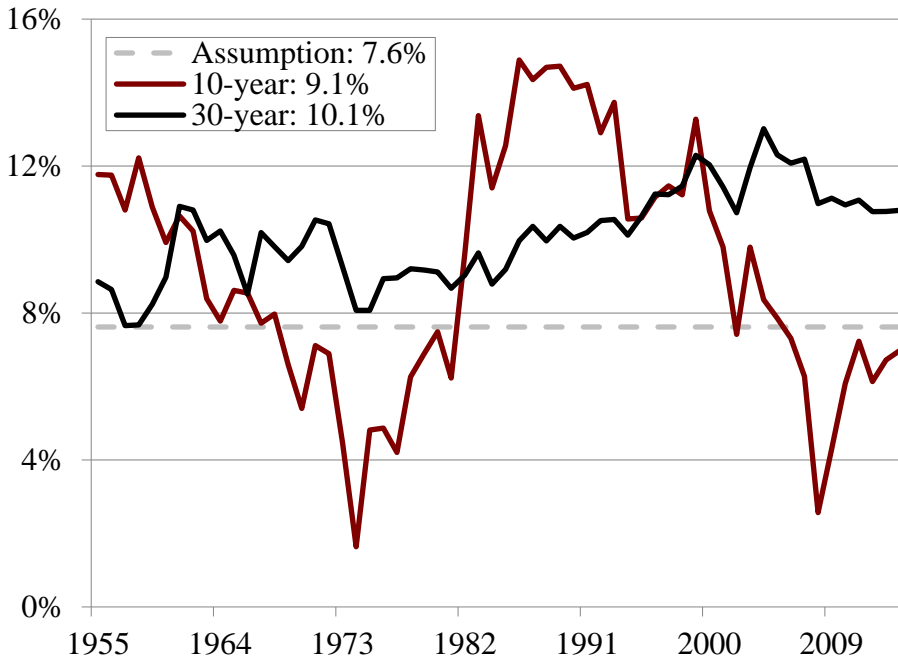
Source: Munnell and Aubry (2016).

Figure 2. Distribution of Pension Liability Before and After GASB 68, in Billions



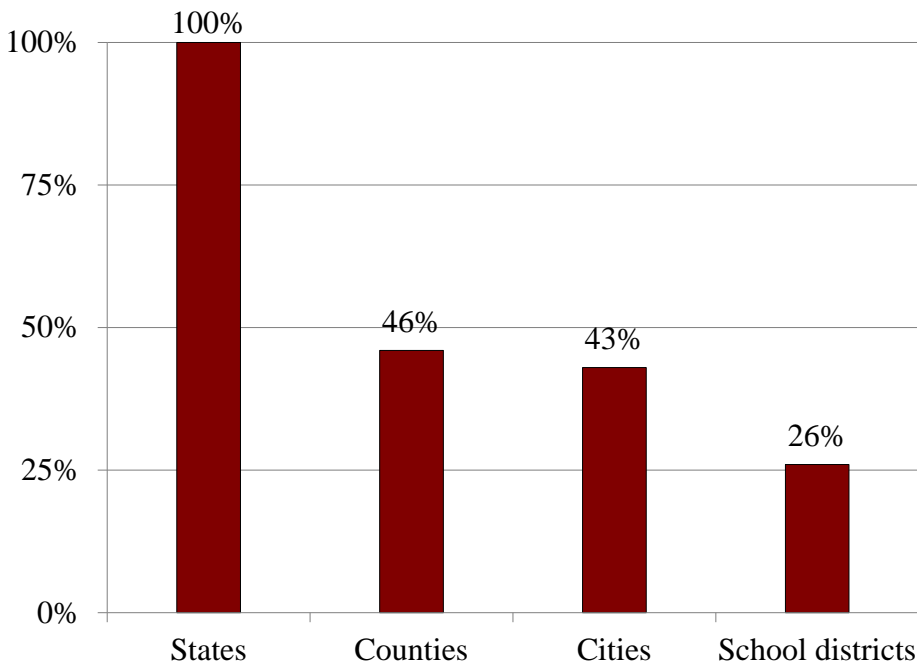
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 3. 10-Year and 30-Year Geometric Nominal Returns for Hypothetical Portfolios of 65 Percent Stocks and 35 Percent Bonds, 1955-2014



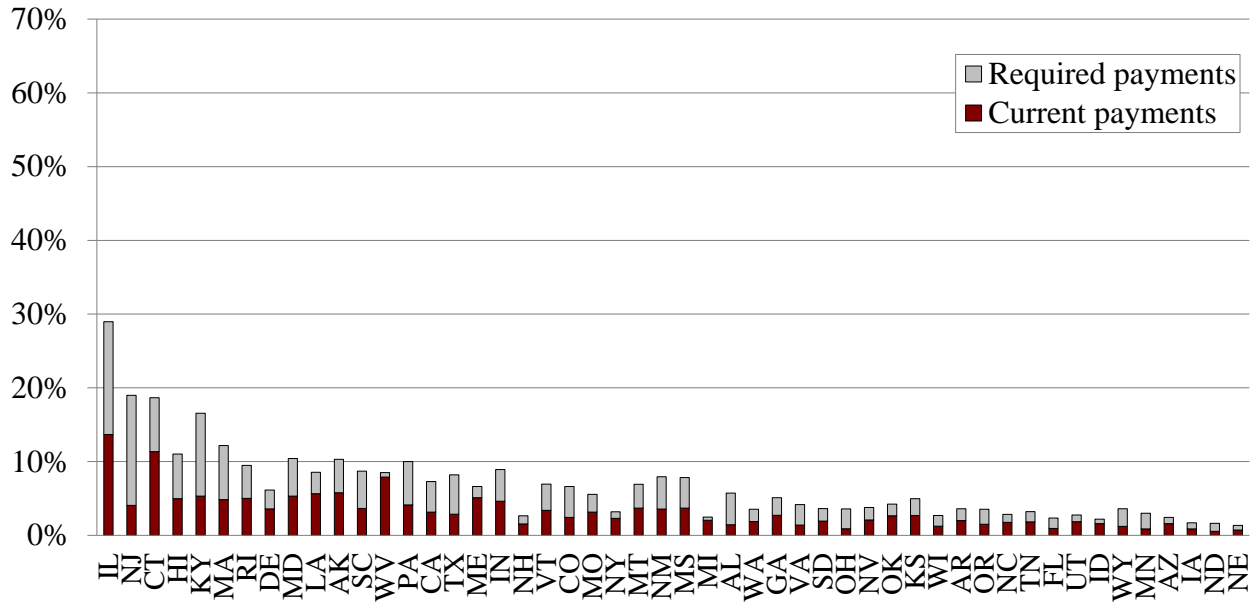
Sources: Authors' calculations from Morningstar, Inc. (2015b); and French (2015).

