THOUGHT LEADERSHIP





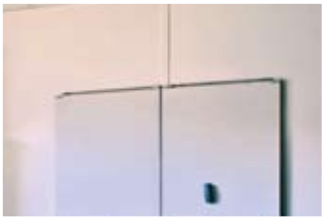




The OPEB Challenge

Mapping a comprehensive strategy for public employers





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At J.P. Morgan Asset Management, we apply our original insight and deep knowledge to deliver innovative investment solutions to the public sector. Today, new accounting rules, rising medical costs and the retirement of baby boomers are intensifying the challenges for public employers in providing "other postemployment benefits (OPEB)."

In response, we tapped two of our intellectual reservoirs to help public employers map a comprehensive strategy for addressing the OPEB challenge:

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The OPEB Challenge

Mapping a comprehensive strategy for public employers

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Executive Summary

Many public sector employers provide retiree medical benefits as a supplement to "traditional" pension benefits. With limited accounting recognition and pay-as-you-go (PAYGO) funding, these benefits have not always received the attention that most agree they deserve. That's changing, largely because of the challenges presented by compliance with new GASB Statement 45.* But it's not just an issue of accounting. The accumulation of benefits under the PAYGO system, the burden of approaching baby boomer retirements, and ever growing medical costs have made retiree medical benefit finance a top priority. Indeed, there's a sense in which the GASB 45 accounting change simply reflects the urgency of those underlying concerns.

What does GASB 45 require? Generally, under the new rules, government entities must begin to account for retiree welfare benefits—technically called "other postemployment benefits (OPEB)"—as they are earned. That will be, in accounting terms, expensive. Going from PAYGO to current accrual can increase the charge for these benefits by a factor of five to ten or even more.

* Governmental Accounting Standards Board (GASB) Statement 45—Accounting and Financial Reporting by Employers for Postemployment Benefits other than Pensions. While our paper is worded so as to focus on employers subject to GASB 45, much of the discussion applies equally to plans subject to GASB 43. For further information, go to www.gasb.org/gasb43_45/index.html.

Moreover, while most government entities have not been pre-funding these benefits, GASB 45 provides incentives to do so. If you fund, you generally are allowed to use the expected return on assets as your valuation discount rate. That's likely a higher rate than you would otherwise be allowed to use. Higher rates equal smaller (accounting) liabilities.

Entities undertaking GASB 45 compliance—and confronting retiree welfare benefit finance generally—face four issues: liability valuation, the funding decision, investment of assets and benefit program design.

Liability valuation

OPEB liabilities are different. Critically, they are different from pension liabilities. For example, employees leaving before reaching retirement eligibility often receive no benefit, so OPEB liabilities are especially sensitive to changes in turnover and retirement rate assumptions. Perhaps the most important difference is that OPEB programs rarely promise a dollar-based benefit. More typically, they promise future medical services.

Because the benefits promised are medical services, OPEB liabilities are very sensitive to changes in the cost of those services (generally called "medical trend"). Medical costs have experienced, in our economy, a unique level of price growth and volatility. In addition, the deferred (and long) payout period for these benefits means that today's liability measures are very sensitive to changes in discount rate assumptions. When you put it together, you find that the critical driver of OPEB liability values is the spread between these two factors—medical trend and discount rate. Volatility in that spread can have a dramatic effect on costs.

This increased sensitivity to assumptions makes OPEB liabilities generally less predictable, more volatile and harder to manage (e.g., through asset-liability strategies) than pension liabilities. And it puts a premium on a thorough and fully stress-tested understanding of the numbers.

Funding decisions

There's no one right answer to the fund/don't fund question. On the one hand, as OPEB benefits are being earned now, it seems appropriate to charge for them—that is, pay from current revenue sources—now. Funding also provides increased benefit security for current and future retirees. And, finally, there can be a clear accounting benefit to funding: the ability to use a higher discount rate in valuing liabilities.

On the other hand, each entity's situation is unique and deserves careful analysis of the options. There may be competing budgetary needs that should be given priority, leading to different solutions that may, in the long run, better provide for the fiscal stability of the entity and, ultimately, the benefit program.

Investment of assets

If you do fund, investment strategy will be critical. Absent a significant re-design of the benefit program, this is your best opportunity to manage the effect of OPEB liabilities on your financials and your treasury. In this paper, we present an investment process that proceeds deliberately through five steps: (1) Identification of risk considerations; (2) Determination of liquidity needs; (3) Selection of the investment opportunity set; (4) Identification of the optimal asset class mix; and (5) Implementation. In that process, two critical factors stand out.

First, the investment allocation process should be undertaken, and its effectiveness should be measured, with a view to the liabilities being funded. The unique features of OPEB liabilities, and their difference from pension liabilities (as previously discussed), fundamentally inform investment analysis. And among those features, the volatility and unpredictability of changes in medical trend stand out.

Second, real assets—Treasury Inflation-Protected Securities (TIPS), real estate, infrastructure and commodities—provide a meaningful, if imperfect, hedge with respect to the inflation component of medical trend. In contrast, bond/cash flow matching and immunization strategies, at times used effectively in pension plans, have considerably less utility, again because of the difference between OPEB and pension liabilities. So, in setting an asset allocation target, you will find that you are on a different efficient frontier than the one you would use for your pension plan or for a returns strategy unrelated to liabilities. Real asset investments will have more "efficiency," and nominal bonds will have less, than they do in a pension investment analysis.

Benefit program design

Generally, the most direct way to control OPEB costs is through benefit program design. While employers often lack benefit design flexibility, available design options should be reviewed, with an eye to maximizing benefit "effectiveness" within given cost constraints. Such a review begins, again, with an understanding of the numbers: What are the real cost drivers in your program? What are the trends for the future? Which benefits are most valuable to retirees? And, what are the secondary and tertiary effects of any design decision being considered? Changes in design may change participant behavior, affecting the pension plan and broader staffing costs in significant ways.

Conclusion

While most entities will find that GASB 45 presents significant challenges—in accounting, cash management, investment strategy and benefits policy—it also presents an opportunity to undertake a disciplined review of your current program from each of these perspectives. Our paper provides a critical foundation for that review, which can help put your OPEB program on a sound financial path for the future.

TABLE OF CONTENTS

1 INTRODUCTION

3 LIABILITY VALUATION

8 Case Study—Part 1: Green County Liability Valuation

13 FUNDING DECISIONS

16 Case Study—Part 2: Green County Funding Decisions

17 INVESTMENT OF ASSETS

25 Case Study—Part 3: Green County Investment Strategy

29 BENEFIT PROGRAM DESIGN

31 Case Study—Part 4: Green County Benefit Program Design

33 CONCLUSION

GASB accounting for OPEB is changing

What does that mean?

The Governmental Accounting Standards Board (GASB) has changed the accounting rules for "other postemployment benefits (OPEB)"

OPEB liabilities consist primarily of liabilities for retiree medical benefits, although other benefits, such as retiree life insurance, are also included.

Here's the change: Previously, government entities could expense retiree medical benefits on a pay-as-you-go (PAYGO) basis. So, for instance, the cost of a retiree medical premium for an employee wasn't charged to the income statement until the employee retired. Under the new rule, this cost must be expensed over the employee's career as benefits are earned, that is, before he or she retires.

This accounting change, as put forth in GASB 45,[1] will have a significant impact on many government entities that provide retiree medical benefits. The new accounting rules will require booking more expenses sooner. Costs, from an accounting perspective, are going to go up just because of this change. That will put pressure on employers to fund OPEB liabilities rather than carry an accounting deficit. And, because of the way the new rules work, the OPEB liabilities themselves may actually be smaller (on an accounting basis) if they are funded.

So, the GASB accounting change puts four questions on the table.

- First, **what are your OPEB liabilities?** This question is a lot more complicated than it sounds. If anything, the process of quantifying and accounting for OPEB liabilities is more complex than it is for pension liabilities.
- Second, **should you fund OPEB liabilities, and if so, when and by how much?** These are also complicated questions, made more difficult by the variety of political pressures that decision makers face.
- Third, **if you do fund, what is the appropriate investment strategy?** Getting the answer to this question right is critical. Your investment strategy will affect your accounting and valuation of liabilities, your contribution flow and your ability to plan.
- Fourth, when you have finished evaluating the "new" liabilities and how much it will take to fund them, **you may wish to review benefit program design.** Can you modify your retiree medical program to control costs? If so, what's the best way to do that?

OPEB liabilities are different from pension liabilities and require fresh analysis.

In considering these questions, there will be a temptation to mimic pension plan management decisions. That may be a mistake. The cost drivers and liability behaviors of OPEB liabilities are sufficiently different from those of pension liabilities that they deserve a clean slate and some fresh analysis. Generally, in evaluating and funding pension and OPEB cost, your objective is the same: to create a benefit financing strategy that is efficient, with "no surprises." But, because OPEB liabilities are different, the strategy may also be different.

[1] Governmental Accounting Standards Board (GASB) Statement 45—Accounting and Financial Reporting by Employers for Postemployment Benefits other than Pensions.

How to use this paper

This paper is designed not only to help you navigate your transition to the new GASB OPEB standard, but more importantly, to provide useful tools to support your understanding, management and financing of retiree medical benefits. We'll cover all four broad topics:

1: Liability valuation

2: Funding decisions

3: Investment of assets

4: Benefit program design

Sections begin with a summary of the key points—"need to know" issues in each key area. We follow with a detailed discussion of those issues—the analytical framework for key decisions. And each section ends with a discussion of our case study—how Green County, a hypothetical, but realistic employer providing retiree medical benefits, handled those issues.

An integrated approach to program management and GASB 45 compliance is essential, because decisions in each area will affect the others. But how far the individual reader will want to go into a particular topic will, in part, depend on his/her goals and responsibilities.

Fundamental principles of OPEB valuation

- The process starts with an understanding of the numbers.
- Retiree medical benefit liabilities differ from pension liabilities in key ways.
- Decisions about other issues, such as funding, investment strategy and design, will fundamentally affect valuation.

Unique features of OPEB liabilities

Feature	Significance
Back-loaded accruals	Very sensitive to retirement age and turnover assumptions
Longer duration	Very sensitive to discount-rate assumptions
Open-ended benefit obligation	Very sensitive to inflation (medical trend) assumptions

The unique nature of OPEB liabilities

The foundation of your OPEB strategy depends, first, on a strong understanding of your current situation. In what follows, we discuss the valuation challenges presented by the unique nature of OPEB liabilities, the GASB 45 valuation process and OPEB valuation methodology generally.

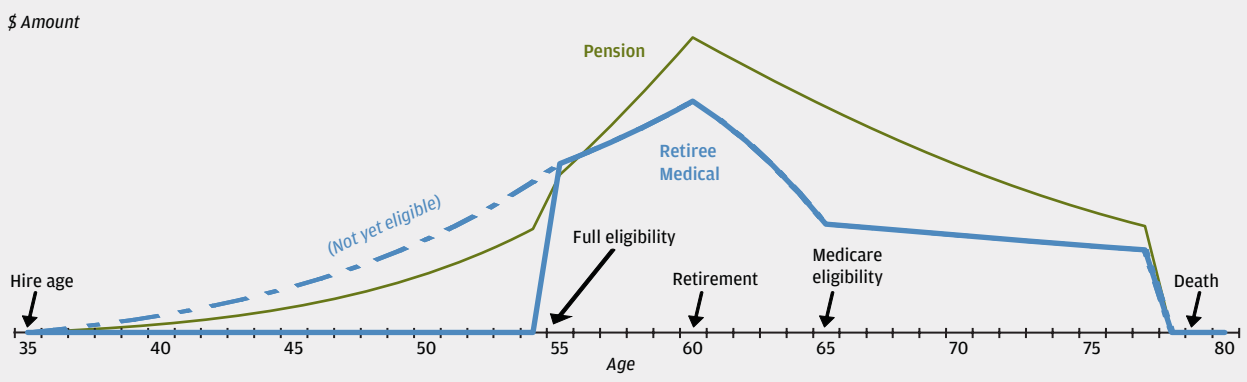
Retiree medical benefits, the major component of OPEB, on the surface appear very similar to pension benefits. Both typically are a stream of payments, commencing at retirement and payable for the lifetime of the retiree. However, unique characteristics pose a challenge to the quantification and management of retiree medical benefit liabilities.

The accrual pattern is different

Unlike pension benefits, which generally accrue more or less evenly over a participant's career and typically vest after five years of service, an employee generally does not accrue a right to retiree medical benefits until he or she becomes eligible for early retirement. In other words, retiree medical benefits are generally back-loaded—a disproportionate share of benefit value is earned toward the end of an employee's career (**Exhibit 1)**.

The result: retiree medical benefits are very sensitive to retirement age and turnover assumptions. Assumptions that are "close enough" for pension valuations may yield significantly inaccurate retiree medical benefit valuations. (We note in passing that the design of, and changes in, your pension plan's early retirement eligibility provisions may have a significant effect on OPEB retirement assumptions and experience as well.)

