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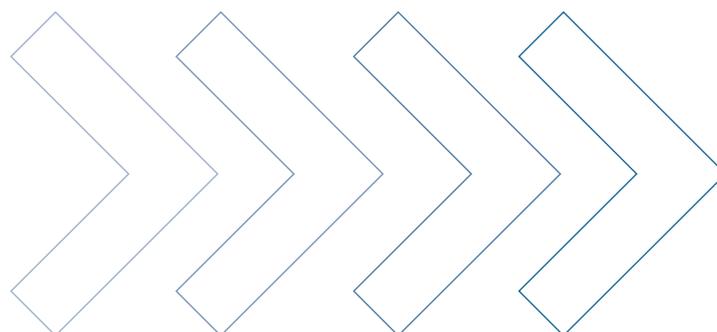
**SOCIAL INSURANCE
& PUBLIC FINANCE
SECTION**

In The Public Interest

ISSUE 13 • SEPTEMBER 2016

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Letter From the Editor

By Jeffery M. Rykhus

This issue's cover article is a highly informative piece based on a Health Section webcast and is titled, "Medicaid Encounter Data: The Next National Data Set," by Jennifer L. Gerstorff and Sabrina Gibson. Kudos to them for doing both the webcast and the article; I appreciate the extensive work that went into explaining this timely issue. It is a valuable reference for Medicaid actuaries, matching the high quality of the other Medicaid articles in this newsletter.

Our section chair, Sven Sinclair, as is usual for him in the Chairperson's Corner, writes an incisive piece titled, "Social Insurance and the Federal Budget." Please also read Stephen C. Goss's article in the April/May 2016 edition of the *The Actuary*—a must-read for every actuary, wait, every informed United States citizen. These two wonderfully complementary articles are as thoughtful as anything I've read on Social Security. I thank these two actuaries, "working in the public interest," for their contributions.

"The Sustainability of the New American Entitlement: Actuarial Values and the ACA," by Greg Fann, opens a new discussion forum. Mr. Fann writes that ACA subsidies are substantively different from any other "entitlement" program that has been passed into law in this country. He believes that this uniqueness requires that financial sustainability of the ACA subsidies be evaluated under a different framework because the subsidies formula results in varying degrees of financial assistance for different groups of eligible beneficiaries. Furthermore, he argues that the dynamics of the ACA subsidies contribute to skewed enrollment and negatively impact the following three things: the labor market, the overall economy and the sustainability of the individual health market.

I will be interested in seeing how other actuaries respond to this article. As is always the case, I invite both confirming and dissenting responses from the audience. In all honesty, strong opinions and dissent are nothing new in our newsletter, as you have seen in the past, which you can see in this issue and which you will see again in future articles.

The international (and highly topical) issue of differential mortality between the higher and lower socio-economic classes is up

next in "Socio-Economic Mortality Differentials: An International Perspective," by Kai Kaufhold. Thank you, Mr. Kaufhold, for another contribution from Germany.

Bringing a second international perspective is "Let's Talk: Interview With an Actuary in the Public Interest," an interview I conducted with Derek Osborne, an actuary with broad experience in Caribbean social insurance.

By way of introducing important section research we have reprinted an issue brief, "How Big a Burden are State and Local OPEB Benefits?" published by the Center for State and Local Government Excellence and the Center for Retirement Research at Boston College in March 2016. This brief is just a taste of what's to come, as Steven D. Bryson, writing in "Section Research Update: Other Postemployment Benefits," states: this section "is currently undertaking a research project regarding the financial health of public sector retiree health systems."

Finally, a little of that promised dissent (regarding public pensions) in the form of an article by Kent Smetters, the Boettner Professor of Business Economics and Public Policy at the Wharton School, University of Pennsylvania, and an adjunct scholar at the American Enterprise Institute (AEI), and Andrew Biggs, a resident scholar at AEI, "Understanding the Argument for Market Valuation of Public Pension Liabilities," originally published as a direct counterpoint to Paul Angelo's article, "Understanding the Valuation of Public Pension Liabilities: Expected Cost versus Market Price," which was reprinted in the January 2016 edition of *In The Public Interest*.