Figure 4. Percentage of State, County, Local, and School District Payrolls Covered by Sample, 2012



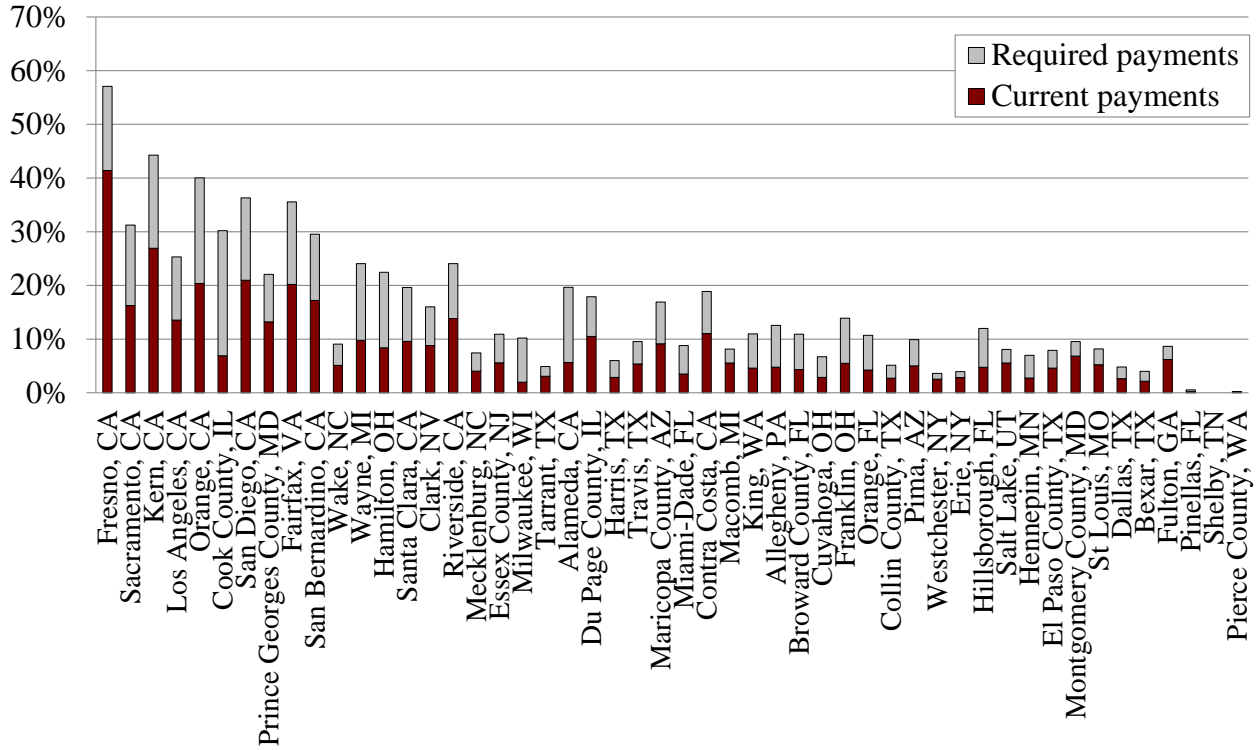
Source: Authors' calculations based on U.S. Census Bureau (2012).

Figure 5. States: Current and Required Pension Payments as a Percentage of Own-Source Revenue, 2014



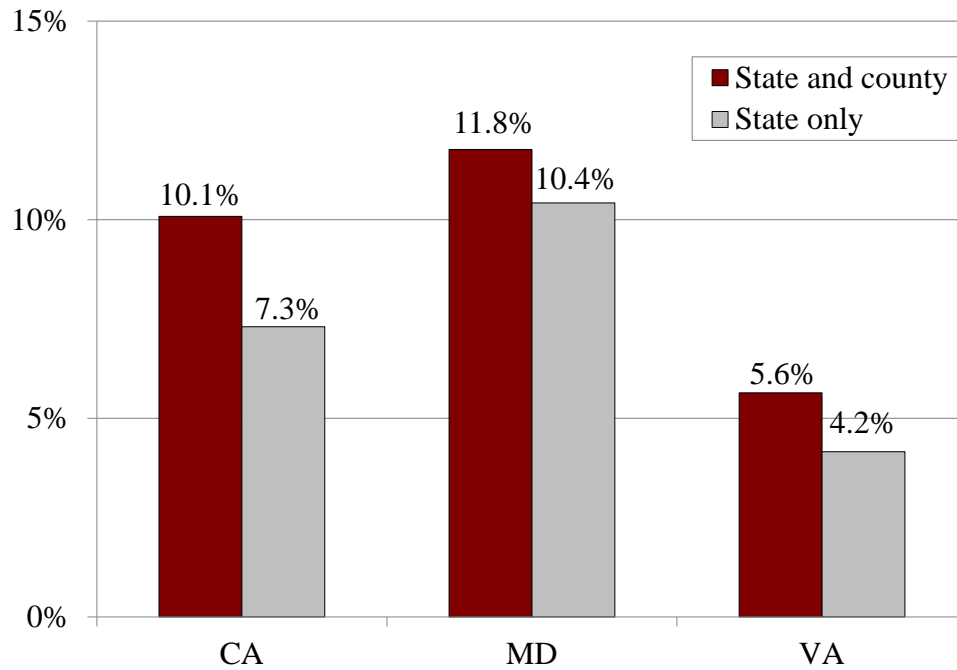
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 6. *Large Counties: Current and Required Pension Payments as a Percentage of Own-Source Revenue, 2014*



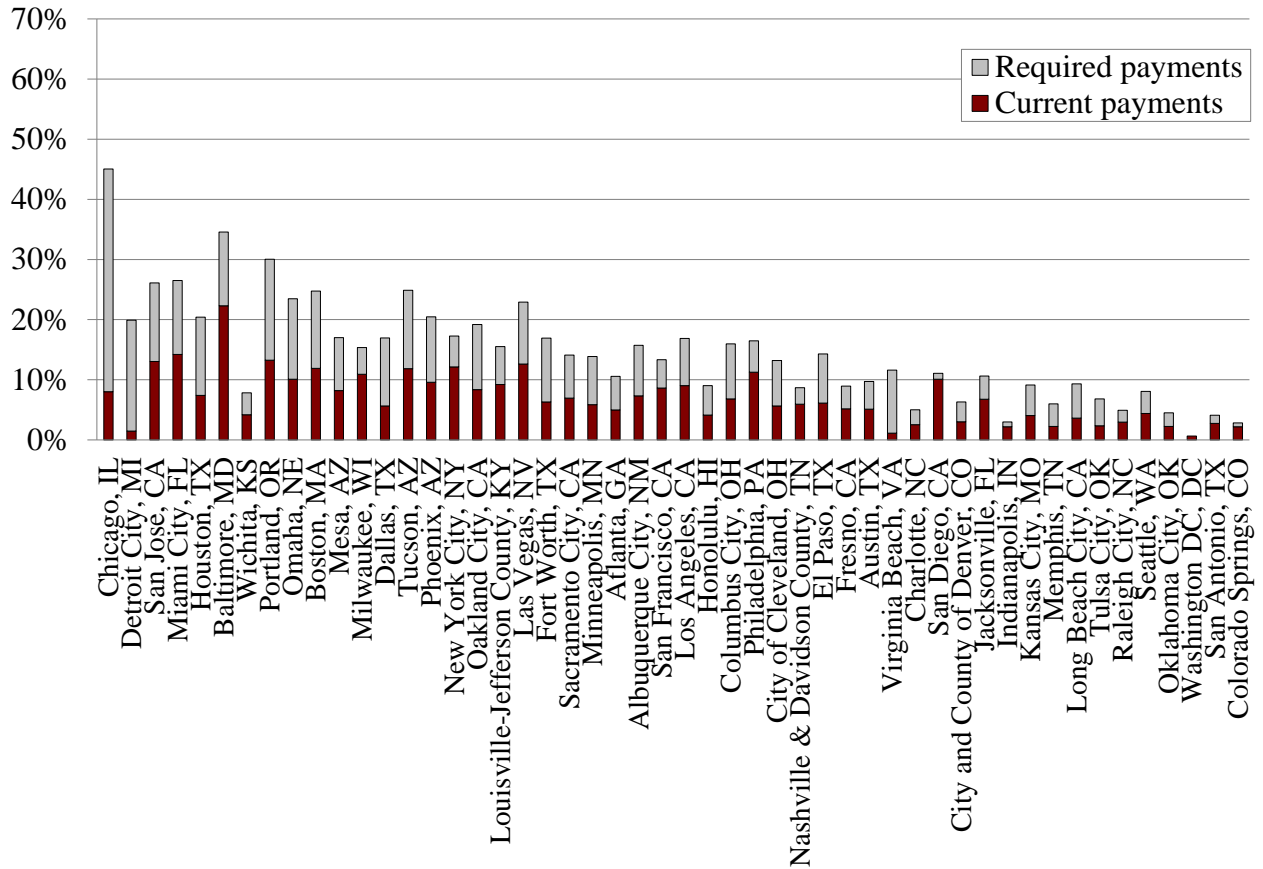
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 7. *States and Counties: Required Pension Payments as a Percentage of Revenue, Selected States 2014*