Exhibit 1: Differences in pension versus retiree medical benefits—Sample accrual and drawdown of present value of benefits for one individual

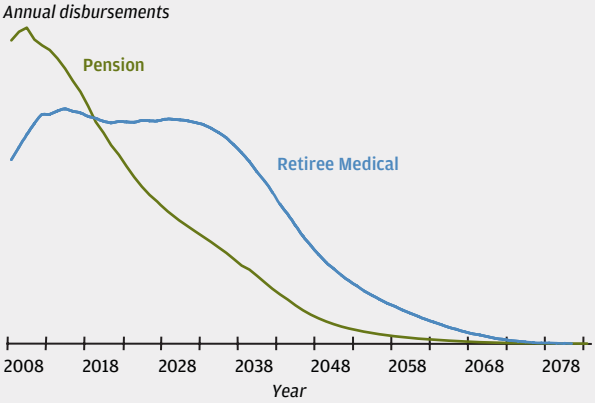


Source: J.P. Morgan Asset Management. Illustrative purposes only.
In this typical example, while pension benefits are vested after five years of service, retiree medical benefits are forfeited if the employee leaves prior to retirement eligibility at age 55. In retirement (from age 60 on), pension benefit payments are steady, leading to a smoothly declining present value of benefits. For retiree medical benefits, Medicare becomes the primary source at age 65, after which the employer provides only supplemental benefits. This results in a slower drawdown of accrued retiree medical benefits, in present value terms.

The duration of the OPEB payment obligation is different

Generally, the duration of retiree medical liabilities is longer than the duration of pension liabilities. That is, retiree medical obligations are, on balance, "further out"—weighted towards periods in the more distant future—than pension benefit obligations. Both pension and retiree medical benefits are, generally, paid until the end of the participant's life. But medical payments, in contrast with pension payments, tend to be higher towards the end of life, and inflation has a greater impact on those final years' payments (**Exhibit 2**).

Exhibit 2: Sample plan cash-flow forecast (current participant group)

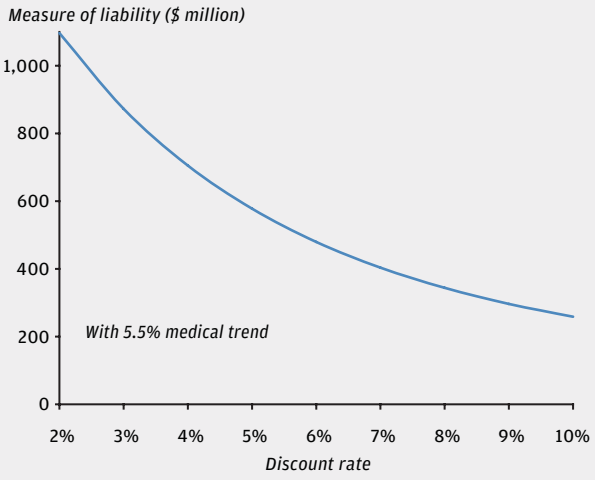


Source: J.P. Morgan Asset Management. Illustrative purposes only. Excludes future hired employees.

The result: OPEB valuations are very sensitive to changes in discount rates. How sensitive? Retiree medical program liabilities often have a duration of 18 years or more. An 18-year duration means that a one percentage point change in the discount rate results in an 18% change in the value of the liabilities. A pension plan covering the same employee group would have relatively less sensitivity to discount rates (typically 11 to 14 years duration).

Exhibit 3 shows the impact on OPEB actuarial liability as we change our assumption about the discount rate.

Exhibit 3: Actuarial liability as a function of discount rate for a sample retiree medical program



Source: J.P. Morgan Asset Management. Illustrative purposes only.

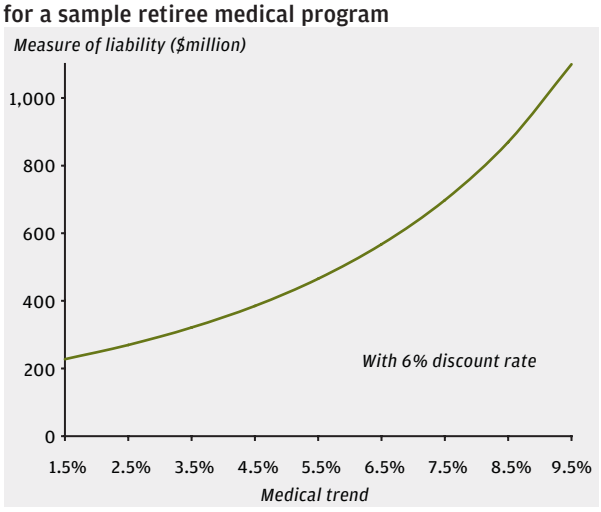
Unlike pension benefits, OPEB medical benefit obligations are not fixed and are very sensitive to changes in the cost of services (medical trend)

While pension liabilities are pre-defined pursuant to a mathematical formula, retiree medical benefits are not. Rather, they represent a promise of healthcare goods and services, the cost of which changes with medical care cost inflation and changes in utilization rates—"medical trend." Furthermore, the benefits are often not guaranteed, but subject to benefit program changes, even after retirement. Thus, new medical procedures, increased longevity, and changes in public policy can increase or rein in medical care costs in a way that is significantly harder to forecast than pension costs.

The result: You cannot settle OPEB obligations the way you can pension liabilities—there is too much uncertainty as to what the ultimate liability might be.

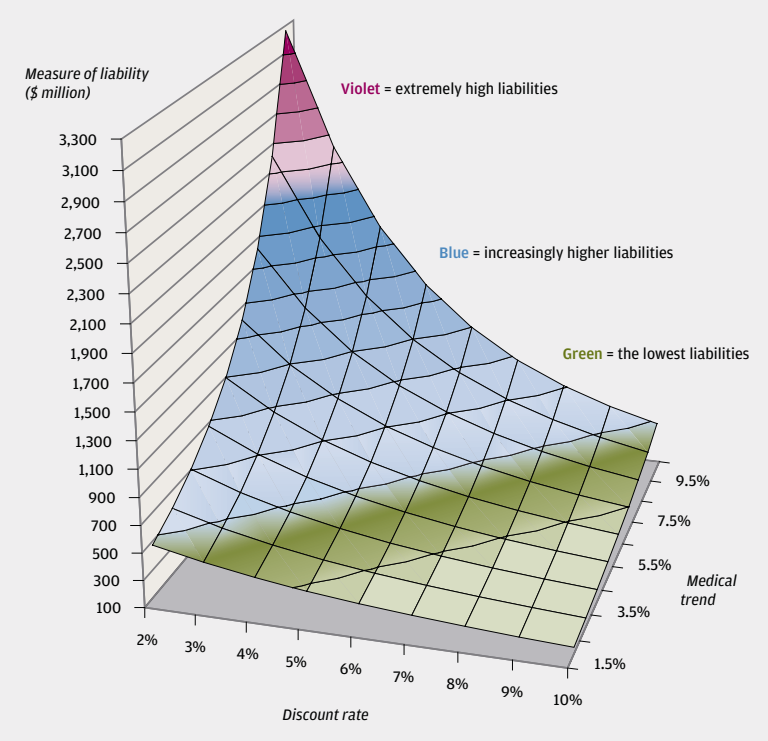
Exhibit 4 shows the impact on OPEB actuarial liability as we change our assumption about future medical cost trends.

Exhibit 4: Actuarial liability as a function of medical trend for a sample retiree medical program



Source: J.P. Morgan Asset Management. Illustrative purposes only.

Exhibit 5: Actuarial liability as a function of discount rate and medical trend for a sample retiree medical program



Source: J.P. Morgan Asset Management. Illustrative purposes only.

The combined sensitivity to changes in discount rates and changes in medical trend makes OPEB liability valuation particularly problematic

In **Exhibit 5**, the vertical axis shows the liability measure resulting from the combination of discount rate and medical trend. The colored regions of the graph map to various bands of liability value, from lowest (green) to highest (violet).

Examination of this chart reveals that it is not the discount rate or the assumed medical trend, per se, that is critical to the liability measure. Rather, it is the spread between the two. For example, for this illustrative program, the liability with a 4% discount rate and a 3.5% medical trend is almost identical to the liability with an 8% discount rate and a 7.5% medical trend: both near $480. In extreme scenarios of low discount rates and high medical trend, the liability measures can get very high, very fast.

The preceding discussion and charts should make a couple of points clear:

- Any discussion of the actuarial liability duration (or discount rate sensitivity) is incomplete without recognition of the effects of assumed medical cost trends. If discount rate and medical trend move together, the spread is unchanged and the liability measure can remain quite steady.
- Discount rate and medical trend sensitivities vary. For example, the increase in actuarial liability for lowering the discount rate from 10% to 9% is much less than the increase in actuarial liability for lowering the discount rate from 3% to 2%—a characteristic known as "convexity."

Of course, not all OPEB programs will demonstrate exactly the behaviors illustrated above. It will depend on the mix of benefits and demographics. But, the relationships shown here are very common among OPEB programs.

The foregoing discussion makes it clear that selection of actuarial assumptions has a critical impact on liability valuation and cost—and the sensitivity to those assumptions is typically greater than for pension plans. Now, let's turn to the new GASB rules for valuing OPEB liabilities.

GASB valuation rules—moving away from PAYGO

Let's begin with the theory behind the new GASB 45 rules—that will help in understanding why this accounting change is being made and what you have to do to comply with it.

Under a PAYGO system, you only expense a benefit when you pay it. That may work fine for some expenses, but retiree medical benefits, like pension benefits, are really future compensation for current services. So, while the benefits are paid in the future, they are earned today. For that reason, says GASB, they should be expensed today.

GASB 45: OPEB benefits are future compensation for current services.

Now, there's a problem that you always encounter when you go from a PAYGO system to a "current accrual" system. During the transition period, you wind up "paying"—really, costing—for the present and the past. That's because you have to accrue for the current year's benefits and you have to accrue for prior years' benefits that weren't accrued under your PAYGO system. That can be painful, and as we'll see, GASB has provided a framework to ease transition to the new rules.

Costing benefits

GASB 45 provides a costing methodology and rules for valuing liabilities. Key assumptions—discount rate and medical trend—will have a significant effect on cost. "Real world" analysis and forecasting are also critical to a disciplined OPEB expensing/funding analysis.

The Annual Required Contribution (ARC)

The new GASB OPEB rules require that the actuary calculate an Annual Required Contribution (ARC). The ARC includes the employer's "normal cost" of providing the benefits earned that year and a provision for amortizing the unfunded actuarial liability.

In determining normal cost and actuarial accrued liability, employers can choose from among six different actuarial cost methods. Different cost methods may allocate higher or lower amounts to early or later years, depending upon the demographics of the population. One method may frontload expenses for one demographic and backload expenses for another. And, this relationship may shift over time. In amortizing the past service liability, employers have a choice between four alternative approaches to amortization. You will want to explore all relevant methodological options with your actuary.

Key valuation assumptions—discount rate and medical trend

As we've seen, two valuation assumptions are critical and will have a significant effect on liability valuation: discount rate and projected increases in the cost of medical benefits (medical trend).

With respect to discount rate, GASB 45 provides a special rule. If you fund the ARC, you generally may use the expected rate of return on plan assets (a "portfolio-based rate") to value liabilities. If you do not, then you must use a generally lower expected rate of return on employer assets (an "employer-based rate"). This feature of the new rules may

GASB 45 key considerations

Costing methodology	Generally, must book current cost and amortize unfunded actuarial liability (which together equal the Annual Required Contribution [ARC]).
Key assumptions:	
Discount rate	If the ARC is funded, a portfolio-based discount rate may be used; if not, a (lower) employer-based discount rate must be used.
Medical trend	Medical cost trend, reflecting medical inflation and changes in utilization patterns
"Real world" analysis	GASB methodology and assumptions may not necessarily reflect real economic costs.
Forecasting	Necessary to test assumptions and understand future challenges

influence valuations, the fund/don't fund decision and investment strategies. Thus it should be kept in mind at each stage of your analysis and decision making.

Medical trend is, generally, the anticipated increase in the cost of providing benefits under the program. Assumptions about medical trend may be thought of as anticipating changes in both price and utilization. For example, an assumption about medical price inflation would capture the projected increase in cost of a particular drug, while assumptions about changes in utilization would capture projected increases (or decreases) in the prescription and use of that drug. In any case, the combined effect of these two factors leads to an assumption about medical trend.

Medical price inflation has, in the past, correlated with headline inflation but has generally been higher.[2] Utilization-related changes in retiree medical costs, however, have not generally correlated with headline or medical inflation. As we will see, these characteristics of medical trend have implications for the formulation of OPEB investment strategies.

Finally, note that actual asset returns and realized medical trend will, in the near term, have only a modest impact on GASB 45 costs because experienced gains and losses are generally amortized over long periods (up to 30 years). Assumptions about future trends, however, are the key drivers of GASB 45 cost measurements.

