The ARC and the Covenants 3.0: US Cities and Counties

Our analysis of US cities and counties encompassed 470 single employer and multi-employer defined benefit plans across 77 of the largest cities and 28 of the largest counties. This sample accounts for over 50% of the net direct debt of US cities, and almost 40% of the net direct debt of US counties. As a result, we believe it is a representative sample.

**State, city, and county net direct debt universe**
Net direct debt (US$ billions)
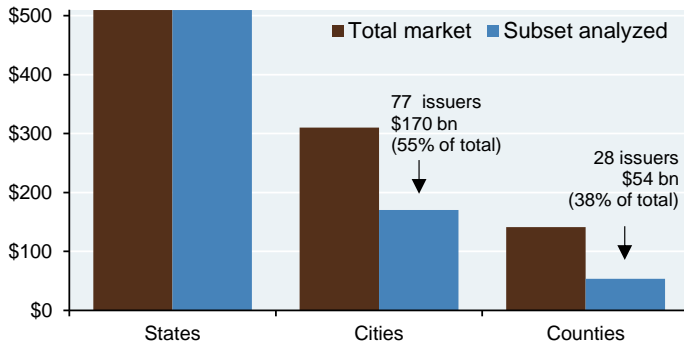


Source: J.P. Morgan Asset Management, Moody's. FY 2015.

The reason this issue gets so much attention: the **underfunded status of many municipal pension and OPEB plans** (OPEB = "other post-employment benefits", primarily retiree healthcare). The next charts show the distribution of *reported* pension and OPEB funding ratios (i.e., using their assumptions).

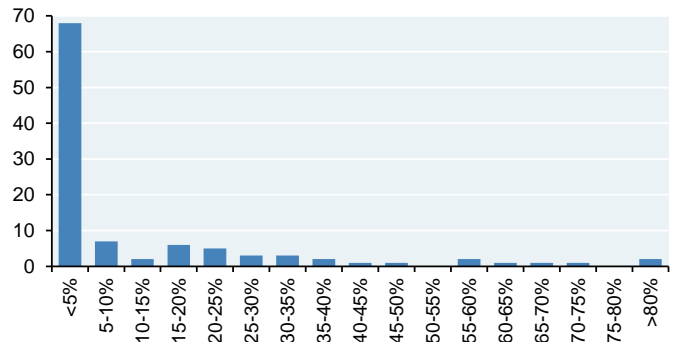**Distribution of reported pension funding ratios**
Number of cities/counties, N=105
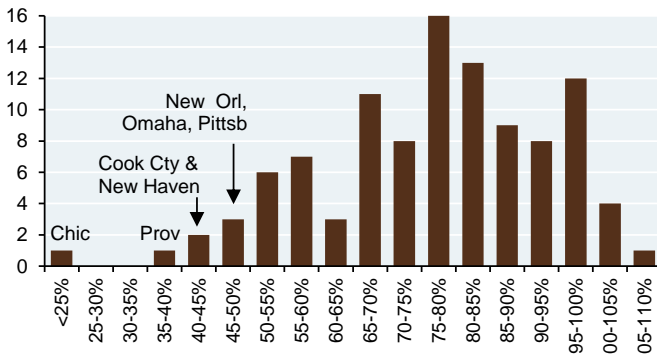


Source: Center for Retirement Research at BC, City/county CAFRs. FY 2015.

**Distribution of reported OPEB funding ratios**
Number of cities/counties, N=105



Source: Center for Retirement Research at BC, City/county CAFRs. FY 2015.

The median reported funding ratio for **pensions** is 75%-80%. In contrast, funding ratios for **OPEB** are much lower since only a few municipalities have made the decision to prefund them. Retiree healthcare is often referred to as a "soft" liability by actuaries, since unlike pensions, OPEB terms and conditions can generally be changed unilaterally. In exhibit SM9, we walk through some OPEB changes at the state level over the last few years. However, I think it's too cavalier to ignore them and simply assume that they will somehow disappear, or that public sector workers will end up being covered by the Affordable Care Act and completely relieve states, cities and counties of these obligations.