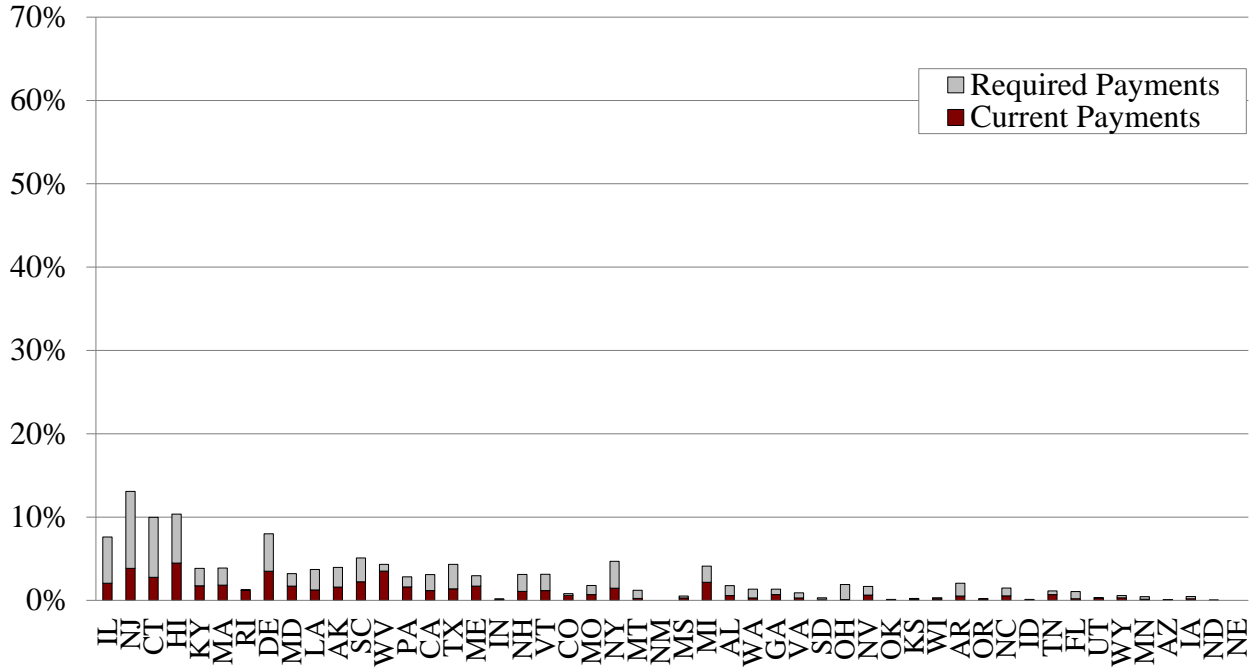
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 8. *Large Cities: Current and Required Pension Payments as a Percentage of Own-Source Revenue, 2014*



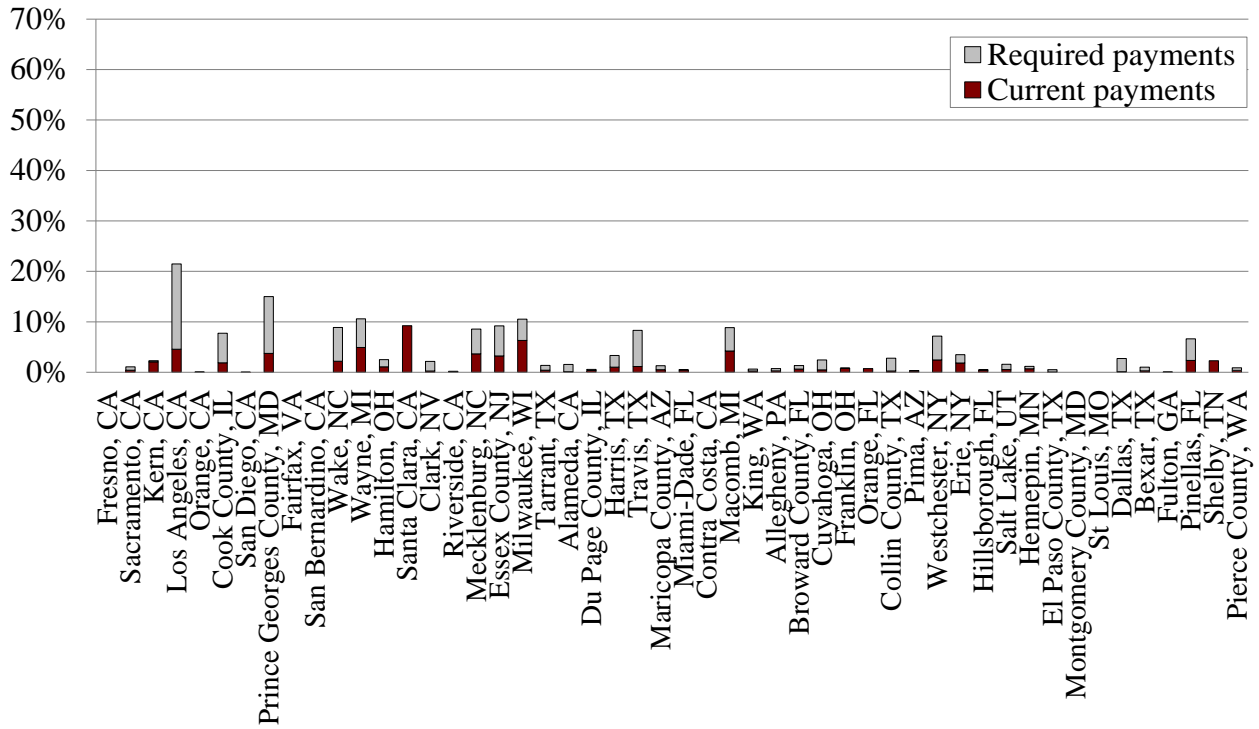
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 9. States: Current and Required OPEB Payments as a Percentage of Own-Source Revenue, 2014



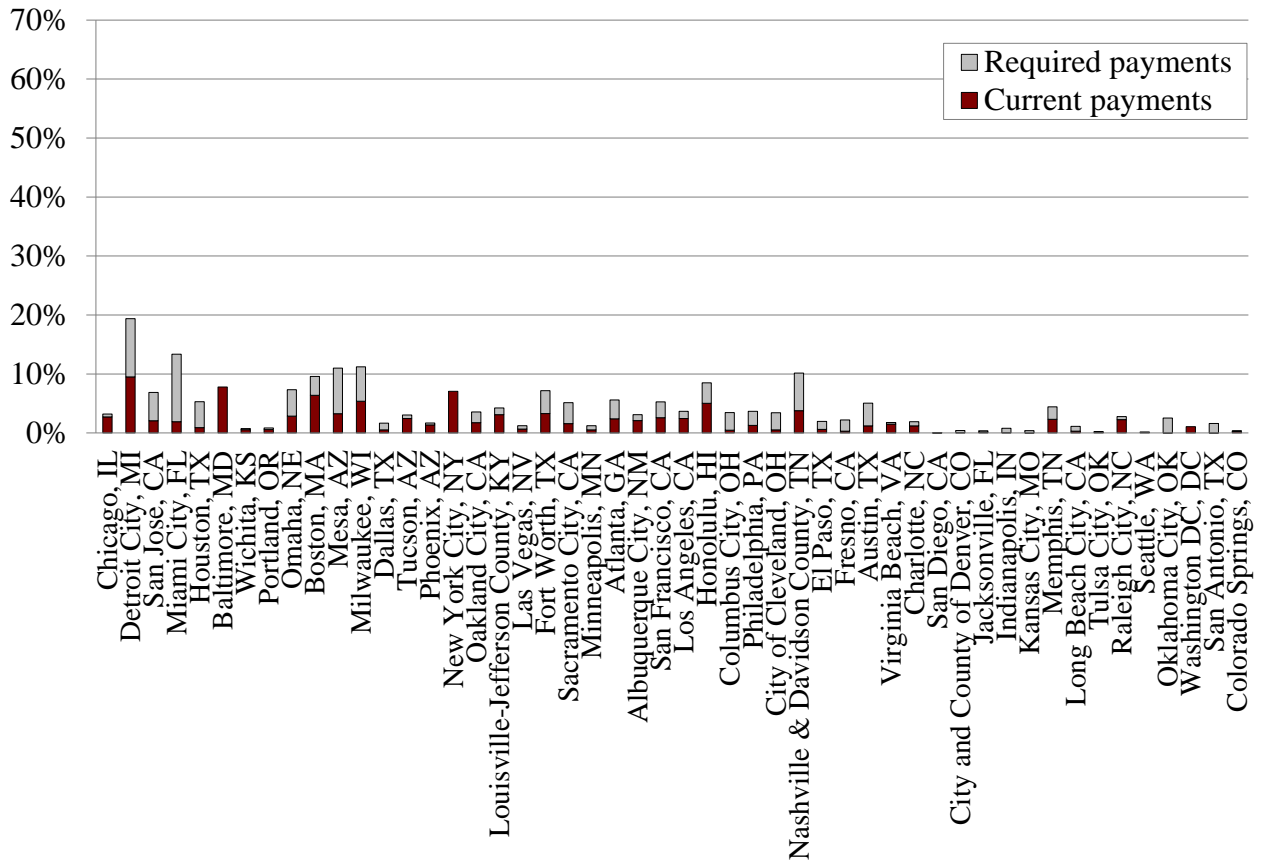
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 10. *Large Counties: Current and Required OPEB Payments as a Percentage of Own-Source Revenue, 2014*