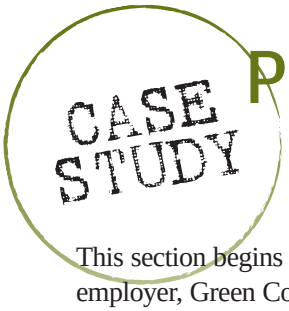
Accounting and economic costs

GASB 45 provides a systematic way to recognize the cost of OPEB programs, but it doesn't necessarily capture their "true" economic cost. In fact, given the many assumptions at play in the OPEB actuarial valuation process, it is unrealistic to expect that any single construct of actuarial liabilities and costs will provide all the perspective needed for sound financial management of the program. Thus, independent of the official accounting numbers you develop, it is worth considering alternative measures of liabilities to provide additional insight and perspective for decision making and to help monitor asset/liability risks.

Forecasting

Finally, sound decision making requires more than just accurate assessment of current liabilities and accounting costs. Critical to planning and decision making is a strong understanding of future liabilities and costs. That requires a robust forecasting methodology including both best- and worst-case scenarios.

[2] Headline inflation is measured by changes in the Consumer Price Index (CPI). See sidebar: **The relationship between CPI and mCPI,** page 20.



Part 1: Green County Liability Valuation

This section begins our review of how a hypothetical employer, Green County, handled the valuation process. We'll revisit Green County at the end of each or our broad topic discussions. The adjacent sidebar provides some background on Green County and its retiree medical benefit program.

For Green County, the GASB 45 valuation process began with a review of liability valuations under different discount rate and medical trend assumptions and a consideration of funded status projections. This analysis permitted Green County to evaluate the additional accounting cost of moving from a PAYGO system to GASB 45. It also illustrated the effect on cost, cash flow and funded status of adopting different funding and investment strategies. Finalization of GASB 45 valuation assumptions and methodologies will, however, depend on decisions made about funding and investments.

Assumptions that are "close enough" for pensions may be woefully inaccurate for OPEB valuations.

Green County: Background

In Green County, the local economy has been strong for several years, though there are signs of some slowing of economic growth. The county enjoys a diverse tax base. The most recent year general fund budget was about $1.1 billion. To date, the cost of the benefits (on a PAYGO basis) has not been overly burdensome. The county has 10,000 active employees (average age, 44; average service, 10 years). There are 1,000 retirees, with an average age of 69.

The county has some flexibility to modify program benefits, but substantive changes would require discussions with the employee union. There are no present plans for significant benefit changes.

Highlights of the (not atypical) Green County retiree medical program are as follows:

- The program offers a preferred provider option pre-Medicare: $300 per person deductible in network; $500 per person deductible out of network; $25 office visit co-pay; 80% coinsurance in network/60% out of network; in network, out of pocket maximum, $1,650 per person; out of network, out of pocket maximum, $3,150 per person.
- Post-Medicare the deductibles and out of pocket maximums are eliminated, but medical benefits become secondary to Medicare.
- There is an onsite health clinic ($10 per visit) available to active employees and retirees for routine and preventive care.
- Prescription drug (Rx) provisions are 5% coinsurance generic; 25% coinsurance formulary; 40% coinsurance non-formulary; $1,100 per person, out of pocket maximum.
- Pre-65 retirees contribute 50% of active premiums. Post-65 retiree contributions are set at county discretion, but currently are about 25% of post-Medicare cost.
- Eligibility for benefits is currently set at age 55 with 15 years of service; age 62 with 10 years of service; or any age, with 30 years of service.

Valuation assumptions—discount rate and medical trend

Green County initially considered program liabilities valued at three different discount rates:

- 8%, a portfolio-based rate (comparable to the rate Green County uses to value pension liabilities), which implied a decision to fund and invest aggressively
- 6%, a portfolio-based rate, which implied a more conservative investment strategy
- 4%, an employer-based rate, which under GASB 45 rules implied a decision not to fund. This rate also corresponded to the current yield available on long U.S. Treasury bonds.

These rates provided a range for consideration and proved useful as Green County considered funding and investment decisions.

Green County considered two long-term medical trend assumptions: 5.5% and 7.5%. The 5.5% assumption reflected 4% assumed annual medical inflation and 1.5% assumed annual increase due to changes in utilization of medical services and prescription drugs. The 7.5% assumption more closely tracked Green County's recent experience and served as a stress test for the medical trend assumption.

Exhibits 6 and **7** analyze Green County's GASB 45 liabilities under different assumptions for an open participant group (i.e., including future hired employees).

Interpretation of exhibits

Exhibits 6 and **7** illustrate the sensitivity of liability valuations to discount rate and medical trend assumptions, with valuations varying from $344 million to $1.097 billion (a range of 300%).

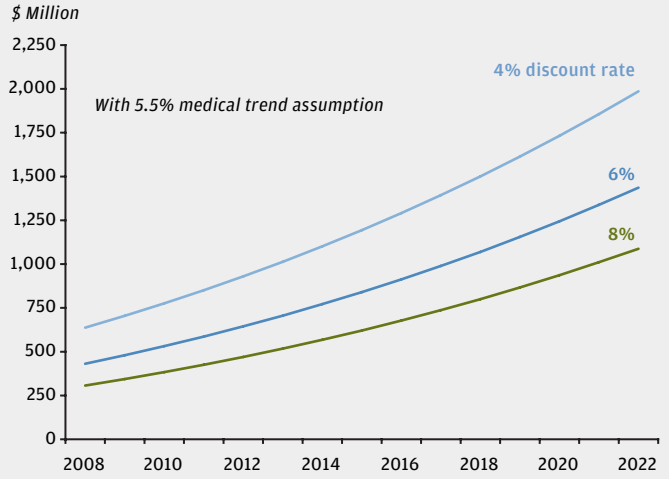
Measured at a 6% discount rate and a 5.5% medical trend assumption, the actuarial liability duration (sensitivity to the discount rate) is about 18 years.

Exhibit 6: Actuarial liability as of 1/1/2009 under varying assumptions ($ millions)

	Medical trend	
Discount rate	5.5%	7.5%
4%	$705	$1,097
6%	480	706
8%	344	483

Source: J.P. Morgan Asset Management. Illustrative purposes only.

Exhibit 7: Forecast of actuarial liabilities for an open participant group



Source: J.P. Morgan Asset Management. Illustrative purposes only.
Includes future hired employees in the forecast.

ARC versus disbursements

In order to understand the consequences of moving away from a PAYGO system of accounting and to understand the cash demands that, regardless of funding strategy, will have to be met, Green County reviewed GASB 45 costs relative to benefit disbursements (i.e., PAYGO costs). ARC versus disbursements captures the essence of the change to GASB 45 rules and brings into focus the fund/don't fund decision.

Interpretation of exhibits

Exhibits 8 and **9** show the anticipated GASB 45 funding challenge in raw numbers: The projected ARC for an open participant group (i.e., including future hired employees) is significantly greater than PAYGO benefit disbursements (the pre-GASB 45 expense). The first year ARC (using a 6% discount rate) of $60 million is over eight times the size of the first-year benefit disbursements of $7 million. By 2022, it is still twice as large. Funding the ARC each year will require a significant increase in cash payments. Of course, not funding the ARC will mean that a lower discount rate must be used, (accounting) cost will be higher and a liability will be booked on the balance sheet.

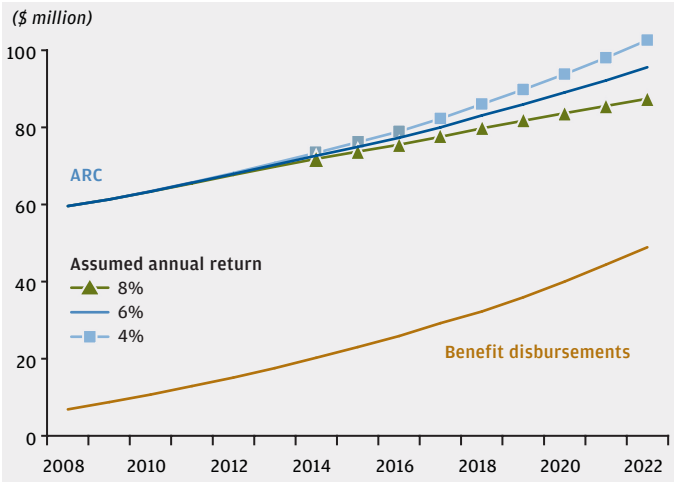
Actual asset returns in the early years will have only very modest impact on the ARC, for two reasons: (1) The asset base is so small relative to the liabilities; and (2) Gains and losses are only gradually amortized in the ARC calculation, assuming the maximum (30-year) amortization period is selected.

Exhibit 8: Summary of ARC calculations

	2008	2009
Actuarial liability	$431	$480
Assets	0	54
Unfunded	**431**	**426**
Amortization of unfunded	30	30
Normal cost	28	30
Interest to mid-year	2	2
ARC	**60**	**62**

Source: J.P. Morgan Asset Management. Illustrative purposes only.
Assumes 6% discount rate and 5.5% medical trend.

Exhibit 9: Forecast of ARC and benefit disbursements —open participant group



Sources: J.P. Morgan Asset Management. Illustrative purposes only.
Includes future hired employees in the forecast. Assumes 6% discount rate, 5.5% medical trend rate and contribution of ARC each year.

Funded status projections

Green County then considered projections of funded status—growth in assets relative to growth in liabilities. Funded status is not a "bottom line" GASB 45 issue, but is important for any entity considering how its funding policy will meet benefit obligations.

Finally, Green County considered funded status projections based on the current group of employees only.

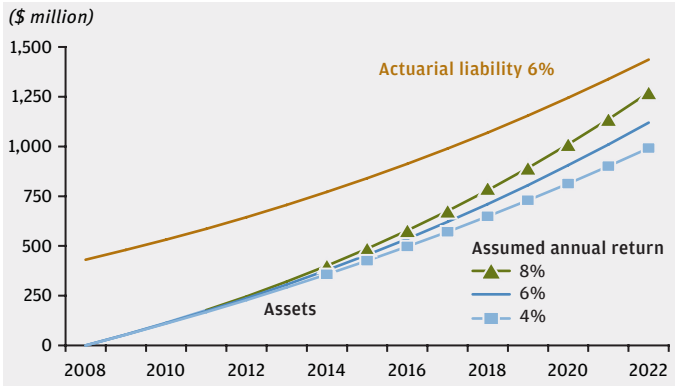
Interpretation of exhibits

With current and future employees included in the forecast (**Exhibits 10, 11**), contribution of the ARC leads to significant funding levels over time. Assuming liability assumptions are met and there are no substantial changes in benefits or eligibility, forecasts using a 6% discount rate and a steady 6% annual asset return lead to assets over $1.1 billion and a funded ratio over 75% by 2022.

In the early years, it is the contribution level, not asset returns, which will be the primary driver of funded status and the key to asset accumulation.

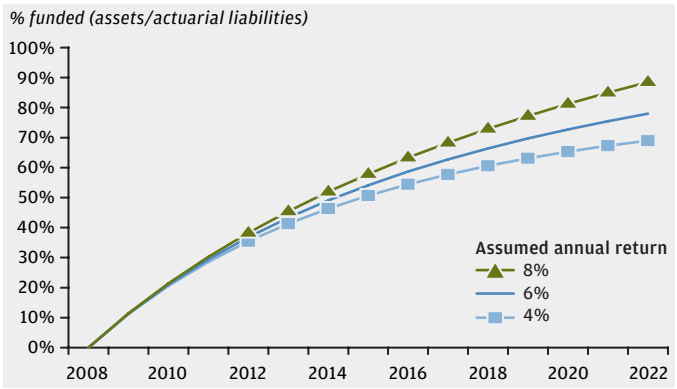
When actuarial liabilities are determined only with respect to current program participants (**Exhibits 12**), liability, ARC and asset values are moderated somewhat. However, the funded ratio by 2022 still falls near 75%, as shown in the baseline scenario.

Exhibit 10: Forecast of assets relative to actuarial liabilities—open participant group



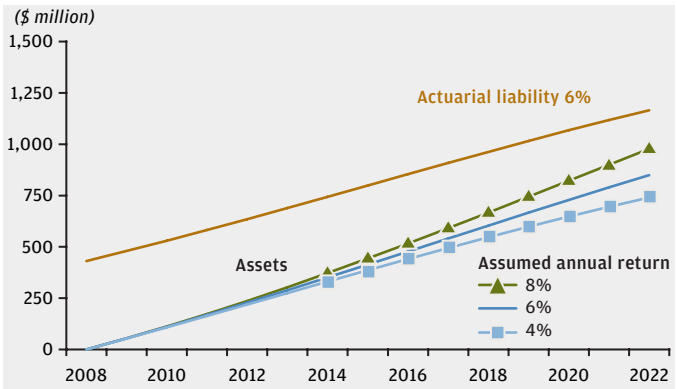
Source: J.P. Morgan Asset Management. Illustrative purposes only. Includes future hired employees in the forecast. Assumes 6% discount rate, 5.5% medical trend rate and contribution of ARC each year.

Exhibit 11: Forecast of funded status—open participant group



Source: J.P. Morgan Asset Management. Illustrative purposes only. Includes future hired employees in the forecast. Assumes 6% discount rate, 5.5% medical trend rate and contribution of ARC each year.