I have already been approached with several strong opinion pieces and articles to be published in the next issue. Anyone is welcome to submit an idea. ■



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Social Insurance and the Federal Budget

By Sven Sinclair

Social Security and Medicare, the largest social insurance programs in the United States, are paid through dedicated trust funds. One of those trust funds—the Supplementary Medical Insurance (SMI) Trust Fund, which pays Medicare Part B and Part D benefits—is financed through a combination of beneficiary premiums and general revenues. All the other trust funds—Medicare's Hospital Insurance (HI) Trust Fund and Social Security's Old Age and Survivors' Insurance (OASI) and Disability Insurance (DI) trust funds—are financed from dedicated taxes. Notably, these trust funds have no borrowing authority, meaning that they can only pay benefits from taxes already paid and interest earned on the trust fund reserves.

This legal limit on trust funds is one important reason that the projected trust fund reserve depletion under current law is significant. If the trust funds are depleted, benefits can be paid only up to the amount of tax revenues coming in, which will not be enough to pay the full scheduled amounts. This would obviously cause financial hardship to millions of beneficiaries; however, it also means that Social Security and Medicare shortfalls would not increase annual federal budget deficits (or the accumulated debt) in the unlikely case that Congress does not act in time to bring those programs into financial balance.

In the article “Understanding Social Security Long-Term Fiscal Outlook,” published in the April/May 2016 issue of *The Actuary*, Social Security Administration's Chief Actuary Stephen C. Goss discusses, among other things, how the budget-scoring convention used in projections of federal budget deficits and debt can be misleading. The budget-scoring convention presumes that the trust funds would continue paying full scheduled benefits after reserve depletion, through transfers from the general fund of the Treasury. Under current law, however, full scheduled ben-

efits are not payable after depletion of the trust fund reserves, and any increase in payable benefits thus must be paid by a corresponding increase in dedicated taxes. Making up the shortfall from the general fund would only be possible if Congress fundamentally broke with history and authorized the trust funds to borrow from the general fund.

We should keep in mind that measures based on current law are necessary for understanding the size of the shortfalls and, hence, the changes needed to address them, but it is hard to imagine that Congress would allow the disruptive scenario of trust fund reserve depletion to actually play out. Sooner or later, some changes in benefits or taxes (or, most likely, both) will almost certainly be enacted to extend the life of the trust fund reserves, though it remains to be seen if these anticipated changes will fully restore the programs' long-range actuarial balance.

Many people wonder if we will be able to afford our current social insurance programs as they take up a greater share of GDP in the future, as is currently projected due to demographic and economic pressures. My answer is that there is no reason to think that we **could not** afford those programs, but we—current and future generations—will decide, through our political institutions, how much of the available resources we are **willing** to allocate to them.

Such questions will be discussed in one of the sessions our section is sponsoring at this year's Annual Meeting titled, “Sustainability of Public Finance in the United States.” I believe we can expect diverse views from the panelists and interesting questions from the audience. I hope to see many of you there, as well as in our other sessions—on the status of Social Security and Medicare, on the differences between the work of private- and public-sector actuaries, and during the Section Breakfast, where we will have a discussion of some exciting new research. I hope to see many of you there! ■