While OPEB funding ratios often are extremely low (if not zero), one mitigating factor is that **unfunded OPEB obligations are generally smaller than unfunded pensions.** The charts below show pension vs OPEB shares for cities and counties. For cities, the median pension share was 79%, while for counties, the median pension share was 69% (with wide distributions around the mean). For municipalities on the right side of both charts, changes to OPEB terms and conditions would have larger impacts on debt ratios, while for those on the left side, the debt ratio consequences would be minimal.

**Pension vs OPEB shares of normalized obligations**
Cities, N=77
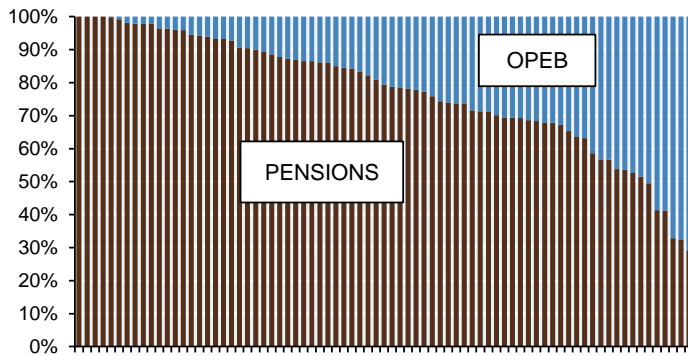
**Pension vs OPEB shares of normalized obligations**
Counties, N=28

Source: JPMAM, Center for Retirement Research at BC, FY 2015.
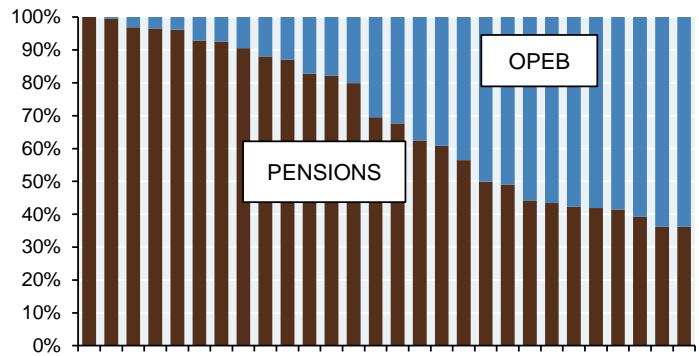
Source: JPMAM, Center for Retirement Research at BC, FY 2015.

### *Our IPOD credit ratio*

Our approach to analyzing the debt burdens of US municipalities is based on an "IPOD" ratio:

*Numerator (cost of debt)* = interest on net direct debt (I) + current pension costs and amortization of unfunded pension balances (P) + current OPEB costs and amortization of unfunded OPEB balances (O) + current cost of defined contribution plans (D)

*Denominator = revenues.* These are the revenues the municipality can use to service its debts

Using this approach, we can compare what municipalities *currently* contribute to what they *would* have to contribute under another set of assumptions. Specifically, we vary the discount rate used to value pension and OPEB liabilities (i.e., the assumed portfolio return), and other assumptions such as the "amortization period", which refers to the time frame over which unfunded amounts are paid down.

### *Why do we use a 6% discount rate?*

This is a hotly debated topic in pension finance. Some pension plans have gradually been lowering their forward-looking return assumptions; the median pension discount rate used by municipalities in our sample was 7.5%. **We believe our 6% assumption is conservative, since it implies a forward-looking 4% real return assuming 2% inflation**. There's a chart on page 8 showing real returns on a simplified stock/bond portfolio since 1956. A 4% real return would rank close to the lowest real 30-year compound returns of the post-war era.

An independent Blue Ribbon panel commissioned in 2014 by the US Society of Actuaries looked at the question of pension discount rates and historical returns. Their conclusion: "return experience does not readily suggest that return assumptions currently in use have been inconsistent with prior experience"[4]. However, the panel also concluded that while historical returns can be a useful reference point, return assumptions should ideally be based on a risk-free rate plus explicit forward-looking risk premia. As a separate risk measure, the panel recommended disclosure of plan liabilities using the risk-free rate.