Exhibit 12: Forecast of assets relative to actuarial liabilities—current participant group



Source: J.P. Morgan Asset Management. Illustrative purposes only. Excludes future hired employees in the forecast. Assumes 6% discount rate, 5.5% medical trend rate and contribution of ARC each year.

OPEB funding strategies can enhance future benefit security and create a more stable long-term cash flow pattern. Ultimately, the best strategy will depend on current budgetary constraints and the employer's full array of investment opportunities.

Should GASB OPEB costs be funded at all?

GASB 45 does not compel funding of OPEB liabilities, but there may be good reasons to fund. If you do so, you will want to establish a sound funding policy—considering the level and sources of funding and selecting an appropriate funding vehicle.

Under the old PAYGO system, you only expensed a benefit when it was paid. So, in a sense, your "expenses" were always fully funded. Under the new system, you will be accruing expenses for amounts that will not be paid until some time in the future. The new GASB OPEB rules do not require that you pre-fund these expenses. So, should you fund them and to what extent?

Funding trade-offs

Pros	Cons
OPEB benefits are current costs and current funding provides for them.	Other uses of cash may be smarter "investments."
Allows more flexibility in choosing discount rate and managing cash flow	Places increased demands on current budgets
Reduces risk of default	

Recognition of the GASB OPEB expense provides a new perspective and addresses a timing issue. A current promise of future retiree medical benefits is current compensation and generally should be "paid for" by the current generation of taxpayers. Failing to recognize the cost today makes future taxpayers pay for services provided to current taxpayers.

That said, there is more than one way that current taxpayers might decide to pay for those deferred benefits. An obvious approach is explicit funding—setting aside assets in, for instance, a trust to provide benefit security. But the government entity could also decide to indirectly fund future benefits by increased investment in the local infrastructure and economy—a strategy designed to grow the tax base and provide increased operating cash flows in later years. There are pros and cons to each approach, and the best answer (or balance of the two) will depend on the specific circumstances of the employer.

Explicit funding does, however, provide an accounting benefit that may be impossible to disregard. Under the new GASB OPEB rules, if you fund the ARC, liabilities may be valued using the expected return on the (pre-funded) assets as the valuation discount rate. Liabilities that are not funded must use a (generally lower) employer-based discount rate. Thus, funding (by allowing the use of a higher discount rate) "reduces the size" of your GASB OPEB liability. While this only changes the accounting recognition of the obligation, and not the obligation itself, the differences in measurement can be quite large due to the long durations of most OPEB obligations.

The retirement of baby boomers makes OPEB benefit security a headline concern.

Another advantage of explicit funding of the benefit promise: It addresses default risk. A PAYGO system will work as long as each succeeding generation is "OK" with paying for the prior generation's cost. But there is always a risk that that system will break down, that the entity may ultimately have to renege on its promise. The imminent retirement of baby boomers makes this issue particularly compelling and will likely make benefit security a headline concern.

Establishing a sound funding policy

Funding decisions will affect investment policy. Especially in instances where funding has just begun, investment decisions must be managed against program liquidity demands. Funding decisions may also affect the public entity's credit ratings and future cost of borrowing. And they will affect the overall cost pattern of program benefits.

Funding policy decision points

Level of funding	Funding ARC has accounting benefits; a more flexible policy allows better cash flow management.
Sources of funding	Taxes and other revenue sources, cuts in services, sale or lease of assets, issuance of bonds, and/or increases in participant contributions
Selection of funding vehicle	Tax Code section 115 trusts, 401(h) accounts, VEBAs, and/or group or state-sponsored trusts

Key issues to consider are the level of funding, sources of funding and the appropriate funding vehicle.

Level of funding

We assume that employers who fund will generally have a bias towards funding the ARC. That approach fully captures the accounting discount rate advantage (you can use a portfolio-based rate of return to discount liabilities) and avoids booking a liability on the balance sheet. However, there will be many situations in which ARC funding is a stretch, and ARC contributions are significantly greater than current PAYGO cash demands.

We note also that, because of the volatility of medical care costs, the potential for reassessment of actuarial assumptions, and the possibility of changes to provided benefits, OPEB liabilities can vary year-to-year in unpredictable ways. Thus, funding more or less than the ARC may alleviate occasional funding pressures and provide additional smoothing of the cash requirements. Alternative funding levels might also better align forecasted funded ratios with an employer's long-term target.

Sources of funding

Together with the decision about the level of funding, there must be a decision about the sources of funding. Funding can come from current operating cash flow, redirected from other budget items. Other potential sources include increasing taxes or other revenue sources, issuance of new debt, or sale or lease of valuable assets (e.g., long-term lease of a toll road or airport concession). Finally, as part of a reconsideration of benefit program design, participant contributions might be increased.

Selecting an OPEB funding vehicle

For funding to qualify for favorable accounting treatment under GASB 45, OPEB contributions must be "irrevocably transferred … to a trust or equivalent arrangement, in which plan assets are dedicated to providing benefits to retirees … and … legally protected from creditors of the employer(s) or plan administrator" (GASB 45, paragraph 13). Key elements of this requirement: contributions generally must be irrevocable, and the funding vehicle must be for OPEB benefits only and protected from employer creditors.

Typical vehicles

The vehicles typically used for this purpose are Tax Code section 115 trusts, section 401(h) accounts and VEBAs (Voluntary Employee Benefit Associations). Each vehicle has advantages and disadvantages. Availability and suitability of each will depend on an employer's specific circumstances. The funding vehicle decision should be made after thoughtful consideration and with appropriate counsel.

Group or state-sponsored OPEB trusts

Some employers may be eligible to participate in an existing group trust, such as one sponsored by an association of public entities or by the state in which the public entity resides. Joining such a trust can reduce startup times and may reduce ongoing expenses, especially for employers who will only contribute modest amounts. Employers who are considering joining a group or state-sponsored trust should consider the following issues:

- Will the group trust's asset allocation strategy be appropriate for the employer?
- Can assets be rolled to another irrevocable OPEB trust?

- Are there any related services provided at reduced or no cost (e.g., actuaries and benefit consultants)?
- Are employers required to purchase medical coverage through the group or state-sponsored trust? Are there any other constraints or requirements that the employer would not have with its own OPEB trust?
- Are any employee groups excluded? For example, does the trust only cover public safety employees, teachers, classified personnel or full-time employees?

Multiple trusts

Under some circumstances, an employer may consider multiple trusts. This might occur where benefits are very different, or where there are different funding sources or funding policies. For example, police and fire might be separated from civilian employees. Multiple trusts may also be used in cases where current employees will be making contributions.

Now, let's look at the Green County case study to see how consideration of the funding decision works out in practice.

CASE STUDY

Part 2: Green County Funding Decisions

Green County considered cash flows under alternative funding scenarios, with various assumptions and demographic projections.

Funding analysis

As a small sample of the analysis done, consider the following charts, comparing ARC funding with benefit disbursements over a 50-year horizon. A 6% discount rate and a 5.5% medical trend rate are used to determine the ARC, and forecasts are shown using asset returns of 6% and 8%. To isolate the effects of the current participant group versus new employees, forecasts are shown both with and without new entrants to the program.

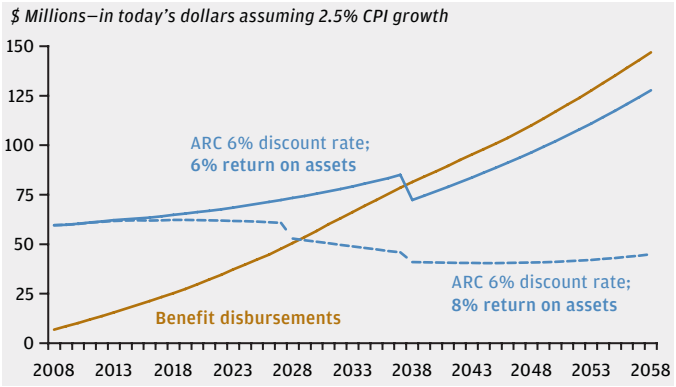
Over such long horizons, it is important to remember that much of the dollar increase shown will be simply due to general inflation. A more appropriate perspective may be to consider the long-term forecast adjusted to today's dollars. Thus, **Exhibits 13** and **14** are shown with all figures adjusted to today, assuming a 2.5% annual growth in CPI.

Interpretation of exhibits

After several years of contributions and asset build-up, the expected benefit of excess asset returns (8%, or 200 basis points above our baseline of 6%) begins to emerge in significantly lower ARC (**Exhibit 13**). However, the outcome illustrated assumes steady annual 8% returns, a challenge, to say the least, in today's market environment. A portfolio expected to return 8% will likely show significant risk and volatility.

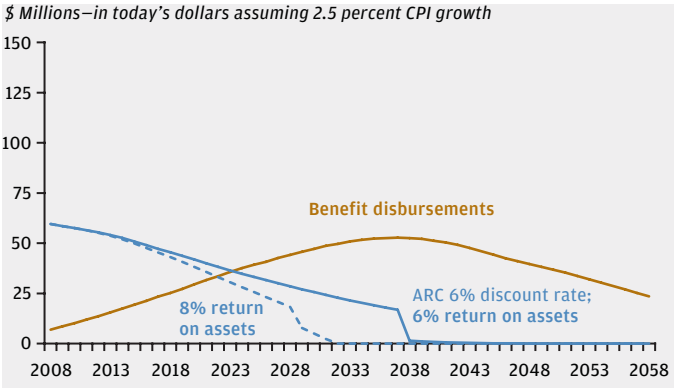
If we focus on the funding to cover the current participant group (**Exhibit 14**), in our baseline scenario the ARC exceeds the plan benefit disbursements (PAYGO cost) until 2024. The ARC continues declining from there, eventually dropping below $2 million (inflation adjusted) in 2038. Meanwhile, benefit disbursements continue to grow (even inflation adjusted) until a peak in 2037, gradually declining from that point.

Exhibit 13: Long-term forecast of contributions and disbursements—open participant group



Source: J.P. Morgan Asset Management. Illustrative purposes only.
Includes future hired employees.

Exhibit 14: Long-term forecast of contributions and disbursements—current participant group



Source: J.P. Morgan Asset Management. Illustrative purposes only.
Excludes future hired employees.

Funding decisions

How did Green County answer the fund/don't fund question? The county analyzed the options, reviewed its ability to raise money if needed, and considered what rearrangement of budget priorities might be acceptable to its citizens. It wanted to provide some added measure of benefit security for retirees, and it liked the idea of having an asset cushion to cover benefit disbursements should operating cash flow become tight in some future year. Furthermore, it realized that the PAYGO approach would also lead to significant cash requirements, albeit deferred for a few years. Based on this analysis, the county decided that it would fund at or near the level specified by the ARC.

The asset allocation process

If you decide to set assets aside to fund OPEB liabilities, then you will have to develop an investment strategy. As we have discussed, your investment strategy will have a direct effect on the accounting liability valuation. And it will have (at least) an indirect effect on funding. So, let's consider what an appropriate OPEB investment strategy might be.

In this section, we focus on the investment decision: What asset allocation strategy is appropriate for funds set aside to provide for OPEB benefits. Given the unique nature of OPEB liabilities, it's critical to approach OPEB investment strategy with "fresh eyes," rather than default to the same investment strategy you use in your pension plan or elsewhere. Although the same disciplined process you use to develop your pension plan's investment policy applies here, you may well arrive at a different OPEB investment policy, as significant differences in liability characteristics, plan size and funded status suggest a different solution to the problem of balancing risks and potential rewards.

We describe the OPEB asset allocation process in five steps:

Step 1: Identify risk considerations

Step 2: Determine liquidity needs

Step 3: Select the investment opportunity set

Step 4: Find the optimal mix

Step 5: Implement

Step 1: Identify risk considerations

- Clarify the entity-specific "risks that matter."
- Properly balance short and long-run objectives.
- Consider multiple perspectives.

Identifying risks and properly assessing risk tolerances are not trivial tasks. Employers often struggle to identify measures of risk that reflect the actual stresses they face. Conventional discussions of expected returns, standard deviations and various ratios provide lots of data but often little insight. And yet, understanding the risks presented by the challenge of financing an OPEB program—not just generic market risk but the specific risks to the trust and to the employer—is key to finding the right asset allocation.

Focusing on the risks that matter

"Real life" risk measures will focus on the long-term cost of employer support for the plan, the volatility of contribution requirements, the plan's funded ratio and the ability to meet benefit disbursements when due. Specific metrics should be developed to reflect the sensitivity of the specific plan and employer. Stress scenarios also should reflect specific plan and employer circumstances.

To illustrate, consider these examples:

- A financially strong, growing employer with a modest-sized plan might focus on the surplus or deficit position of the plan 15 years from now. A struggling employer with substantial liability burdens might place more emphasis on meeting benefit disbursement or ARC commitments over the next five years.
- A city that is heavily dependent upon the financial services sector for its tax revenues might carefully model risks of portfolio downturns correlating with periods of budget pressures. A county whose economy is driven by oil and gas markets might build stress tests related to changes in those markets.

- A state that sponsors a large pension plan and a large OPEB program should consolidate pension and OPEB portfolios in assessing their risk tolerance for equity exposure.