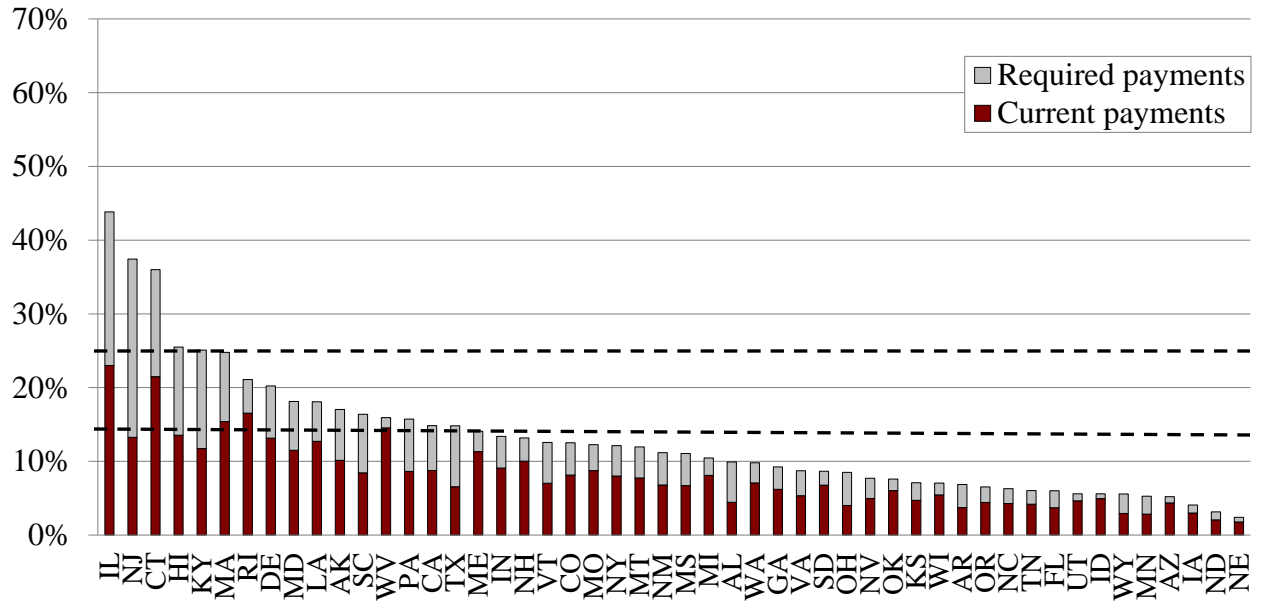
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 11. *Large Cities: Current and Required OPEB Payments as a Percentage of Own-Source Revenue, 2014*



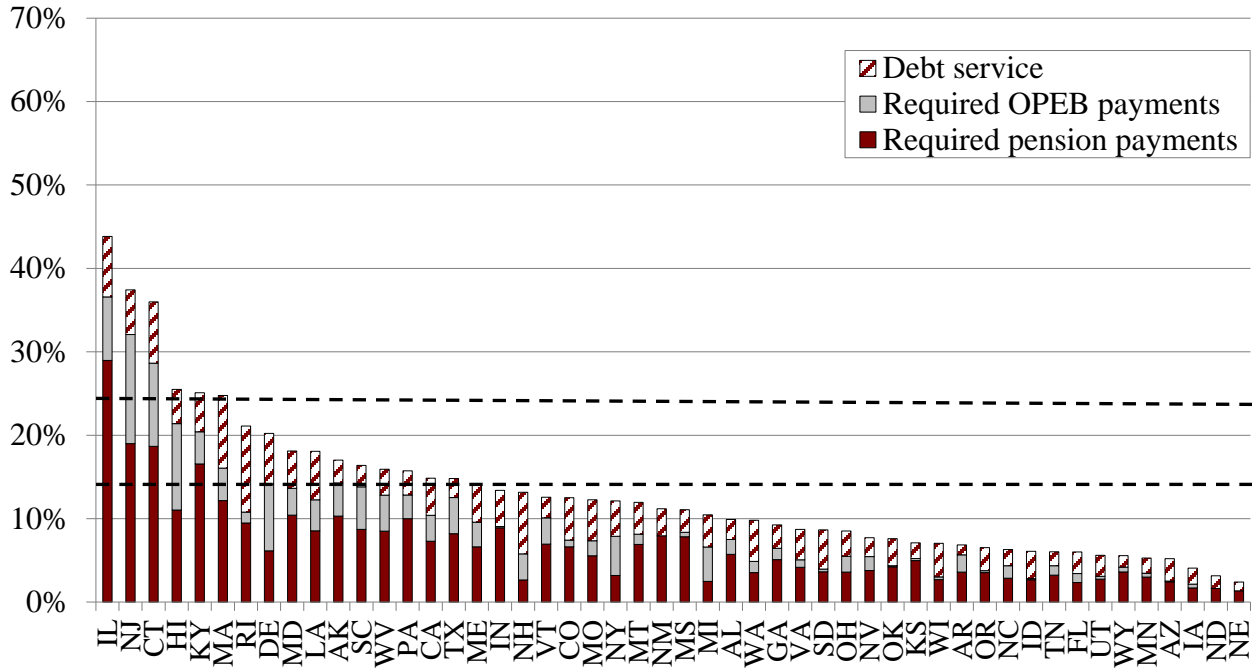
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 12. States: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Own-Source Revenue, 2014