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[4] "*Report of the Blue Ribbon Panel on Public Pension Plan Funding*", An Independent Panel Commissioned by the Society of Actuaries, February 2014

### *Normalizing pension and OPEB obligations across municipalities*

Most of the time, our normalized IPOD estimate of pension and OPEB costs is **higher** than what municipalities currently contribute.  There are four primary reasons for this:

- Some municipalities do not meet the annual required contribution computed by their own actuaries. As with US states, pension ARC compliance is considerably higher than OPEB ARC compliance.  Of 105 cities and counties in our universe, 97 contributed at least 80% of the pension ARC in FY2015, while only 37 contributed at least 80% of the OPEB ARC (see SM5)

- Some contribute 100% of their "required" contribution, but this contribution is sometimes set by statute (e.g., by the legislature) rather than by its actuaries

- We assume a 6% discount rate instead of the generally higher pension discount rates assumed by many municipalities; this increases the size of the gross and net pension liability (see SM3)

- We assume level dollar amortization instead of an approach more commonly used which assumes that ARC payments rise over time ("level percent"; see SM4)

The next charts compare what cities and counties *currently* contribute to what they would be paying under our normalized IPOD analysis.  In essence, these charts show **municipal funding gaps**.

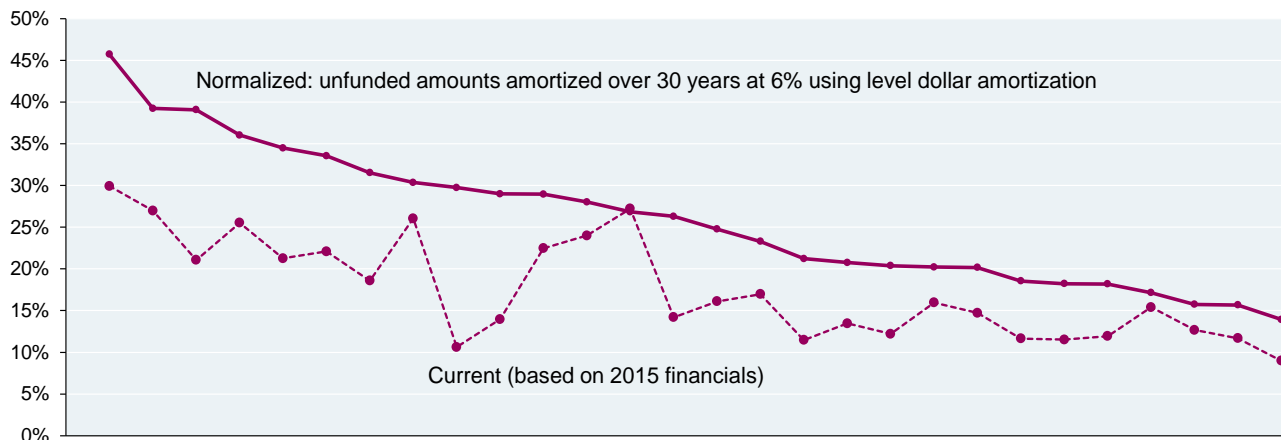**City IPOD ratios: current payments vs normalized payments**
% of municipality's revenues
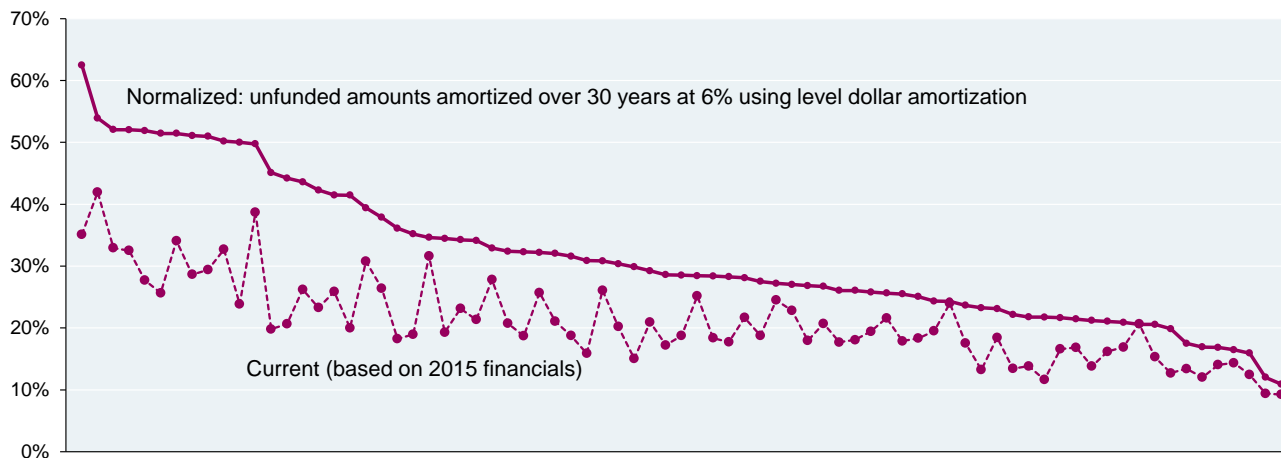