Long-run risk versus short-term expediency

As always, it's critical to reconcile both the short-term and long-term consequences of investment decisions. The effects of investment risks accepted today will be borne by tomorrow: tomorrow's retirees and tomorrow's taxpayers.

The need for more than one perspective

Finally, in assessing the risks that OPEB program finance presents, an employer will want to look at several different risk measures. No one measure or single graph can capture the diversity of risks and variety of perspectives needed. There are competing priorities. Accounting rules and funding policies will change. Mathematical models will prove incomplete. And ultimately, human judgment will be essential in evaluating risks and rewards.

Step 2: Determine liquidity needs

- Evaluate the program's liquidity requirements.
- Consider the financial capacity of the employer.
- Determine the contribution/disbursement plans of the employer.
- Identify assets to satisfy liquidity requirements.

We highlight liquidity because in start-up OPEB plan funding it can be a significantly bigger issue than it is for the typical pension plan. At start-up, accumulated assets are likely to be small relative to annual disbursements, and employer funding policies may not be well-established.

As discussed in the "liability valuation" section, long-term OPEB cash flows are a challenge to predict. But short-term cash flow needs generally can and should be planned for. To get a handle on your plan's liquidity needs, you will want to understand the anticipated short-term flow of benefit disbursements and employer contributions. You'll need answers to the following questions:

- What is the current level of benefit disbursements? How might it trend going forward?
- What uncertainties—e.g., design changes, demographic shifts, actuarial assumption changes—exist with respect to disbursement forecasts?
- Will program benefits be paid from trust assets or from non-trust sources?
- How does the level of disbursements compare with the level of employer funding and the level of assets accumulated in the trust?
- What is the employer commitment with respect to benefit disbursements and trust funding? Will the ARC or some other amount be funded annually?
- How financially strong is the employer? Do local economic factors suggest risks to maintaining funding commitments?

The answers to these questions will allow you to determine a prudent allocation to stable, highly liquid assets to cover near-term disbursement expectations and provide coverage for disbursements over a longer period, should funding fall below forecast.

Cash and intermediate-term fixed income investments are the obvious liquidity vehicles. Absolute return strategies may also satisfy a portion of this portfolio component if they are properly managed and any asset lock-up periods are taken into account.

Step 3: Select the investment opportunity set

- Consider legal constraints.
- Identify assets with inflation-hedging potential.
- The performance of real assets shows a meaningful correlation with inflation and provides a useful, if imperfect, hedge for certain OPEB liability risks.

In the abstract, and subject to legal limits on investments that may apply for some employers and plans, the investment opportunity set is generally wide and includes equity, fixed income and alternative assets.

There are, however, characteristics of OPEB liabilities that suggest that certain asset classes should be given special consideration.

As previously discussed, the "noise" of OPEB liabilities, that is, their volatility and unpredictability, is high. They do not present the more predictable cash flow/fixed income hedging opportunity that many pension liabilities do. Nevertheless, certain assets can imperfectly, and to a limited extent, cancel some of the noise, and make long-run asset/liability predictions more reliable.

We have previously attributed the noise of OPEB liabilities to changes in actuarial factors (non-financial factors such as turnover of workforce, retirement patterns and utilization of medical services), as well as changes in economic and financial market factors (including medical inflation, discount rates, and especially the spread between medical trend and discount rate).

For purposes of the investment decision, we pay particular attention to the liability's financial factors. (In general, non-financial liability factors are best addressed through benefit design.) We have therefore focused our analysis on the market-related driver of volatility peculiar to OPEB—medical inflation. Thus, we have analyzed the relationship between asset classes and medical inflation to identify relevant investment opportunities.

We preface our analysis with some observations about the complexity of the asset-inflation relationship.

The complexity of the asset class return/ inflation relationship

To begin with, an OPEB investor will have an inflation assumption built in to liability-valuation assumptions. Thus, in setting investment objectives relative to liabilities, the most critical risk is not the general (expected) level of future inflation, but any unexpected changes in inflation. In that regard, there is not simply one type of unexpected change, one type of effect on asset values or one way of looking at those changes and effects. Consider the following:

Timing of response: The impact of an inflation change on asset class returns can be: simultaneous; ex-ante (in expectation of a future inflation change); or ex-post (when an inflation impact has worked its way through the economy).

Cycle effects: Assets can react differently depending on the stage (or perceived stage) of the inflation cycle (increasing, stable or decreasing) and the market's uncertainty with respect to future inflation.

"Frequency" of impact: Inflation changes can be infrequent and dramatic (e.g., commodity price shocks that drive sudden and drastic movements) or "creeping and low."

These factors make any one-to-one matching of returns and inflation risk—any "pure hedge"—impossible. Moreover, no single analysis captures all inflation dynamics.

Summary of results for asset class return/ inflation analysis

We have analyzed the asset sensitivity to a change in inflation and medical inflation (See sidebar: **The relationship between CPI and mCPI** on the following page) through various econometric[3] analyses and over a variety of time horizons. **Exhibit 15** summarizes our preliminary conclusions, and is followed by a more detailed interpretation. Our research in this area is ongoing.

Exhibit 15: Analysis of inflation-hedging properties of various asset classes

Asset	Short term (1 year)	Long term (10+ years)
Nominal Fixed income		
3-month T-bill	Moderate	Low
Fixed income (LB Aggregate)	Very low	Low/Moderate
Equity		
U.S. equity (S&P 500)	Very low	Low/Moderate
Real assets		
TIPS	Moderate	Better
Listed real estate (REITs)	Very low	Moderate
Direct real estate	Low	Better
Commodities	Better	Better
Other		
Hedge funds (HFRI)	Low	Moderate

Source: J.P. Morgan Asset Management.
See final page of report for further details on indices employed.

[3] The analyses include simple linear regressions. In addition, a vector auto regressive model was constructed, where asset class returns were explained endogenously and exogenously by inflation, real short-term rates, credit spread, term structure of interest rates and dividend yields. This model was shocked using a generalized impulse response method, where the effects of a short-term increase to inflation (one standard deviation) were measured over time.

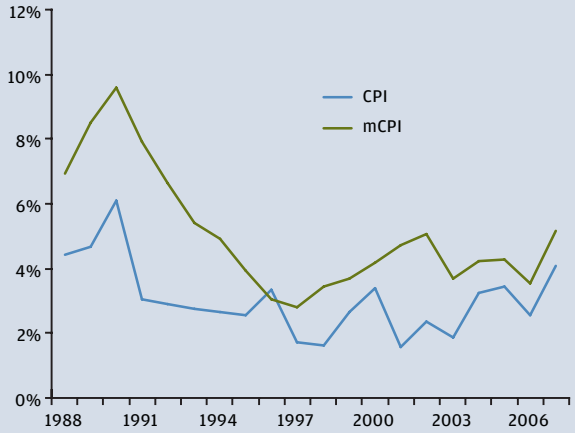
The relationship between CPI and mCPI

In this paper we analyze the effect of inflation on OPEB liabilities and on the performance of certain asset classes. In some cases, our analysis and discussion focus on general "headline" inflation (as measured by changes in the Consumer Price Index or CPI). Where possible (e.g., with respect to OPEB liabilities), we discuss the effect of, and correlations with, medical inflation (measured by the change in the medical care component of CPI, or mCPI). While the two indices are obviously not the same, their behavior is similar enough to make the discussion useful.

The behavior of the two indices over the last 20 years is summarized in **Exhibit 16.**

Exhibit 16: Annual rate of change in CPI and mCPI, calendar years 1988–2007

Annualized growth (%)



Source: J.P. Morgan Asset Management. Illustrative purposes only.

Over the last 20 years, mCPI has grown at an annualized rate of 5.1%; CPI has grown at a rate of 3.0%. The correlation of annual (calendar year) change in mCPI and CPI over the 20 year period is near .75—not surprising, since many of the same economic factors that drive changes in mCPI also affect CPI, and, moreover, mCPI is a component of CPI. Thus, while there have been periods when mCPI and CPI movements have not been strongly correlated, as a general matter, mCPI has been correlated with, and been higher than, CPI.

In what follows, we unpack some of the findings summarized in **Exhibit 15**, providing our understanding of why the returns of a given asset class do or do not respond to changes in inflation. As the discussion below will make clear, the effect of inflation on asset values is not simple, and different effects will dominate different asset classes, at different times/across different time horizons.

Nominal fixed income (3-month T-bill and Lehman Brothers Aggregate)

Generally, unexpected high inflation has a direct and largely negative effect on fixed income ("nominal bond") investments. Credit spreads widen, the yield curve "steepens" and returns decline. Higher quality credit retains more of its value in such an environment.

However, the effect of unexpected inflation on the returns of bonds can vary over different time horizons. Short-term fixed income securities can respond to inflation changes with higher yields, whereas longer maturity fixed income will sustain losses in response to market yield increases. Over the longer term however, as the inflation cycle inverts, and inflation (simultaneously with interest rates) is reduced, fixed income investments will gradually regain what they had lost.

Nevertheless, fixed income securities overall are more a victim of inflation than a hedge against it. As summarized in **Exhibit 15**, for the most part, they provide only a low insurance against unexpected changes in inflation, rising to "moderate" only where (long) duration and (higher) credit risk permit returns that compensate for the inflation risk.

In view of the widespread use of fixed income assets in pension liability hedging strategies, another point must be made. The "noisiness" of OPEB liabilities (that is, the relatively high unpredictability of OPEB cash flows) makes bond/cash flow matching or immunization strategies less efficient. In other words, assets that may be minimum risk, relative to a predictable, nominal stream of (e.g., pension) liability cash flows, may not be minimum risk relative to retiree medical program OPEB liabilities.

Equities

In general, equities are a poor hedge against inflation in the short run, with some hedging attributes over longer horizons. A cycle of high (unexpected) inflation followed by contraction hurts economic growth.

This leads to lower earnings and therefore lower dividends which, combined with higher discount rates, results in lower stock prices. Over longer periods, however, higher pricing pressure leads to higher future dividends and, thus, higher stock prices.

Hedge funds

As Exhibit 15 indicates, hedge funds can provide some inflation hedge. The absolute return mandates of many hedge funds, seeking excess returns through any market environment, may contribute to the characteristics we have observed. A caveat: Our hedge fund analysis is empirical and based on a fund of funds index.[4] As is widely known, hedge fund of funds indices have a number of biases (e.g., survivorship), and they do not necessarily represent the opportunity set that an investor would have access to today. Furthermore, the wide range of hedge fund strategies certainly implies a similarly wide range of inflation hedging characteristics.

Real assets—TIPS, real estate, and commodities

We generally see a higher tracking (particularly long-term) of the performance of "real assets" and inflation.

TIPS

TIPS (Treasury Inflation-Protected Securities) are indexed to inflation. Thus, it is no surprise that they provide a hedge to inflation. But note that this hedging feature is only moderate in the short term, when TIPS returns are driven by changes in expectations and shifts in market yields, among other factors. TIPS do fairly well (that is, their performance correlates well with inflation) in periods of inflation/contraction, periods of a slowing economy/Fed easing of monetary policy, and periods when there is a flight to quality.

Real estate (listed real estate (REITs), direct real estate and infrastructure)

Real estate (both "direct real estate" and REITs) is a better hedge against unexpected inflation over the long term. In the short term, the correlation of inflation and real estate is weaker. The explanation: In an inflation/contraction/recovery scenario, real estate prices (in the recovery phase) tend to remain sluggish until the recovery is fully priced in. While in the long run REIT values track direct real estate values, in the short run REITs (as publicly traded securities) behave more like equities—hence their "very low" short-term correlation with inflation.

We did not analyze infrastructure, an emerging "real estate" sub-asset class, because of a lack of historical data. Nevertheless, infrastructure's likely inflation-hedging capacity is too strong to ignore. Infrastructure assets (e.g., toll roads, satellite networks, gas pipelines and water utilities) tend to provide consumer necessities with little competition, protecting their ability to pass on inflation to end users of services. Thus, generally speaking, the structure of these assets permits cash flows to be adjusted in order to compensate for inflation changes.

Commodities

Commodity prices react strongly to inflation shocks. A diversified basket of commodities comes the closest to providing a hedge against unexpected changes in inflation. CPI is, of course, derived from the price changes of a basket of goods. Moreover, commodity futures have been shown to contain information regarding future inflation. Our analysis indicates that commodities (on an aggregate, risk-adjusted return basis) tend to out-perform stocks and bonds during periods of unexpected inflation.

All that said, keep in mind that commodities tend to exhibit very high volatility relative to their expected returns and that such volatility is unlikely to nicely synchronize with year-to-year OPEB liability movements.

Inflation swaps

In addition to the above, be aware that there is a growing market for inflation swaps, which should constitute another tool to address inflation risk. While they offer potential for tailor-making interest rate and inflation exposure, they have implementation challenges of their own (including documentation and counterparty risk).