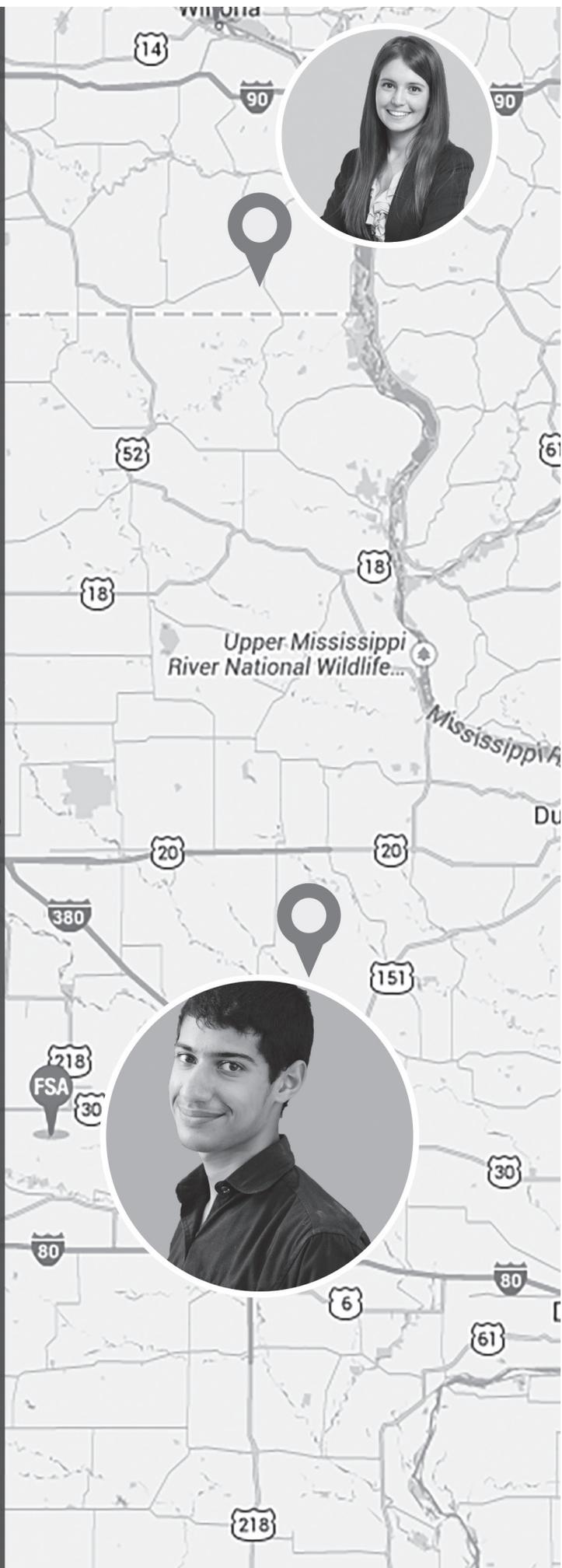
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Medicaid Encounter Data: The Next National Data Set

By Jennifer L. Gerstorff and Sabrina Gibson

Medical claim data, referred to as “encounter data” in Medicaid programs, is the single most important analytical tool for health plans and health programs. Without accurate and timely data, it is not possible to analyze costs, utilization, or trends; evaluate benefits; or determine the quality of services being provided to members. Health plans store their claim data in repositories that allow them to access the data for these types of analysis, but these repositories are not available to outside parties who may also need the data for analytical purposes. As Medicaid managed care becomes the primary provider of Medicaid benefits, states and the Centers for Medicare and Medicaid Services (CMS) have need of this information for similar purposes. This led to the development of complex encounter data submission processes that allow the health plans, or managed care organizations (MCOs) as they are commonly called in Medicaid, to push the claim data to the state’s repository. The development of these processes and the systems to collect this data has taken years and is still in its infancy in many states. CMS has accelerated this process through some recently mandated changes and plans to standardize the data files. This article discusses the need for and challenges of collecting Medicaid encounter data as well as the future of Medicaid encounter data—the next national data set.

WHY WE ARE HERE

The Medicaid program covers more than 20 percent of the U.S. population and accounts for more than 16 percent of all U.S. health care spending.¹ For many years, just like other medical programs, Medicaid was administered on a fee-for-service basis, usually by states that built their own claim payment systems or through an administrative services only (ASO) arrangement where a third-party administrator pays claims. The states had access to all of the claim data, since it was stored in a single repository. Recently, states have been shifting the administration of their Medicaid benefits to MCOs in order to improve the access and quality of care, create more stable funding streams, and reduce costs in the programs. In full-risk managed care arrangements, the state pays the MCOs a capitated per-member-per-month (PMPM) rate, and the MCO assumes the risk of the plan costs. This change reduces states’ visibility into the claim data, since the data is now housed by the MCOs. To regain access to

the data, states now require MCOs to submit claim information as encounter data to the state or third-party intermediary for collection in a repository that the state can access. Often there will be more than one MCO in a state, so the state requires all of the MCOs to submit the encounter data in the same format.