Source: JPMAM, CRR,  City CAFRs, Moody's. FY 2015.

**County IPOD ratios: current payments vs normalized payments**
% of municipality's revenues



Source: J.P. Morgan Asset Management, Center for Retirement Research at B.C., County CAFRs, Moody's. FY 2015.

### *What options do municipalities have to close their funding gaps?*

The table shows the cities and counties with the largest funding gaps. We refer to options for closing the gaps as the "**cost of remediation**", measured as the increase in taxes, cuts in non-pension spending or increase in public sector worker contributions[5] that would close the gap fully over time:

- All of these steps would need to take place every year for 30 years
- The tax increase would have to be a "dedicated" tax whose proceeds are only used to shore up underfunded pension and OPEB plans. In other words, a tax paid by all citizens to address issues affecting public sector workers. According to the BEA, public sector workers comprise 7% of the total workforce in the cities in our sample, and 15% of the workforce on a national level
- To be clear, this table assumes that (a) the municipality **wants** to fully close the gap over 30 years, and (b) believes that **6%** is the right discount rate assumption to use when estimating the cost
- Other remediation options include reductions in pension cost-of-living adjustments (COLA)[6], and changes to terms and conditions for OPEB (see SM9 for OPEB scenario analysis)

| Largest funding gaps | | | | | | 30-year remediation (mut. exclusive) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| City | Pension Funding Ratio (%) | Pension share of Pen+OPEB | OPEB Funding Ratio (%) | Current IPOD ratio | Normalized IPOD ratio | Funding gap: normalized minus current | Increase in revenues (taxes) | | Cuts in direct non-pension spending | | Increase in worker contributions |
| Chicago | 23% | 98% | 0% | 35% | 62% | 27% | 27% | or | 14% | or | 428% |
| Houston | 66% | 81% | 0% | 24% | 50% | 26% | 26% | or | 23% | or | 772% |
| Austin | 67% | 69% | 0% | 26% | 51% | 26% | 26% | or | 28% | or | 287% |
| Dallas | 54% | 94% | 0% | 20% | 45% | 25% | 25% | or | 30% | or | 459% |
| Baton Rouge | 71% | 50% | 0% | 28% | 52% | 24% | 24% | or | 20% | or | 525% |
| Fort Worth | 58% | 77% | 7% | 21% | 44% | 24% | 24% | or | 20% | or | 549% |
| Oakland | 72% | 74% | 0% | 29% | 51% | 22% | 22% | or | 22% | or | 462% |
| Phoenix | 52% | 95% | 32% | 29% | 51% | 22% | 22% | or | 18% | or | 404% |
| Jersey City | 56% | 57% | 0% | 20% | 41% | 21% | 21% | or | 29% | or | 510% |
| Pittsburgh | 45% | 82% | 2% | 33% | 52% | 20% | 20% | or | 24% | or | 333% |
| Atlanta | 69% | 71% | 0% | 33% | 52% | 19% | 19% | or | 15% | or | 329% |
| Sacramento | 77% | 78% | 2% | 23% | 42% | 19% | 19% | or | 18% | or | 301% |
| Minneapolis | 82% | 98% | 0% | 18% | 36% | 18% | 18% | or | 13% | or | 217% |
| Los Angeles | 84% | 79% | 67% | 33% | 50% | 18% | 18% | or | 19% | or | 228% |
| Omaha | 48% | 86% | 0% | 26% | 44% | 17% | 17% | or | 19% | or | 286% |
| Honolulu | 64% | 54% | 7% | 34% | 51% | 17% | 17% | or | 21% | or | 76121% |
| Cleveland | 80% | 85% | 29% | 19% | 35% | 16% | 16% | or | 15% | or | 207% |
| El Paso | 83% | 89% | 0% | 26% | 41% | 16% | 16% | or | 16% | or | 200% |
| Columbus | 73% | 85% | 25% | 19% | 34% | 15% | 15% | or | 15% | or | 243% |
| Cincinnati | 60% | 87% | 73% | 16% | 31% | 15% | 15% | or | 15% | or | 278% |
| **County** | | | | | | | | | | |
| Cook(IL) | 41% | 82% | 0% | 11% | 30% | 19% | 19% | or | 33% | or | 577% |
| King(WA) | 84% | 96% | 0% | 21% | 39% | 18% | 18% | or | 9% | or | 301% |
| Pr.Georges(MD) | 61% | 36% | 2% | 30% | 46% | 16% | 16% | or | 18% | or | 783% |
| LA(CA) | 87% | 50% | 2% | 14% | 29% | 15% | 15% | or | 14% | or | 552% |
| SanClara(CA) | 77% | 70% | 29% | 21% | 34% | 13% | 13% | or | 16% | or | 282% |
| Bergen(NJ) | 55% | 41% | 0% | 19% | 32% | 13% | 13% | or | 17% | or | 558% |
| Shelby(TN) | 94% | 61% | 12% | 27% | 39% | 12% | 12% | or | 16% | or | 217% |
| Suffolk(NY) | 98% | 42% | 0% | 14% | 26% | 12% | 12% | or | 11% | or | 3855% |