In summary, the foregoing analysis identifies which asset classes, because of their ability to help "insure" against the risks posed by medical inflation, deserve special consideration in constructing an OPEB asset portfolio. Tight hedging against year-over-year

[4] Our hedge fund analysis is based on Hedge Fund Research, Inc.'s HFRI Fund Weighted Composite Index.

changes in medical trend, however, is not possible. And, as noted, inflation is only one of the key drivers of OPEB liability volatility. Nevertheless, judicious selection of a diversified mix of assets, with a view to their inflation-hedging potential, can provide important protections against unexpected inflationary risks.

Step 4: Find the optimal mix

- Evaluate all opportunities.
- Consider the asset/liability frontier.

Once you have identified critical risk factors, determined liquidity needs, identified any investment constraints, and evaluated the "hedging utility" of available asset classes, the task is to find the optimal mix. As with any portfolio optimization, you will want to consider return expectations, volatilities and correlations among various asset classes. **Exhibit 17** illustrates the long-term risk/return trade-off that might be expected from the overall investment opportunity set.

Analyzing returns relative to liabilities —excess returns

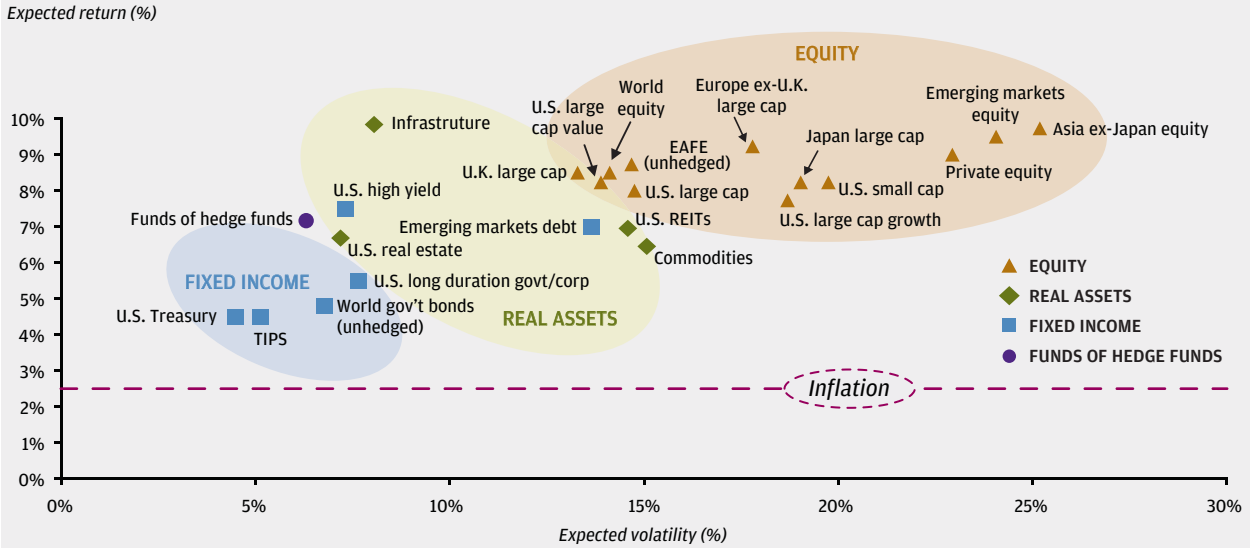
Long-term outcomes for the trust and employer will be driven not just by asset performance, but by the performance of assets relative to liabilities. OPEB portfolio risk measurement and optimization should focus on the capacity to cover the benefit commitment. The optimization model should take into account the impact of inflation on both assets and liabilities. Thus, and notwithstanding the uncertainties of OPEB liability forecasting, asset portfolio optimization should focus on the issue of surplus(deficit)—the value of assets relative to the value of liabilities—rather than on absolute returns. We call this an "excess returns" analysis.

Let's note a couple of features of an excess returns analysis. First, it differs fundamentally from a returns-only analysis. While an efficient excess returns (asset/liability) frontier may have a shape similar to a returns-only frontier, it's not the same. Asset mixes that might not be "efficient" in a returns-only strategy may be efficient on the excess returns frontier, because of their positive performance relative to liabilities. Second, an OPEB excess returns frontier may well consist of different asset mixes than a pension plan excess returns frontier, because of differing liability behavior.

Exhibit 17 shows the risk/return profile of various asset classes on an asset-only basis. When liabilities are included in the picture, however, a few things change:

- Real assets look relatively more attractive from a risk perspective: their inflation-insurance characteristics reduce the volatility of the funded status.

Exhibit 17: Expected risk and return profile of assets over the long term



For illustrative purposes only. Source: J.P. Morgan Asset Management—Long term Capital Market Return Assumptions, November 30, 2007. For further details, please visit our website at jpmorgan.com/pages/jpmorgan/am/ia/research_and_publications/cmra_2008.

There is an opportunity cost, however, given their lower expected return relative to certain other asset classes.

- Nominal fixed income instruments, as noted previously, may not offer the lowest risk as their return can be lower and driven by factors unrelated to funded status volatility. However, they will be useful in covering immediate liquidity requirements.
- Equity investments, offering a higher risk and a higher return, allow lower expected contributions over the long term, at the cost of higher funded status volatility and increased downside risk.
- Funds of hedge funds with a low volatility have, as seen in **Step 3**, historically shown inflation insurance characteristics. Given their efficiency (in terms of risk/return profile) they can help in the role of a portfolio volatility moderator. In addition, lower volatility hedge funds can be part of a portfolio's liquidity planning.

There is no single asset allocation which will be optimal for all OPEB plans. Because each employer's circumstances and objectives are unique, it is impossible to prescribe any one optimal portfolio. Part 3 of our Green County case study, however, provides one example of this sort of asset allocation decision process.

Step 5: Implement

- Recognize that in the short-term, the liquidity strategy may take priority.
- Consider size barriers with respect to certain investment classes.
- Understand and develop expertise with respect to non-traditional asset classes.

The foregoing discussion of appropriate OPEB investment strategies notwithstanding, you will, in all likelihood, not be able to construct your "ideal" asset portfolio in year one. Generally, you will be starting from zero. The first dollars contributed to the trust will have to be allocated to liquid investments, unless there is a commitment from the employer to cover current disbursements directly from the general account budget. Moreover, for some time, trust assets may not be "big" enough to participate in certain desired portfolio strategies (e.g., real estate or private equity). So an element of your investment strategy will be an understanding of the timeline—how you will get from your day one portfolio to your model portfolio.

Practical considerations

In constructing such a "ramp up" strategy, some practical issues should be considered:

- Do you have access to quality investment opportunities across the spectrum of asset classes considered—particularly among alternative investments, such as real estate, infrastructure, private equity and hedge funds?
- Do you have sufficient, qualified staff to manage the range of investments or to adequately oversee external managers?
- Are you comfortable with the level of illiquid assets in the ultimate asset allocation, given the employer funding commitment and any buffer of highly liquid investments?

Getting comfortable with real assets

Finally, given that real assets may well play an important role in your OPEB investment portfolio, we offer some thoughts and considerations pertinent to them:

- ***Imperfect correlation with inflation:*** While inflation should act as a return driver for these investments, the correlations are in no way immediate or perfect. Other factors will blur the relationships. But also keep in mind that the ultimate liability target will itself exhibit an imperfect correlation with inflation.
- ***Illiquidity:*** Direct real estate and infrastructure will likely have significantly lower liquidity relative to stocks and bonds. Even at exit, the investor may be faced with queues.
- ***Expertise:*** Real assets require a specific knowledge base and skill set. They require a strong understanding of the investment, the use of leverage and the key risk/return drivers. In many cases, the selection of the asset or the asset manager will become the biggest determinant of success. Properly evaluating these issues is a challenge for any investor.

- ***Size barriers:*** Some investments (e.g., direct real estate and infrastructure) generally cannot accommodate smaller dollar amounts (typically, less than $10 million).
- ***Concentration risk:*** Depending on the amount you have to invest, use of diversified funds may be preferred over direct investments in real estate and infrastructure to avoid concentration of risk exposure. If you are making direct investments, it may be necessary to resist a tendency to "go with what you know," that is, invest in local real estate and infrastructure. A more important decision driver should be whether the investment acts as a diversifier relative to the employer's own revenue base.
- ***Timing and diversification:*** From our analysis, we show that the relationship between inflation and real asset classes is dynamic. Different categories of real assets respond differently to changes in the marketplace. Maintaining a mix of asset classes will be crucial in maximizing their inflation-linking benefits and providing downside risk protection for a wide variety of economic scenarios.

Part 3: Green County Investment Strategy

CASE STUDY

Now let's consider Green County's OPEB investment decision process.

Entity-specific risk considerations

Recapping: In Green County, the local economy has been strong for several years, though there are signs of some slowing of economic growth. The county enjoys a diverse tax base. The most recent year general fund budget was about $1.1 billion. To date, the costs of the program (on a PAYGO basis) have not been overly burdensome. The county has some flexibility to modify program benefits, but substantive changes would require discussions with the employee union. There are no present plans for significant benefit changes.

The county understood that program costs and disbursements will grow rapidly over the next twenty years. Current circumstances allowed a focus on the long-term horizon, and county officials wanted to put in place a funding and investment strategy that would secure benefits and thus help preserve the county's fiscal health over the long term.

While the county is generally well positioned to accept some risk in their OPEB investment portfolio, these countervailing considerations exist:

- The county also maintains a defined benefit pension plan. That plan is well funded, but it has a substantial allocation to equities, and there was some concern about adding significantly to equity risk exposure.
- County growth rates have slowed in recent years and are expected to slow significantly over the next decade. The county's pension and OPEB plans are projected to become much more material to the county's financial position as the county and the plans mature.

The county was most focused on:

- The funded status of the plan 10 to 20 years out
- The predictability of each subsequent year's ARC
- The overall cost burden to support the plan over the long term

They were concerned not just with general expectations for these measures, but also with the downside risks. These priorities and concerns influenced their choice of risk measures as they analyzed asset allocation alternatives.

Liquidity needs

Green County 2008 benefit disbursements are about $7 million, expected to increase steadily to about $15 million in 2012 and over $40 million by 2022 (See Exhibit 9, page 10). The county had committed to funding the ARC for each of the next several years, with funding scheduled at the end of the second quarter. The trust will be responsible for paying benefits as due.

Depending on the discount rate selection, the ARC is expected to be near $60 million, and not less than $44 million, for 2008. The future ARC is obviously subject to a variety of factors, but baseline forecasts put it between $50 and $70 million in 2012 and increasing thereafter. The trust begins 2008 without assets, but funding the ARC (less benefit disbursements) is likely to grow the trust to between $150 and $250 million by 2012, and approaching or exceeding $1 billion by 2022 (See Exhibit 10, page 11).

The ARC is expected to easily cover disbursements for the next several years. However, due to timing differences within the year and in order to provide a cushion should funding be temporarily interrupted, Green County established a policy of maintaining the greater of two years of expected disbursements, or 10% of trust assets, in stable, liquid assets. In the initial years of funding, the two years of expected disbursements requirement will exceed the 10% floor. If 6% is selected as the ARC discount rate, baseline forecasts show the 10% floor will exceed the two years of expected disbursements requirement by year 2017.

Selecting the investment opportunity set

Green County reviewed the range of asset classes that are allowed under state law and local policy guidelines. They paid particular attention to asset classes they believed might provide real return characteristics, given the inflation sensitivity of the benefit obligations. They included in their analysis cash, fixed income, domestic equity, international equity, private equity, TIPS, REITs, real estate, commodities, infrastructure and hedge funds.

Finding the optimal mix

Green County's investment strategy was focused on the performance of assets relative to actuarial liabilities. Therefore, rather than focus on traditional asset-only metrics for risk and reward, they focused on asset and liability interactions.

Excess return efficient frontier analysis

Green County began with a consideration of an excess returns and standard deviation analysis. This analysis is similar to traditional efficient frontier analysis, except that it looks at returns and volatilities relative to the liability measure.

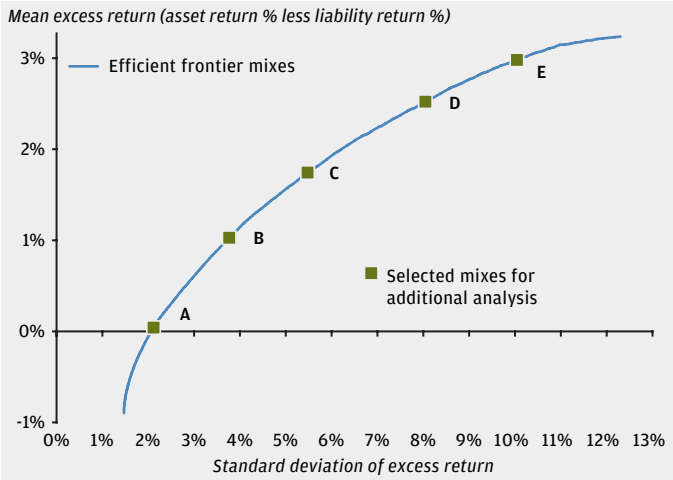
Several constraints were imposed on the analysis, notably: (1) At least a 10% allocation to low volatility, high liquidity assets as determined under the liquidity policy; and (2) Various constraints ensuring acceptable limits for very illiquid assets. Applicable legislative constraints on investments were also applied.