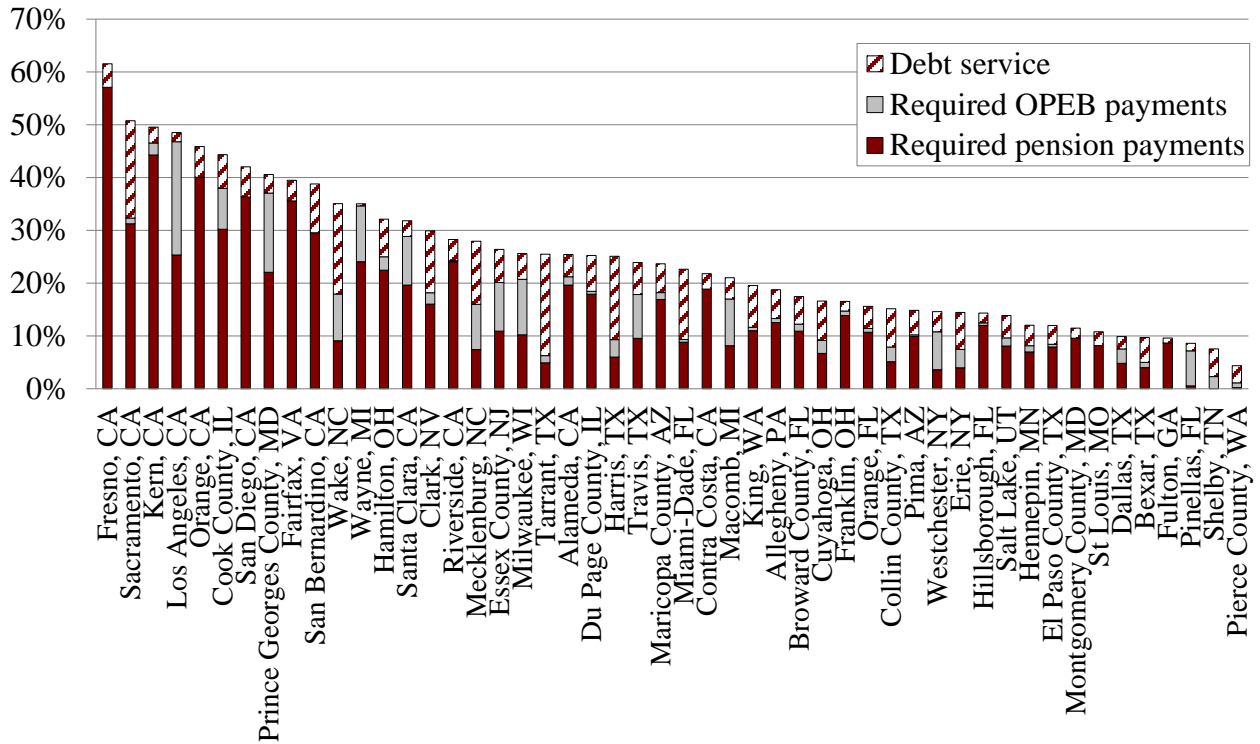
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 13. States: Required Payments for Pensions, OPEB, and Interest Payments as a Percentage of Own-Source Revenue, 2014



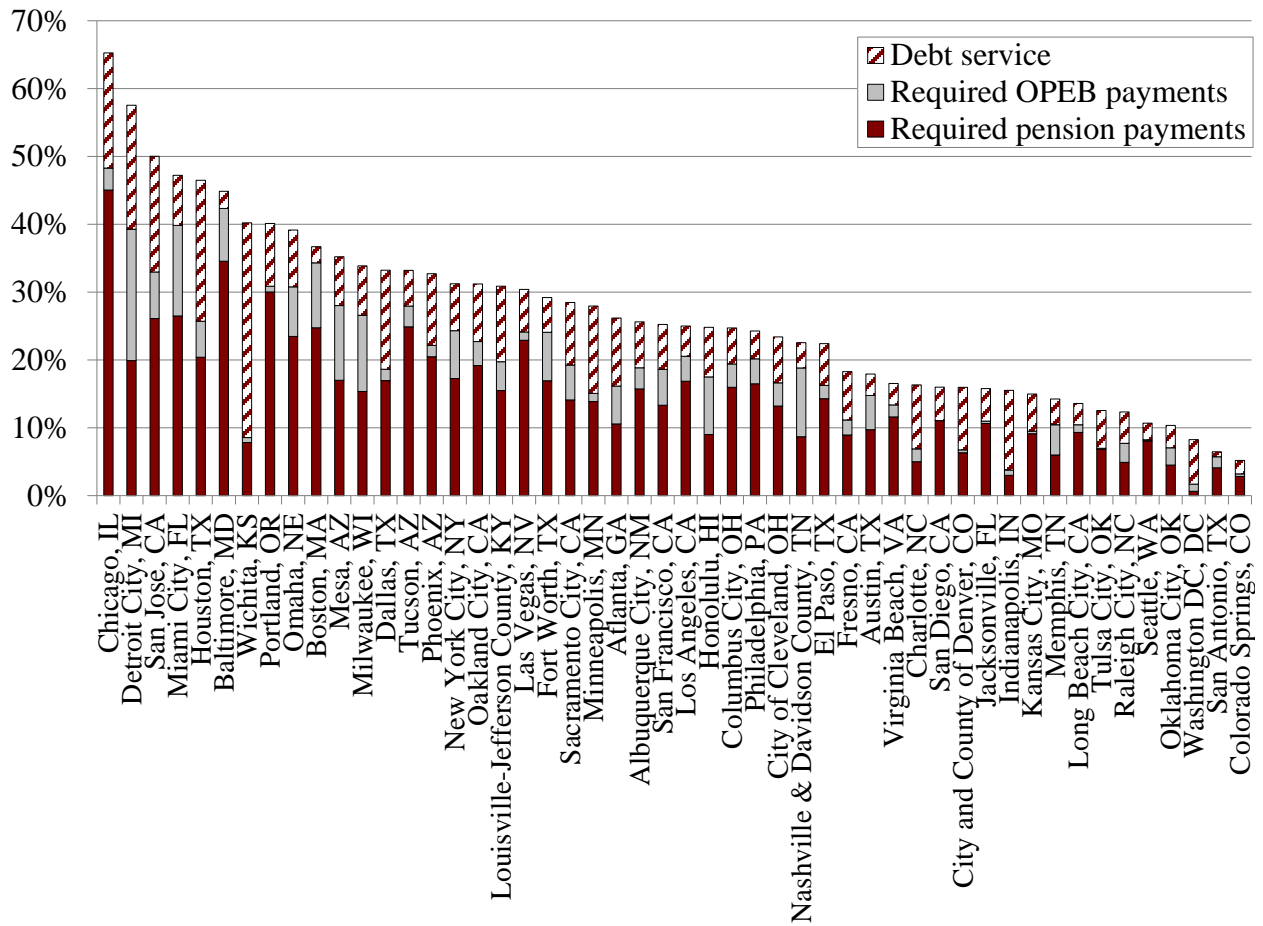
Sources: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 14. Large Counties: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Own-Source Revenue, 2014