Source: J.P. Morgan Asset Management, Center for Retirement Research at BC, City/county CAFRs. FY 2015.

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[5] The high figures in the worker contribution column for Honolulu and Suffolk County reflect the fact that their public sector workers have only recently begun contributing to pensions. As a result, the baseline amounts are small and would have to increase astronomically to close the funding gap on their own.

[6] How would COLA adjustments impact this table? Take the example of Chicago. A 1% COLA reduction would reduce its liabilities by ~8%; its IPOD ratio would fall to 55%; and its required tax increase would fall to 20%.

### *Can municipalities earn their way out through higher investment returns?*

In the absence of remediation, and assuming contributions remain at current levels, what investment returns would be needed over the next 30 years to meet future projected obligations? In other words, "can municipalities earn their way out"?

The table shows breakeven annual returns required for pension and OPEB plans. "Con<Serv" means that the municipality is not contributing more than its current service costs, in which case a breakeven return is impossible since no assets accumulate to amortize unfunded amounts. "No Solution" means that the required return is > 50%. The middle column shows the share of underfunded amounts made up by pensions. For example, while Chicago and Phoenix have negative or low breakeven OPEB returns, their OPEB burdens are small to begin with, representing less than 5% of the pension + OPEB amount.

**How high are these returns?** The chart shows rolling 30-year real returns on a 70/30 stock bond portfolio since 1956. The 90th percentile of this real return distribution is 7.1%. Assuming 2.5% future inflation, the 90th percentile nominal return would be 9.6%. As a result, cities like Chicago, Dallas, Houston, Fort Worth, Phoenix, etc would have to earn among the highest real returns on record on (or above them) to "earn their way out" of underfunded pensions. A tall order at a time of low yields.