Based on these parameters, an excess return efficient frontier was generated (**Exhibit 18**).

After development of the excess return efficient frontier, five potential asset mixes from across the risk/reward spectrum were selected for additional analysis (labeled A through E in Exhibit 18). Various scenario forecasts of ARC and funded status (baseline and stress test scenarios) were analyzed for the five selected mixes. Through Monte Carlo simulations, each portfolio's efficiency was tested under 4,000 scenarios, where a number of key inputs such as inflation, asset returns and interest rates varied randomly. This allowed an assessment of the likely impact of inflation on assets and liabilities, which enabled calculation of likely ranges and downside risks to ARC and funded status for each asset mix across various time horizons.

Green County's analysis showed that the predictability of next year's ARC was not a particular problem, due to the very long amortization periods permitted under GASB 45 rules. Over time, however, simulated ARC results showed a dispersion due to asset volatility and asset/liability mismatches.

Exhibit 18: Excess return efficient frontier



Source: J.P. Morgan Asset Management. Illustrative purposes only.

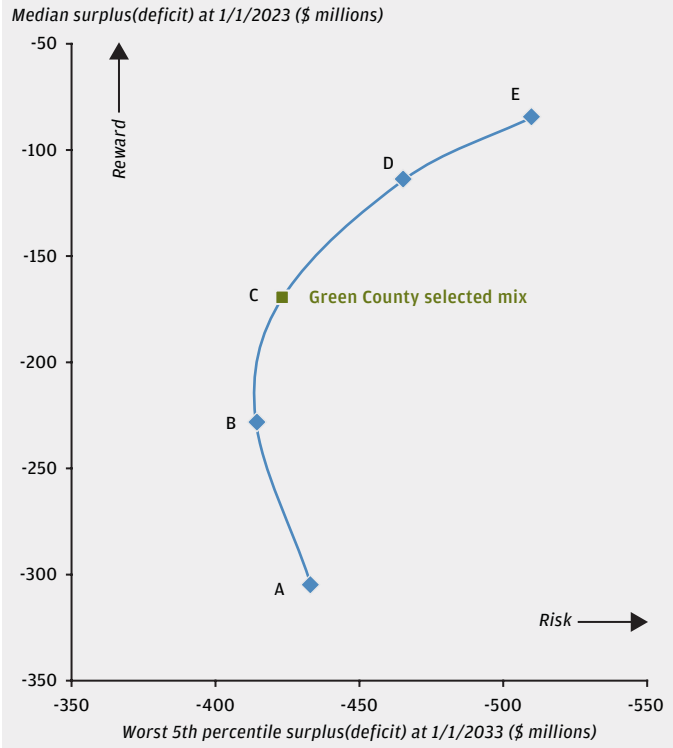
Expected case versus worst case analysis

Next, Green County considered the risk/reward potential relative to the downside risk of different strategies. **Exhibit 19** compares "expected case" to "worst case," as of January 1, 2023, for the five selected mixes. In the chart, the Y-axis measures median surplus(deficit) and the X axis measures the worst 5th percentile surplus(deficit). Because funding of the ARC responds only slowly to asset gains or losses (recall that experience losses are amortized over 30 years), the surplus(deficit) position generally reflects asset and liability performance, not differences in contribution patterns. The chart takes a form similar to an efficient frontier analysis, with the desired outcomes (low risk, high reward) in the upper left corner.

The plan started January 1, 2008 with a $431 million deficit (Exhibit 8, page 10). By 2023, three of the five mixes (A, B and C) show a reduction in deficit even in worst-case outcomes. That is to say, at least 95% of the time (as simulated), the combination of ARC contributions and investment returns is able to more than cover benefit disbursements and new liability growth. Of those three mixes, one (**Mix C,** marked **"Green County selected mix"**) clearly outperforms the other two at the median result.

The other two mixes (**D** and **E**) are certainly expected to achieve a narrowing of the deficit, but with much more risk. At the fifth percentile outcome, contributions and investment returns will have lost ground relative to the liabilities.

Exhibit 19: Surplus(deficit) median and worst 5th percentile at 1/1/2023 for selected asset mixes



Source: J.P. Morgan Asset Management. Illustrative purposes only.

The decision

While Green County officials were committed to looking at investment strategy from a variety of viewpoints, **Exhibit 19** and the related analysis was particularly influential in their decision making. Green County selected **Mix C**, the asset mix highlighted in **Exhibit 19**, as their long-term strategic asset allocation target.

Green County picked a broadly diversified target portfolio that they believe best achieves long-term plan funding targets within prudent downside risk-to-surplus and risk-to-contribution requirements. They believe that this strategy, in combination with the valuation methods and assumptions, and ARC funding policy they have adopted, will preserve their current favorable credit ratings.

Exhibit 20 summarizes the target asset allocation strategy Green County adopted.

Exhibit 20: Green County's selected long-term strategic asset allocation mix

Nominal fixed income	**12%**
Cash	5
Aggregate	7
Equity	**32%**
U.S. equity	15
Non-U.S. equity	11
Private equity	6
Real assets	**48%**
TIPs	13
REITs	3
Real estate	12
Commodities	10
Infrastructure	10
Other	**8%**
Hedge funds	8
Total	**100%**

Source: J.P. Morgan Asset Management. Illustrative purposes only.

Under the capital market assumptions modeled, the target allocation is expected to return 7.5% (nominal, annualized compound rate), with an annual standard deviation of 5.9%. It will, however, take some years to reach that expected return level.

Getting there from here

How does Green County's asset allocation evolve from its starting point to the preferred target asset allocation?

As mentioned earlier, Green County decided to allocate an amount equal to at least two year's benefit disbursements to stable, liquid investments. After one year's contribution and disbursements, this equals a liquidity allocation of about 35%. This allocation will be met with cash and other high quality short-term to intermediate-term fixed income investments.

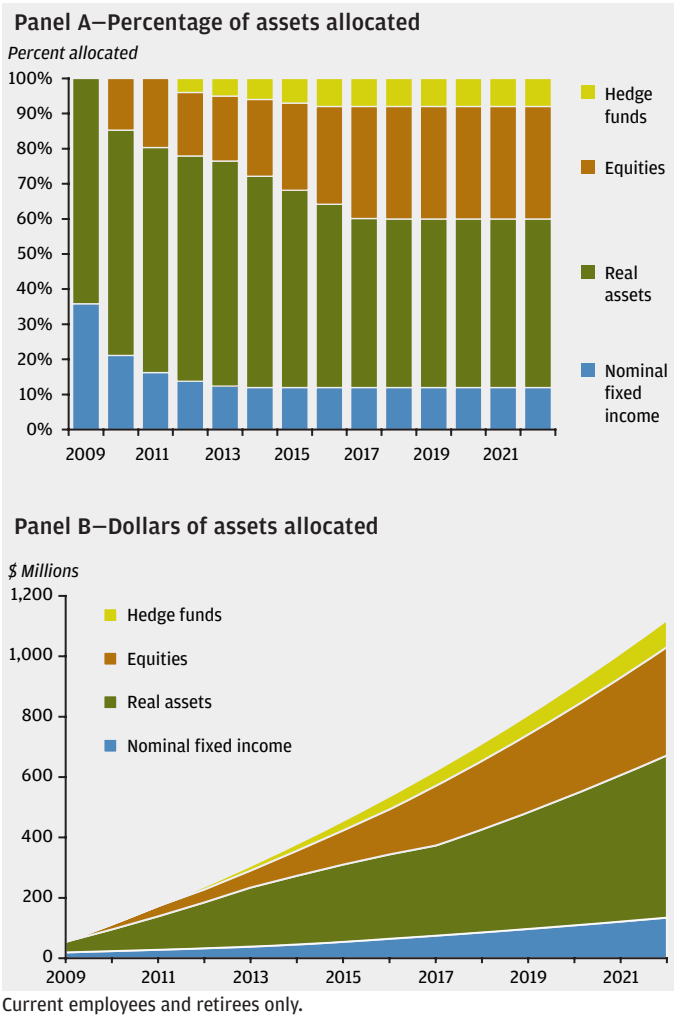
Green County wished to focus the remainder of early year investments on real assets. Although initial assets represent only a small fraction of program liabilities, Green County wanted to begin building the portfolio's liability risk matching characteristics as quickly as possible. Thus, the Green County trust initially holds a real asset allocation near 65%. Once the sum of their "liquidity assets" and real assets grow to equal one-third of the size of the actuarial liabilities (projected to occur in 2013), they will begin to reduce the real asset allocation (on a percentage basis), providing more room for equity and hedge fund investments. By 2017, they expect to reach their target strategic asset allocation.

This may seem a very slow implementation schedule. But the approach recognizes two important realities of Green County's "starting from scratch" situation: (1) It will be some time before the trust has sufficient scale to efficiently entertain some of their intended investments; and (2) Concern about both meeting liquidity demands and managing inflation risk calls for significant prioritization of the liquidity and real asset portions of the allocation.

A baseline forecast of their implementation plan is shown graphically, in both percentage terms and dollar terms (**Exhibit 21, Panels A** and **B**).

Obviously, Green County's analysis is subject to periodic review and change, as actual investment performance emerges, and as benefit program and employer circumstances evolve. But Green County now has in place a thoughtful plan of action for investing contributed assets to back their medical benefit promises to current and future retirees.

Exhibit 21: Asset allocation implementation baseline forecast



Current employees and retirees only.
Source: J.P. Morgan Asset Management. Illustrative purposes only.

Issues of benefit program design

Having reviewed the numbers, the fund/don't fund decision and the OPEB investment strategy, let's now turn to issues of benefit design.

GASB 45 compliance and an analysis of the issues presented by the challenge of financing retiree medical liabilities often provokes questions about the appropriateness of current benefit program design.

Understanding baseline numbers

Consideration of program design modifications should begin with an understanding of the current, "baseline" liabilities. Key elements to understand include the proportion of the liability that is attributable to different demographic groups (current and future retirees, spouses, etc.) and types of benefit (medical, prescription drug, dental, life insurance, etc.). This information will allow employers to focus on design issues that will meet their objectives.

Managing major cost drivers

Two things drive retiree medical program claim costs: medical trend (reflecting medical inflation and utilization) and demographics. While employers will have little control over medical inflation, they can consider design changes that respond to medical inflation trends (e.g., monitoring usage of high cost procedures). And employers can make design changes that directly affect utilization.

Both price and utilization trend can be affected by the mix of services that members seek, which in turn is influenced by the demographics (age, gender mix, retirement ages) of the population. Employers should analyze health care claim data on an ongoing basis to monitor health care inflation, determine cost drivers and identify high cost conditions. Where necessary, employers may implement appropriate program designs to best contain costs for both participants and the employer, while providing the best benefits for each dollar spent.

Improving the health of future retirees, through wellness initiatives, should result in lower future health care costs, and it may be possible to anticipate those reductions in future costs in the OPEB valuation. Health risk assessments and thoughtfully designed risk profiling of active and retired participants can be an important tool to monitor and control costs, while also assisting participants in dealing with current chronic conditions and keeping others from following in the same path.

Other cost control measures

There are other areas that employers may want to consider to control OPEB liabilities. These could include:

- Selecting more cost-effective vendors
- Changing retiree and/or spouse contributions, deductibles or co-pays
- Capping the employer's annual obligation toward the cost of coverage
- Changing age and/or service retirement eligibility requirements, in the OPEB program and/or any applicable pension plan
- Changing dependent eligibility requirements
- Changing the program available for new hires
- Revising Medicare coordination procedures
- Selecting optimal Medicare Part D alternatives
- Changing to a defined contribution approach

What is appropriate will obviously vary depending on the employer's circumstances and the needs of program participants.

Fully analyzing the effect of design changes

If the employer allows future employees to retire with benefits, it's important to perform projections including assumptions for new hires and to think about whether a stable, growing, or decreasing active population is expected.

It is also important to think through how particular changes may affect key assumptions. For example, if you increase participant or spouse contributions, should assumed participation rates decrease? Or, if changes are to be made for anyone that retires after a certain date, should retirement rates be assumed to increase in anticipation of a wave of pre-effective date retirements?

If not analyzed completely, design changes may produce significant unintended and unanticipated consequences. You may also want to consider the effect of changes in pension plan design on retirement patterns and, thus, costs under your retiree medical program.

CASE STUDY

Part 4: Green County Benefit Program Design

Let's visit Green County one last time. As part of its analysis of retiree medical program obligations and its long-term strategy, Green County also reviewed benefit design. This review considered not only the direct financial effect of any design change, but also its indirect effect on recruiting and staffing needs, employee retention objectives and pension and payroll costs.

The county first reviewed baseline liabilities to determine which demographic groups and benefits are the largest "contributors." They determined that over 75% of liabilities relate to post-Medicare benefits and that 79% of liabilities relate to current actives (future retirees) and their dependents (**Exhibit 22**).

Based on this information, Green County considered various design changes that focused on current actives and their dependents. One part of their analysis, a forecast of the ARC under various program changes, is shown in **Exhibit 23**.