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

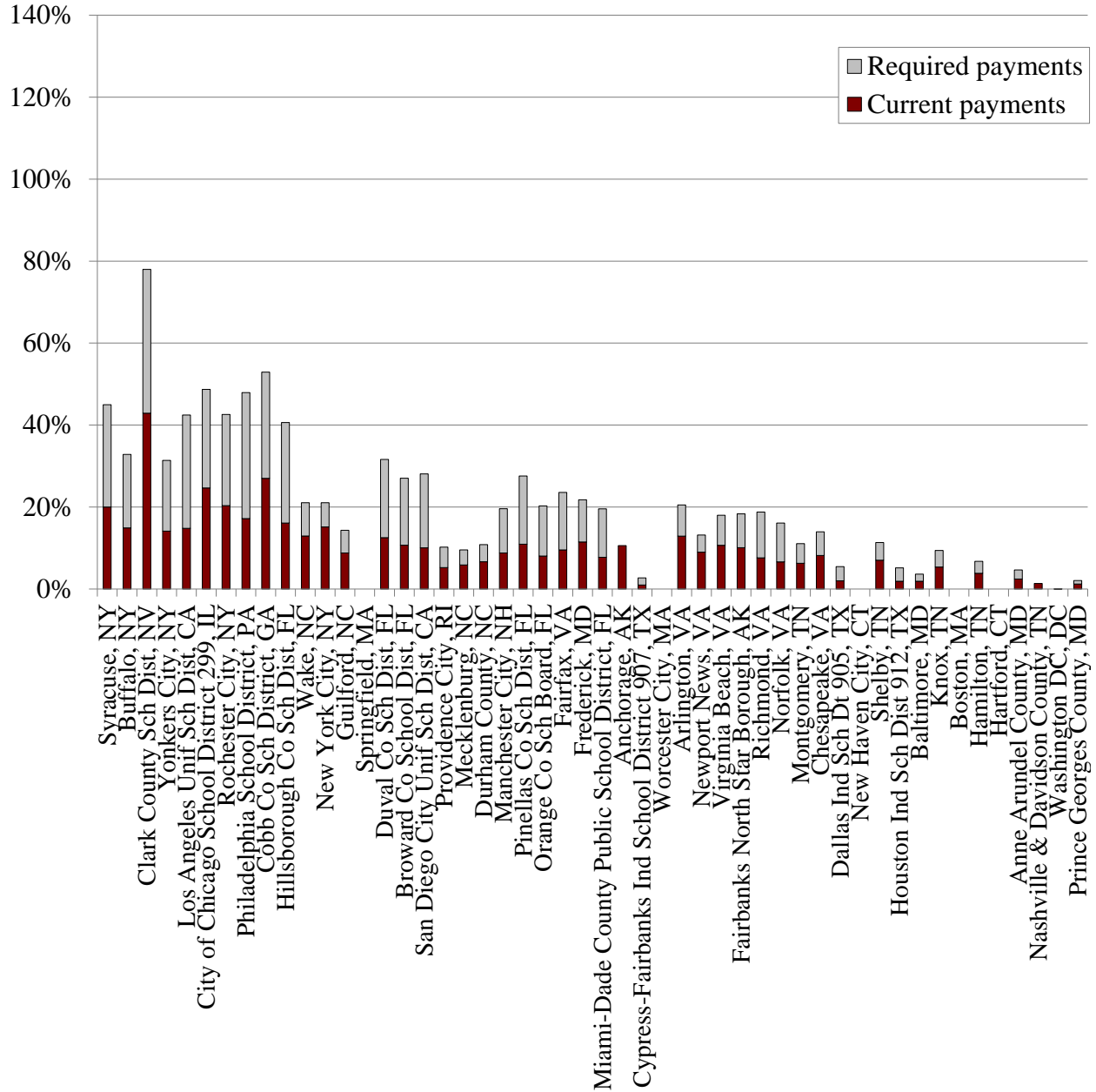
Figure 15. *Large Cities: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Own-Source Revenue, 2014*



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

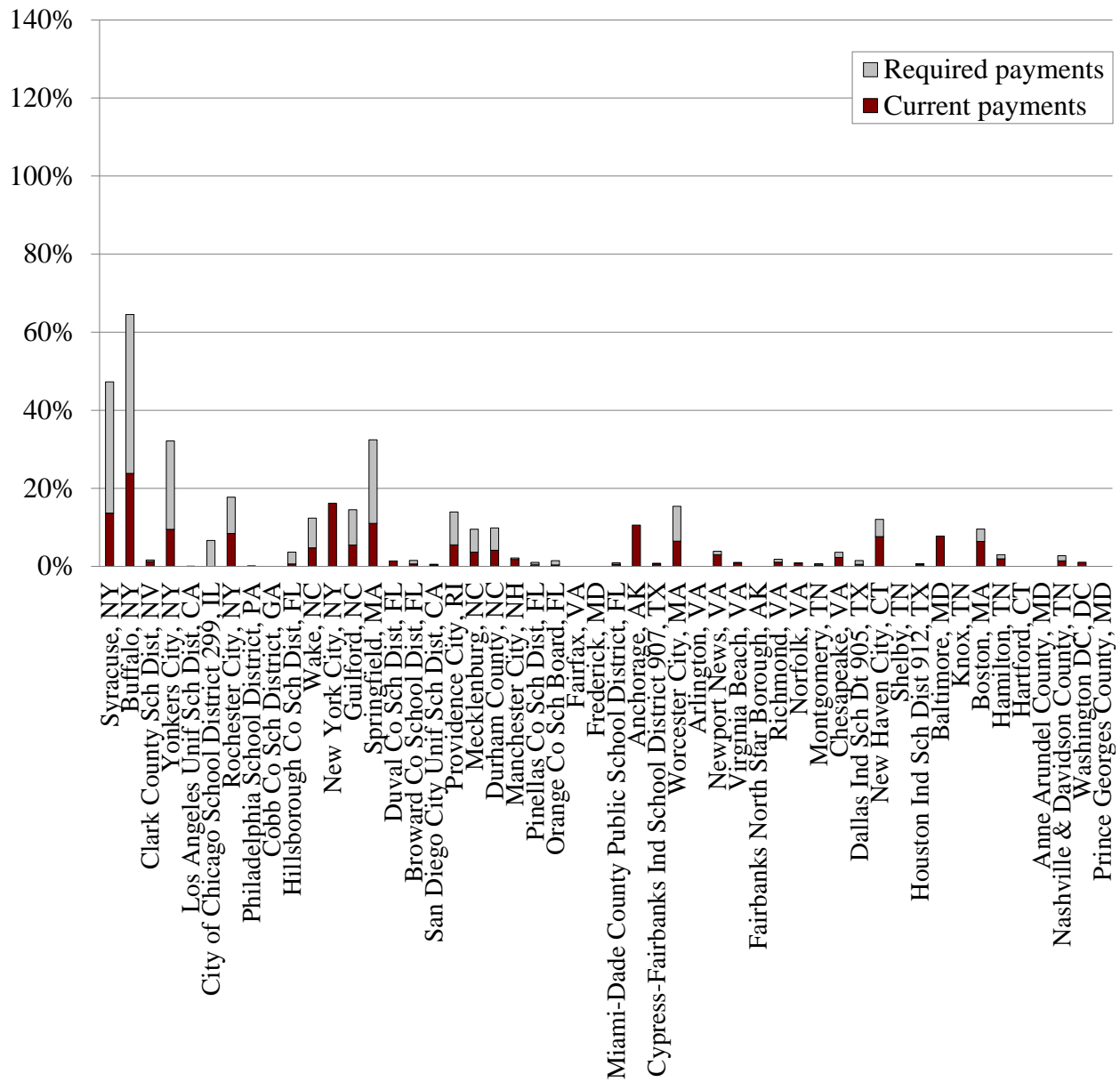
Appendix A

Figure 16. *Large School Districts: Current and Required Pension Payments as a Percentage of Own-Source Revenue, 2014*