| City | B/E nominal pension return | Pension % of unfund. obligation | B/E nominal OPEB return |
|---|---|---|---|
| *Without remediation, required compound 30-year investment return on plan assets to pay down liabilities* | | | |
| Chicago | 17.9% | 98% | -11.7% |
| Houston | 10.0% | 81% | Con<Serv |
| Austin | 9.1% | 69% | Con<Serv |
| Dallas | 11.1% | 94% | No solution |
| Baton Rouge | 8.0% | 50% | Con<Serv |
| Fort Worth | 11.0% | 77% | No solution |
| Oakland | 8.1% | 74% | No solution |
| Phoenix | 11.2% | 95% | 6.7% |
| Jersey City | 10.0% | 57% | Con<Serv |
| Pittsburgh | 11.5% | 82% | No solution |
| Atlanta | 8.2% | 71% | No solution |
| Sacramento | 7.9% | 78% | Con<Serv |
| Minneapolis | 8.3% | 98% | No solution |
| Los Angeles | 7.2% | 79% | 8.0% |
| Omaha | 12.4% | 86% | No solution |
| Honolulu | 10.0% | 54% | 32.8% |
| Cleveland | 8.3% | 85% | 16.2% |
| El Paso | 8.0% | 89% | Con<Serv |
| Columbus | 8.9% | 85% | 18.7% |
| Cincinnati | 9.3% | 87% | 8.8% |
| **County** | | | |
| Cook(IL) | Con<Serv | 82% | Con<Serv |
| King(WA) | 7.8% | 96% | No solution |
| Pr.Georges(MD) | 8.0% | 36% | No solution |
| LA(CA) | 7.0% | 50% | Con<Serv |
| SanClara(CA) | 8.2% | 70% | 10.9% |
| Bergen(NJ) | 9.9% | 41% | No solution |
| Shelby(TN) | 7.4% | 61% | 19.7% |
| Suffolk(NY) | 6.9% | 42% | No solution |

Source: J.P. Morgan Asset Management, Center for Retirement Research at BC, City/county CAFRs. FY 2015.

**Historical real returns for hypothetical 70% stock, 30% bond portfolio,** 30-year rolling real return
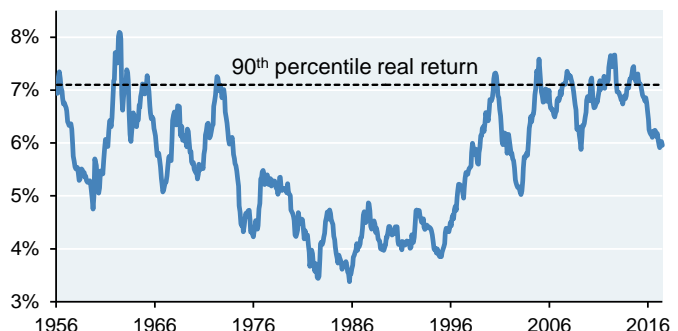


Source: JPMAM, Shiller, Ibbotson. June 2017. Past performance is not indicative of future results.

***What might pension funding ratios look like in 10 years without remediation and assuming a conservative 6% return on plan assets?***

This is a complex question, since unlike closed plans, most public plans are "open" and receive new contributions and accrue new liabilities each year. In SM8, we walk through our open plan model for estimating what funding ratios might be in 10 years. The results for municipalities with the lowest pension funding ratios appear in the table. To be clear, there are **a lot of assumptions involved** in such an exercise (see box), and actual outcomes could differ substantially from our estimates.

In the table, we show two scenarios since municipalities can use either "level dollar" amortization or "level percent" amortization. As explained in SM4, level percent amortization results in lower ARC payments in early years, and higher ones in later years. When combined with an "open" amortization method (which recomputes ARC payments annually over the subsequent 30 years rather than for a fixed future date), level percent payments are consistently lower than level dollar, and result in lower funding ratios. Yes, I know it's complicated; no one ever said actuarial pension math was simple.

**Most pension funding ratios improve over time, or do not deteriorate very much.** This suggests that many cities and counties have several years over which to address underfunded pensions, and that most of the time, there's no "fuse" resulting in imminent, sharp declines in funded status. But to reiterate, **this assumes that municipalities consistently make the pension contributions specified in the table** (which has *not* always been the case), *and* that there is no major setback in asset values.