WHY STATES NEED THE DATA

In 2013, 38 states operated risk-based managed care programs that enrolled approximately 70 percent of the Medicaid beneficiaries in those 38 states.² In fiscal year 2013, almost 30 percent of all Medicaid dollars were paid through MCOs with individual state percentages ranging from 0 percent to almost 80 percent.³ All indications are that the overall percentage of Medicaid MCO spending will continue to increase in future years.

As the fiduciaries of the Medicaid programs, states have the responsibility of program oversight and integrity, which results in the need to collect complete and accurate encounter data. Section 1903(m)(2)(A)(xi) of the Social Security Act specifies that in order to receive federal funding for their Medicaid programs, states must include in their contracts with MCOs a provision that the MCO must report “patient encounter data” for physician claims to the state in a timeframe and level of detail specified by the secretary.⁴ This was strengthened under Sections 6402(c)(3) and 6504(b)(1) of the Patient Protection and Affordable Care Act to mandate that states collect and routinely report accurate, complete, and timely encounter data in order to receive federal funding for managed care payments under their Medicaid programs.⁵ CMS implemented this requirement in rule 42 CFR 438.818(a), which would require states to submit to CMS “sufficient and timely enrollee encounter data to CMS ... in the format required by the Medicaid Statistical Information System

Medicaid provides health coverage to millions of Americans, including eligible low-income adults, children, pregnant women, elderly adults, and people with disabilities. Medicaid is administered by states, according to federal requirements. The program is funded jointly by states and the federal government.

[Source: Medicaid.gov overview]

(MSIS)” or risk losing their Medicaid federal funding. Further rule 42 CFR 438.5(c) requires states to use encounter data for capitation rate-setting for managed Medicaid populations.

With the continued loss of historical fee-for-service data and the implementation of these rules, state Medicaid agencies are working to collect encounter data from the MCOs and store it in a single repository. This is preferable for many reasons:

- Data is easily accessible from a single source.
- Data is validated at intake and stored in a format consistent with fee-for-service.
- Claim detail allows for state review of anomalies and understanding of utilization patterns and services provided.
- Claims may be priced consistent with fee-for-service delivery for understanding of MCO payment variation.
- Health care management may be monitored and compared among the contracted health plans and alternative delivery systems.

WHAT STATES DO WITH ENCOUNTER DATA

States have multiple uses for encounter data, which may be classified in three primary groups:

- Financial.
- Program oversight.
- MCO contract monitoring.

Financial uses

Financially speaking, encounter data is useful for budget forecasting and capitation rate development, though there are many other ways for states to utilize the data.

Budget forecasting

Medicaid funding is approximately 20 percent of most state budgets, the second-largest state expenditure after education. Development of state budgets tends to be a highly political annual or biennial process. State leaders often look to Medicaid spending levels when overall budget shortfalls need to be addressed.⁶ Development of the Medicaid component of a state budget requires solid historical data, so that trends in population growth and benefit spending can be broken down and analyzed—which points to the crucial role for encounter data.

During the budgetary process, encounter data can be used in combination with fee-for-service and other Medicaid spending categories and analyzed in multiple ways:

- Reviewing utilization, unit cost, and service mix changes.
- Quantifying mandatory versus optional Medicaid services.

Enrollee encounter data means the information relating to the receipt of any item(s) or service(s) by an enrollee under a contract between a state and an MCO, PIHP, or PAHP.

- Evaluating differences in morbidity profiles of populations over time and across programs.
- Understanding the efficiency and savings potential of managed care programs relative to fee-for-service.