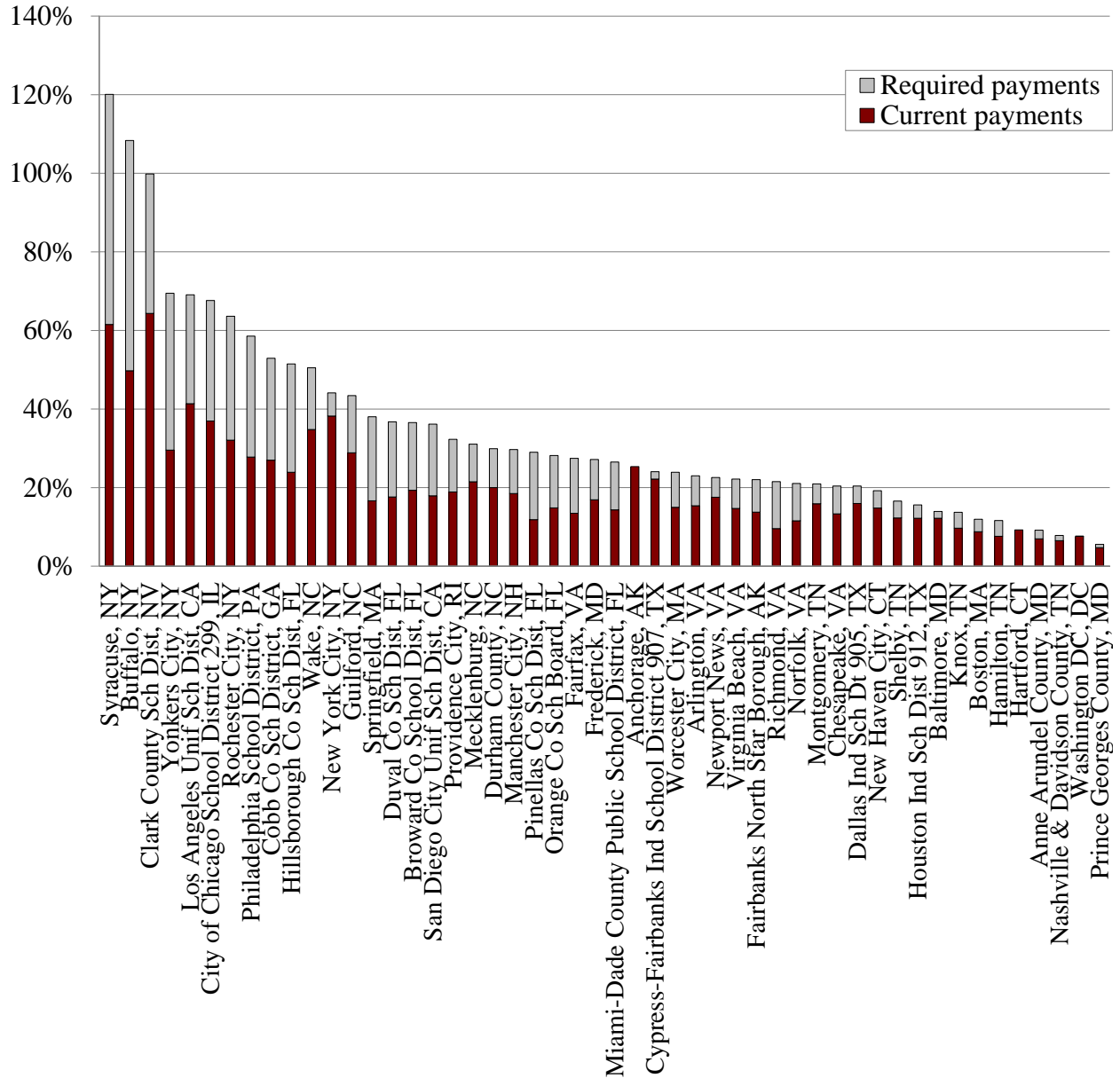
Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 17. Large School Districts: Current and Required OPEB Payments as a Percentage of Own-Source Revenue, 2014



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

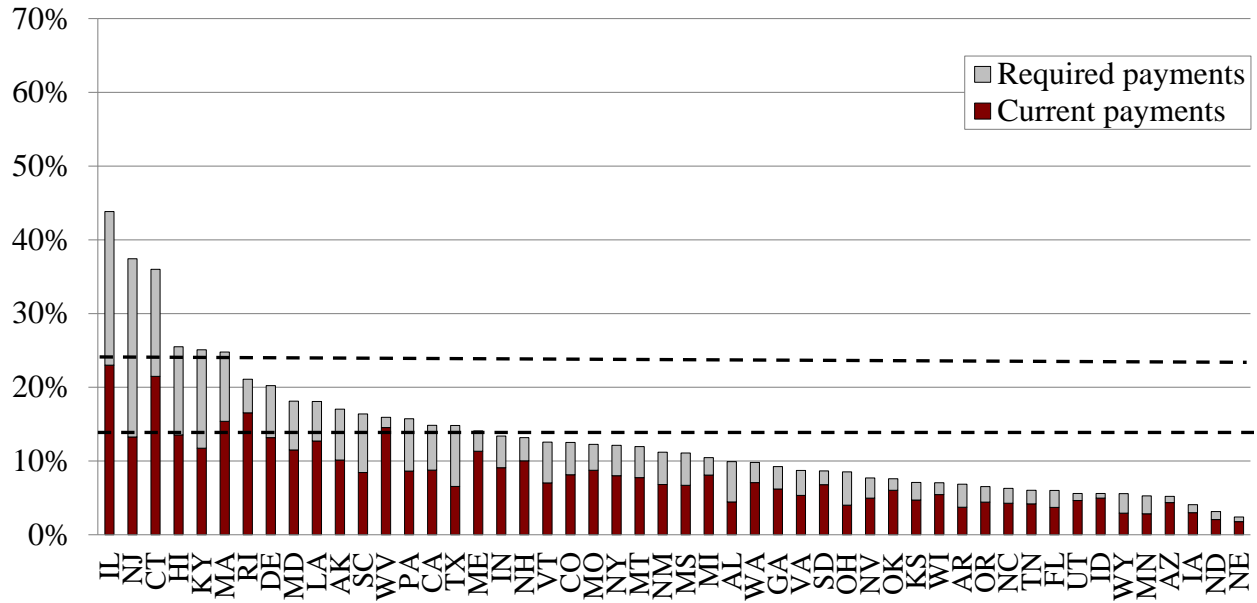
Figure 18. Large School Districts: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Own-Source Revenue, 2014



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

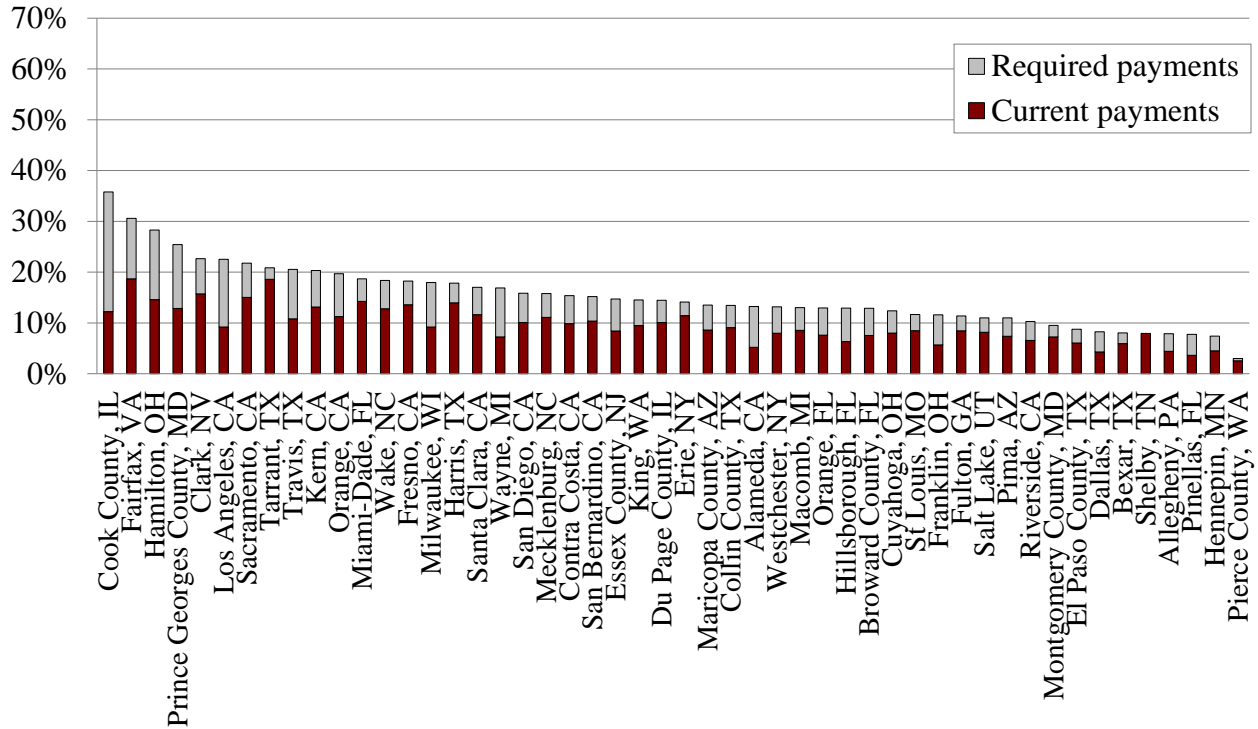
Appendix B

Figure 19. States: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Net Revenue, 2014