| Estimated Year 10 pension funding ratios; sorted by current funding ratio | | | |
|---|---|---|---|
| **Municipality** | **Current contrib % of pension ARC** | **Current pension funding ratio** | **Year 10 funding ratio: level dollar** | **Year 10 funding ratio: level percent** |
| Chicago | 52% | 23% | 26% | 15% |
| Providence | 100% | 39% | 56% | 43% |
| Cook (IL) | 98% | 41% | 74% | 65% |
| New Haven | 100% | 43% | 60% | 48% |
| New Orleans | 88% | 45% | 56% | 44% |
| Pittsburgh | 118% | 45% | 69% | 57% |
| Omaha | 96% | 48% | 61% | 50% |
| Philadelphia | 78% | 50% | 50% | 39% |
| Louisville | 100% | 51% | 69% | 59% |
| Phoenix | 100% | 52% | 66% | 56% |
| Dallas | 90% | 54% | 70% | 62% |
| Union (NJ) | 100% | 54% | 77% | 68% |
| Bergen (NJ) | 100% | 55% | 77% | 69% |
| Newark | 100% | 55% | 79% | 72% |
| Jersey City | 100% | 56% | 76% | 67% |
| Jacksonville | 99% | 57% | 71% | 62% |
| Fort Worth | 86% | 58% | 67% | 59% |
| Boston | 100% | 60% | 73% | 65% |
| Cincinnati | 66% | 60% | 57% | 49% |
| Glendale | 100% | 60% | 67% | 57% |
| Pr.Georges(MD) | 100% | 61% | 71% | 63% |
| Birmingham | 51% | 63% | 57% | 51% |
| Honolulu | 109% | 64% | 74% | 65% |
| Houston | 88% | 66% | 66% | 58% |
| Anchorage | 100% | 66% | 71% | 63% |

Source: J.P. Morgan Asset Management, Center for Retirement Research at BC, City/county CAFRs. FY 2015.

Future pension funding ratio assumptions:

- Realized investment return of 6% (ex-post)
- Municipality maintains current contribution ratio relative to ARC
- Municipality maintains its current discount rate (ex-ante)
- Starting point is current funding ratio
- "Open" amortization method (rolling 30-year period rather than fixed date)
- Service costs equal to 3% of liabilities
- Payroll growth of 4%

## *Putting it all together: IPOD ratios and other factors affecting debt sustainability*

Understanding debt sustainability requires synthesis of a lot of information, not just f our IPOD ratios. When we look at the forest and the trees, we have the greatest concerns about municipalities with high funding gaps; which have large operating deficits; which do not have high revenue and/or population growth (making it harder to grow out of the problem); whose underfunding problems are mostly related to pensions rather than OPEB (limiting their flexibility); and whose pension dynamics deteriorate more rapidly over time. We created a risk indicator which synthesizes our IPOD ratio with these other factors. The risk indicator is shown in the last column, along with other summary statistics from this paper.