Capitation rate development

Capitation rates are the premiums paid to MCOs for managing care and paying medical services for Medicaid beneficiaries. Recently, CMS has placed increasing emphasis on the use of encounter data as the primary data source underlying capitation rates. Relying heavily on the encounter data to produce actuarially sound rates incentivizes MCOs to provide timely and complete data to the states to align benefit cost with premium payments.

Increasingly, MCO payments include risk-adjusted capitation rates. Risk adjustment in Medicaid tends to be budget neutral, shifting capitation payment dollars among MCOs to reflect the relative risk of each MCO’s enrolled population. However, most risk adjustment models require comprehensive encounter data to reflect risk profiles adequately. It is in each MCO’s best interest to submit timely and complete encounter data to maximize revenue.

Other financial uses

Some states have various funding arrangements with MCOs that result in transfers of gains or losses between the state and the MCO. These come in the form of:

- Gain sharing.
- Risk corridors.
- Minimum medical loss ratio guarantees.
- Administration maximums.
- Profit margin maximums.
- Reinsurance or stop loss for large claims, high member claims, or for single claims like high-cost drugs.
- Reconciliations, such as reconciling for retroactive member claim costs.

To administer these funding arrangements, states need encounter data; otherwise they must rely on the MCOs to provide the data in an alternate format.

Program oversight

In order to properly monitor managed care programs, states must use encounter data to conduct a multitude of analyses.

Policy analysis

Several types of analyses are common when states consider changes to Medicaid policy:

- *Carving benefits into or out of managed care.* Encounter data may be reviewed to understand utilization patterns or cost of services relative to expected fee-for-service delivery of benefits. Common services that may be considered for a carve-out include pharmacy, behavioral health, dental, and non-emergency transportation services. States may choose to segregate benefits for many reasons, including, but not limited to, more optimal funding arrangements negotiated by the state, advocacy initiatives for certain populations or benefits, or contracts with entities that specialize in a limited set of benefits.
- *Adding or eliminating an optional service to the Medicaid benefit package.* As state budgets cycle through expansion and contraction periods, optional benefits may be added or eliminated from year to year. Encounter data are used to summarize the utilization and cost of services provided under managed care at a detailed level. Optional benefits include services such as dental, chiropractic, podiatry, optometry, personal care, physical therapy, or occupational therapy. Note that coverage is only optional for adults, as children would qualify for all of these services under the mandatory Early and Periodic Screening, Diagnostic, and Testing (EPSDT) benefit.⁷
- *Understanding of underlying social issues.* State politicians and advocacy groups frequently request that state Medicaid agencies provide summaries of information related to social issues that affect members of the community. This may include issues such as the over-utilization of certain pharmaceutical products, the impact of behavioral health services in an area, the frequency of avoidable services such as visits to an emergency room, or the prevalence of certain disease categories in a subset of the Medicaid population.

QUALITY REVIEW AND FEDERAL REPORTING

Encounter data enables measurement of managed care program integrity and quality outcomes.

- *Calculating quality measures.* States use detail claims data inputs to calculate certain measures that allow for comparison of performance across health plans or delivery systems. For beneficiaries enrolled in managed care, this claims data

source is encounter data. The Healthcare Effectiveness Data and Information Set (HEDIS) includes several quality measures defined and maintained by the National Committee for Quality Assurance (NCQA), and many of these measures are commonly used directly or modified for use in monitoring Medicaid programs.⁸ Quality measures are used for a variety of reasons, such as internal monitoring, pay-for-performance initiatives, federal reporting, or public reporting.