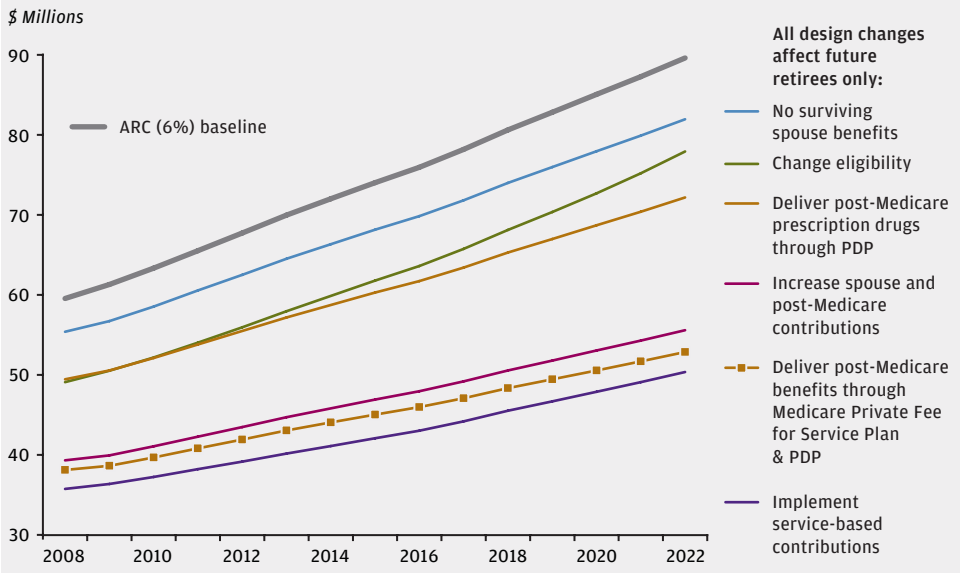
After further examination of possible design changes, the county's human resources (HR) department also expressed concern about the projected number of retirements of experienced staff over the next several years and their ability to replace them with qualified new hires. In general, HR would like employees to defer retirement until later ages.

Exhibit 22: Demographic review of Green County OPEB liabilities

	Pre-Medicare Medical & Rx % of Total	Post-Medicare Medical & Rx % of Total	Total
Current actives	14.3%	37.4%	51.7%
Current active dependents	7.4	19.9	27.3
Current retirees	1.7	13.8	15.5
Current retiree dependents	0.1	5.4	5.5
Total	**23.5%**	**76.5%**	**100.0%**

Source: J.P. Morgan Asset Management. Illustrative purposes only.

Exhibit 23: Forecast of ARC under various design changes



Source: J.P. Morgan Asset Management. Illustrative purposes only.
Includes future hired employees in the forecast. Assumes 6% discount rate and 5.5% medical trend.

Based on the relative significance of liabilities related to current actives (future retirees) and their dependents and the HR department's objective of encouraging deferral of retirement, the county considered a change to retiree medical program eligibility (**Exhibit 24**).

Measured at a 6% discount rate, the January 1, 2008 actuarial liability declines from $431 million to $369 million (a reduction of nearly 15%), as a result of the proposed design change. The resulting ARC and benefit disbursement forecasts are shown in **Exhibit 25**.

Green County also considered:

1. The likely effect of the change on employee retirement timing
2. The implications of the change for staffing and payroll costs
3. The implications of the change for pension plan costs and design. In addition, the county wanted to "grandfather" under current rules employees within a couple of years of eligibility, which reduced the effect of the changes illustrated above.

After full analysis and determination of a grandfathered group, Green County implemented this change, which they believe will allow them to continue to offer generous retiree medical benefits while also supporting employee retention objectives and controlling overall program costs.

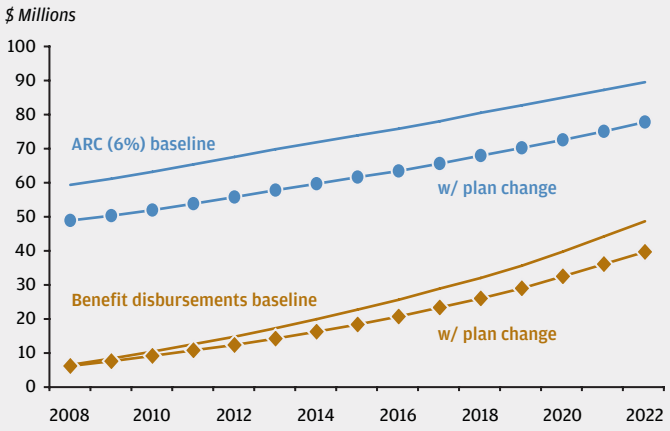
The County then reviewed the impact of the change on valuation, funding and investment decisions it had made.

Exhibit 24: Proposed changes to Green County program retirement eligibility

Current plan	Proposed change
Age 55, 15 years of service	Age 60, 15 years of service
Age 62, 10 years of service	Age 65, 10 years of service
30 years of service	No change

Source: J.P. Morgan Asset Management. Illustrative purposes only.

Exhibit 25: Forecast of ARC and benefit disbursements for an open participant group—with and without eligibility change



Source: J.P. Morgan Asset Management. Illustrative purposes only.
Includes future hired employees in the forecast. Assumes 6% discount rate and 5.5% medical trend.

CONCLUSION

Our purpose in this paper was to introduce you to the core issues of OPEB program finance, including the accounting considerations presented by GASB 45. In our discussion, we have focused on the four key elements in the OPEB decision process: valuation, funding, investment strategy, and benefit design.

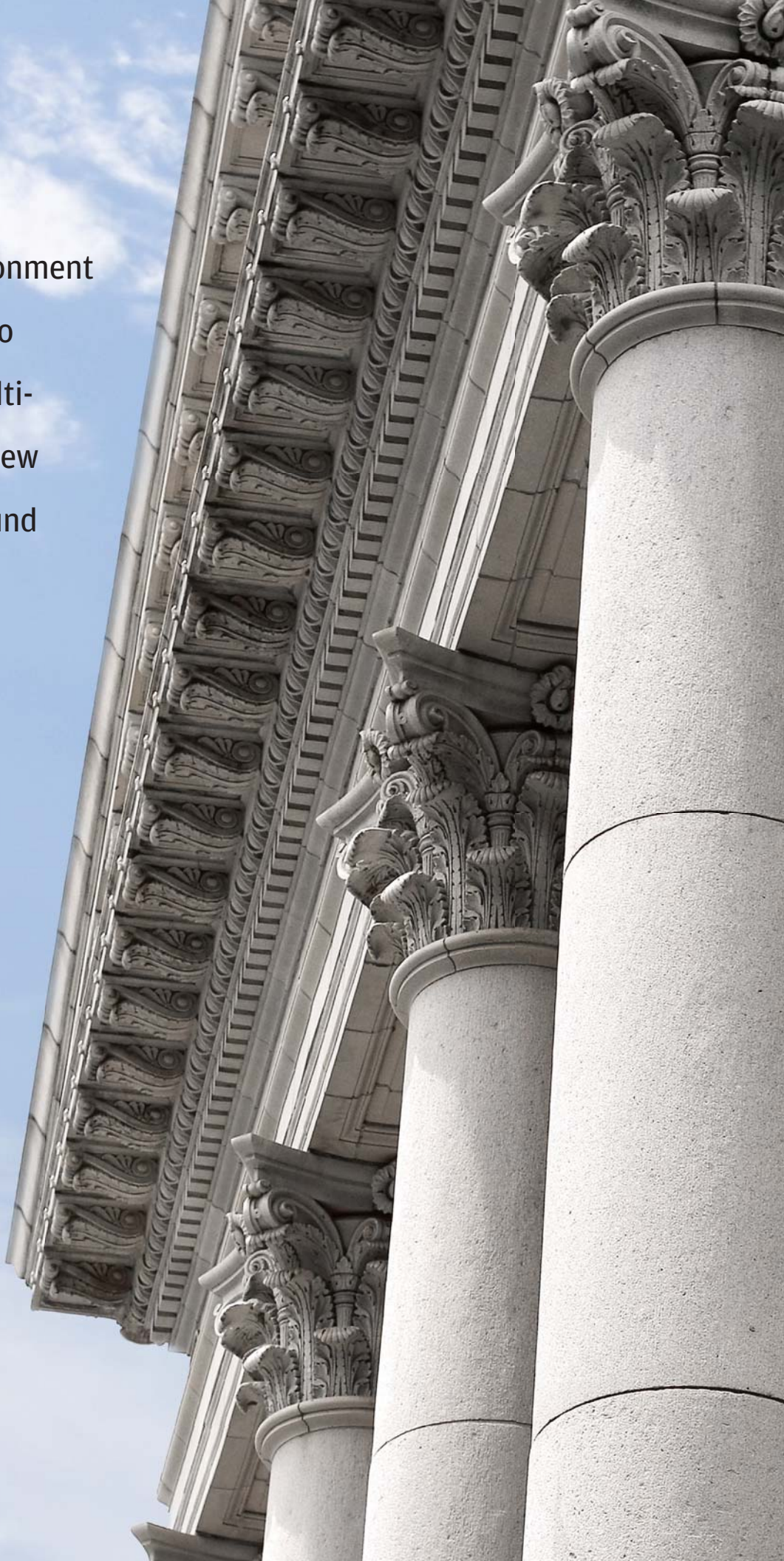
At each step in the process, we have emphasized three themes that cut across each decision element:

- A thorough understanding of the numbers is critical.
- OPEB finance is different from pension finance.
- Decisions with respect to any one element—e.g., valuation methodology, the decision to fund, investment strategy or design—will affect all the others.

The numbers won't tell you the answer, but understanding them will be the foundation of all your decision making. That's why we've emphasized the following key points: the critical effect on OPEB liabilities of the interplay of discount rate and medical trend; the effect of the funding decision on liability valuation; the relationship of real assets to OPEB liability volatility; and the need to understand what's driving costs before undertaking a re-design of the benefits.

We believe that good decisions are the product of a sound process. Our purpose in this paper has been to provide you with the foundation for that process.

The changing OPEB environment presents an opportunity to undertake a rigorous, multi-dimensional program review in order to establish a sound foundation for the future.



Acknowledgements

We would like to begin by expressing our gratitude to Hank Kim and Ryan Francis and their colleagues at the National Conference on Public Employee Retirement Systems for their support and guidance.

We acknowledge our numerous colleagues at J.P. Morgan (too many to list) who have generously contributed to the content and quality of this report: Charlie Stebbins and the members of our Public Sector Matrix Team, in particular Joel Damon, John Ide, Bob Parise and Shaka Rasheed, for their contributions to making this report as practical and actionable as possible for our public sector clients; our colleagues at Compensation and Benefit Strategies, Brian Whitworth and Jim Rubie, for lending their expertise; Dan Darst and our institutional marketing team, especially our editor, Barbara Heubel, our graphics and design professionals, Sean Coleman and Rachel Liu, and our marketing project managers, Maria Cassisi and Lori Amico for keeping us all on track. We also thank Bill McHugh for initially championing this report and Mike Barry for his skill and persistence in crafting a clearly written, accessible piece. Very special thanks to our SIAG colleagues, Rumi Masih and Alex Christie, for their invaluable contributions to the rigor and structure of our quantitative analysis. And, finally, we extend our thanks to Susan Oh for her insightful advice, constant support, and encouragement. Of course, any errors and/or omissions are the sole responsibility of the authors.

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The Citigroup 3-Month T-Bill Index is an unmanaged index of three-month Treasury bills. Index returns reflect the reinvestment of dividends and capital gains. Fees, brokerage commissions or other expenses of investing are not included. The Lehman Aggregate Bond Index is a broad-based index often used to represent investment grade bonds being traded in the U.S. The S&P 500 Index is an unmanaged broad-based index that is used as representation of the U.S. stock market. It includes 500 widely held common stocks. Total return figures reflect the reinvestment of dividends. The Lehman Brothers U.S. TIPS Index is an unmanaged market index comprised of all U.S. Treasury Inflation Protected Securities rated investment grade (Baa3 or better), having at least one year to final maturity, and at least $250 million par amount outstanding. The Morgan Stanley US REIT Index is designed as a broad representation of REITs. It consists of REITs included in the MSCI U.S. Investable Market 2500 Index, excluding specialty equity REITs that do not generate a majority of their revenue and income from real estate rental and leasing operations. Approximately 85% of the U.S. REIT universe is represented in this index. The NCREIF Property Index (NPI) provides returns for institutional grade real estate held in a fiduciary environment in the U.S.. Properties are managed by investment fiduciaries on behalf of tax-exempt pension funds. As of the fourth quarter of 2007, the index contained 5,711 properties. The HFRI Fund Weighted Composite is an index designed to reflect hedge fund industry performance, constructed as an equally weighted composite as reported by the hedge fund managers listed within the HFR Database. The index includes over 2000 funds. The S&P GSCI Total Return Index measures the returns accrued from investing in fully-collateralized nearby commodity futures. The total return index provides useful representations of returns available to investors from investing in commodities and can be comparable to returns from a regular investment in the S&P 500 (with dividend reinvestment) or a government bond.

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