| Largest funding gaps | | | 30-year remediation (mut. exclusive) | | | | | W/O remediation, req. return on assets | | Pension funding ratio | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| City | Current IPOD ratio | Norm. IPOD ratio | Funding gap | Tax increase | Cut in direct non-pension spending | | Increase in worker contributions | B/E nom. pension return | B/E nom. OPEB return | Current | Est. in 10 yrs w/out remed @ 6% return* | Debt Risk indicator |
| Chicago | 35% | 62% | 27% | 27% | or | 14% | or 428% | 17.9% | -11.7% | 23% | 15% | 121 |
| Houston | 24% | 50% | 26% | 26% | or | 23% | or 772% | 10.0% | Con<Serv | 66% | 58% | 86 |
| Austin | 26% | 51% | 26% | 26% | or | 28% | or 287% | 9.1% | Con<Serv | 67% | 67% | 56 |
| Dallas | 20% | 45% | 25% | 25% | or | 30% | or 459% | 11.1% | No solution | 54% | 62% | 95 |
| Baton Rouge | 28% | 52% | 24% | 24% | or | 20% | or 525% | 8.0% | Con<Serv | 71% | 67% | 90 |
| Fort Worth | 21% | 44% | 24% | 24% | or | 20% | or 549% | 11.0% | No solution | 58% | 59% | 78 |
| Oakland | 29% | 51% | 22% | 22% | or | 22% | or 462% | 8.1% | No solution | 72% | 71% | 88 |
| Phoenix | 29% | 51% | 22% | 22% | or | 18% | or 404% | 11.2% | 6.7% | 52% | 56% | 119 |
| Jersey City | 20% | 41% | 21% | 21% | or | 29% | or 510% | 10.0% | Con<Serv | 56% | 67% | 66 |
| Pittsburgh | 33% | 52% | 20% | 20% | or | 24% | or 333% | 11.5% | No solution | 45% | 57% | 103 |
| Atlanta | 33% | 52% | 19% | 19% | or | 15% | or 329% | 8.2% | No solution | 69% | 68% | 98 |
| Sacramento | 23% | 42% | 19% | 19% | or | 18% | or 301% | 7.9% | Con<Serv | 77% | 75% | 76 |
| Minneapolis | 18% | 36% | 18% | 18% | or | 13% | or 217% | 8.3% | No solution | 82% | 74% | 83 |
| Los Angeles | 33% | 50% | 18% | 18% | or | 19% | or 228% | 7.2% | 8.0% | 84% | 77% | 89 |
| Omaha | 26% | 44% | 17% | 17% | or | 19% | or 286% | 12.4% | No solution | 48% | 50% | 85 |
| Honolulu | 34% | 51% | 17% | 17% | or | 21% | or 76121% | 10.0% | 32.8% | 64% | 65% | 81 |
| Cleveland | 19% | 35% | 16% | 16% | or | 15% | or 207% | 8.3% | 16.2% | 80% | 70% | 99 |
| El Paso | 26% | 41% | 16% | 16% | or | 16% | or 200% | 8.0% | Con<Serv | 83% | 76% | 68 |
| Columbus | 19% | 34% | 15% | 15% | or | 15% | or 243% | 8.9% | 18.7% | 73% | 65% | 59 |
| Cincinnati | 16% | 31% | 15% | 15% | or | 15% | or 278% | 9.3% | 8.8% | 60% | 49% | 78 |
| County | | | | | | | | | | | | |
| Cook(IL) | 11% | 30% | 19% | 19% | or | 33% | or 577% | Con<Serv | Con<Serv | 41% | 65% | 47 |
| King(WA) | 21% | 39% | 18% | 18% | or | 9% | or 301% | 7.8% | No solution | 84% | 80% | 76 |
| Pr.Georges(MD) | 30% | 46% | 16% | 16% | or | 18% | or 783% | 8.0% | No solution | 61% | 63% | 70 |
| LA(CA) | 14% | 29% | 15% | 15% | or | 14% | or 552% | 7.0% | Con<Serv | 87% | 79% | 48 |
| SanClara(CA) | 21% | 34% | 13% | 13% | or | 16% | or 282% | 8.2% | 10.9% | 77% | 74% | 39 |
| Bergen(NJ) | 19% | 32% | 13% | 13% | or | 17% | or 558% | 9.9% | No solution | 55% | 69% | 43 |
| Shelby(TN) | 27% | 39% | 12% | 12% | or | 16% | or 217% | 7.4% | 19.7% | 94% | 84% | 62 |
| Suffolk(NY) | 14% | 26% | 12% | 12% | or | 11% | or 3855% | 6.9% | No solution | 98% | 86% | 39 |

Source: J.P. Morgan Asset Management, Center for Retirement Research at BC, City/county CAFRs. FY 2015. * See page 9 for details on calculations and assumptions.

While the red and orange risk indicators do not necessarily imply immediate risks for bondholders, they do highlight municipalities we see as having the most difficult choices ahead of them. To be clear, municipalities can default for reasons unrelated to pensions and OPEB, simply because their revenues are far below their operational expenditures, which is current the risk facing cities like Hartford.

Michael Cembalest
JP Morgan Asset Management

*see next page for Acknowledgements and a link to Supplementary Materials*

The link below will take you to the supplementary materials, which contain information on our IPOD assumptions and methodology, background data and sources, scenario analysis and legal precedents

## Supplementary Materials (SM) Table of Contents

*Acronyms*
**ARC** Annual Required Contribution, sometimes referred to as an Actuarially Determined Contribution; **CAFR** Comprehensive Annual Financial Report; **COP** Certificate of Participation; **FY** Fiscal year; **GASB** General Accounting Standards Board; **IPOD** Interest, Pensions, OPEB and Defined Contribution, divided by Revenues; **OPEB** Other post-employment benefits (retiree healthcare); **POB** Pension Obligation Bond

## IMPORTANT INFORMATION

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