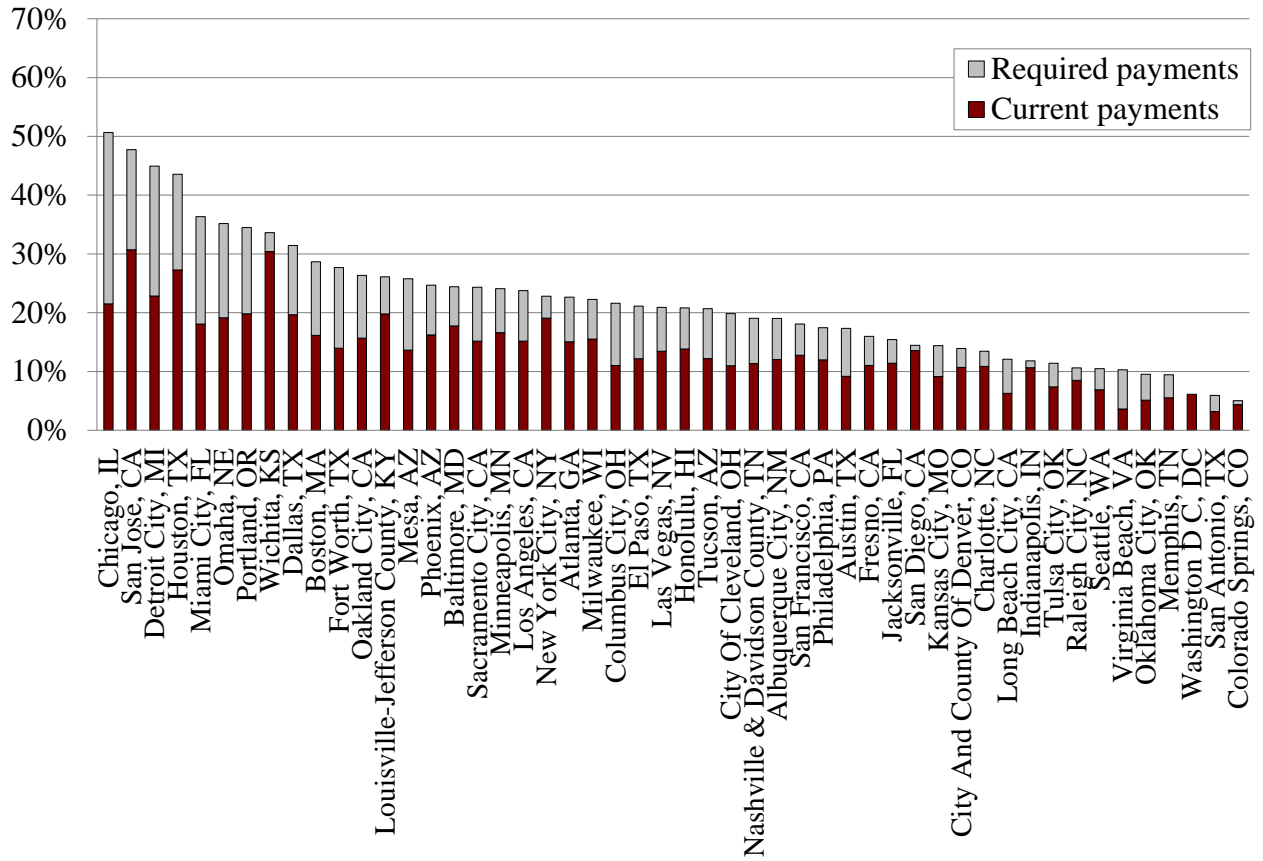
Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 20. Large Counties: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Net Revenue, 2014



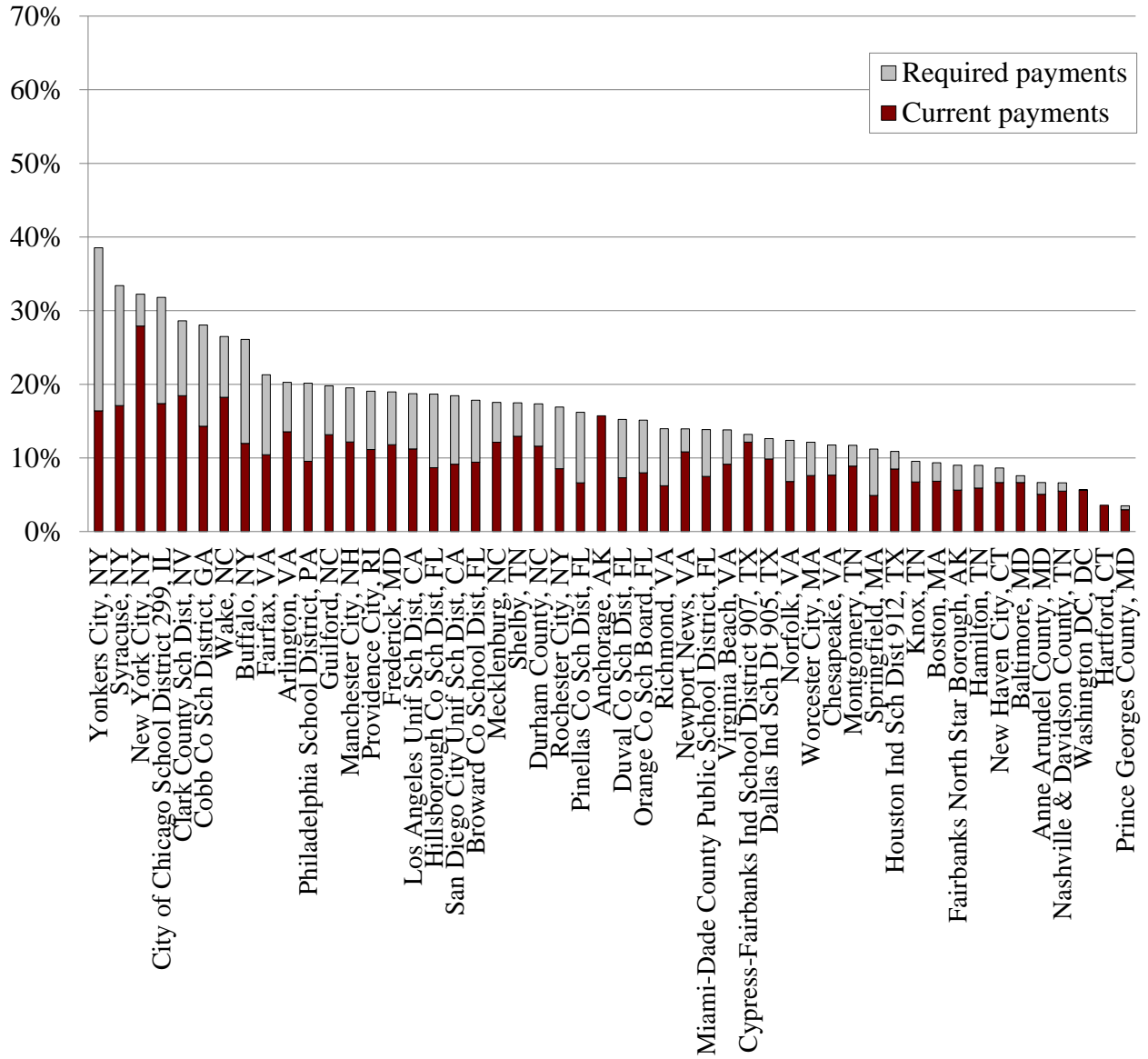
Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 21. Large Cities: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Net Revenue, 2014



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).

Figure 22. Large School Districts: Current and Required Pension, OPEB, and Interest Payments as a Percentage of Net Revenue, 2014



Source: Authors' calculations based on various FY 2014 plan and government financial reports and actuarial valuations; and U.S. Census Bureau (2014).