- *Measuring network access and adequacy.* States use encounter data as a resource to review member utilization of services by geographic area or provider type to determine if patterns suggest that availability or access may be an issue. This helps program administrators ensure that Medicaid beneficiaries can receive necessary medical services. Federal standards are currently under revision to establish well-defined access standards for Medicaid, so this information may become a federal reporting requirement in the future as evidence of compliance.
- *Federal reporting.* States are required by federal law to report benefit experience to CMS. Paid expenditures are reported quarterly for all Medicaid covered benefits. For states that operate managed care programs under the authority of a waiver, either 1915(b) managed care waivers or 1115 research and demonstration waivers, additional reporting is required to illustrate cost-effectiveness of the program relative to fee-for-service benefit administration.⁹

MCO contract monitoring

States have extensive contracts with the MCOs that provide Medicaid services for their members. States manage MCO contracts by monitoring many of the contract requirements through review of encounter data such as:

- EPSDT requirements for children.
- Timely claim payment requirements.
- Quality measure benchmark requirements.
- Reimbursement levels relative to fee-for-service.
- Network access and adequacy.
- Validating that services are consistent with the Medicaid State Plan and benefits covered by the MCO contract.
- Monitoring in-lieu-of services that an MCO substitutes as a cost-effective alternative to a state plan service.

Additionally, states monitor the MCO administration and interaction with providers through the encounter data by reviewing claim denial reasons, physician enhancement payments, and provider add-on payments.

CHALLENGES IN SUBMITTING AND COLLECTING ENCOUNTER DATA

Encounter data sets are large and complex, so there are multiple challenges involved in collecting the data in a standardized format. These challenges arise both on the MCO side in trying to submit data and on the state side in trying to collect the data.

Reporting challenges: File formats

Encounter claim data is most commonly submitted in the HIPAA-compliant 837 and National Council for Prescription Drug Programs (NCPDP) file formats. The 837 file format is used for Institutional, Professional, and Dental services while the NCPDP file format is used for Pharmacy services. There are approximately 1,000 fields on an 837 file. To add to the complexity, there are multiple versions of these 837 files, including some state proprietary versions. MCOs that operate in more than one state may face additional complications when a state deviates from standard use of specific fields within the 837 file format. These variations increase the probability that encounter data will be rejected, as MCOs must modify their reporting to align with each state-specific system's submission requirements. This does not necessarily indicate that the data they are reporting is of low quality. Substantial cooperation among MCOs and state resources is often required to resolve data format problems.

Reporting challenges: Rejected encounters

Even if MCOs submit their encounters, states may still reject them. State encounter systems usually contain elaborate front-end edits to reject encounters that the state labels as invalid. This can happen for a variety of reasons, some that the MCO can fix and others that require action by the state or by providers.

As mentioned above, there are almost 1,000 fields on an 837 file. Some fields are required and some are not, depending on the individual state's encounter submission process. The format that providers use to submit claims for payment to the MCOs differs from the format that the MCO sends to the state. To receive payment for a claim, providers do not necessarily have to file all of the data elements that the state may require for the same encounter from the MCO. These missing elements are a common reason for rejection of encounters by the state.

All encounters must contain information on the provider of the service. In most, if not all, states, providers must register their National Provider Identifier (NPI) to be a valid Medicaid provider. The list of registered providers in a state is called the "roster." When the state receives an encounter, the NPI on the encounter is cross-referenced against the roster to seek a match. If there is no match, the encounter will be rejected. Unfortunately, in some states, the provider does not necessarily have to be on the roster for the MCO to pay the claim, so the providers do not

always have an incentive to register. There are also other reasons for variances between the encounter and the roster:

- *Out-of-state providers.* Often Medicaid members cross state lines to receive services when they live in border counties. These providers may be registered with their state's Medicaid program but not the neighboring state.
- *Members of multiple physician practices.* Some physicians work for more than one physician practice. The provider may have registered under one practice NPI but not the others.
- *Taxonomy codes.* Some states require providers to be registered under their various areas of practice. It is not unheard of for a state to allow up to 15 taxonomy codes for one NPI. If the provider is billing for a service that does not coincide with the registered taxonomy codes, the encounter will be rejected.
- *One provider on the encounter is not registered.* The 837 file has fields for each of the following:
 - Billing provider.
 - Rendering provider.
 - Referring provider.

State submission policies vary on which of these fields are required for encounter acceptance. If a required provider is not on the roster correctly, the encounter may be rejected.

The natural operations of the managed Medicaid program create situations that cause encounters to be rejected due to an edit. Some of these are just timing issues, but others will not resolve themselves over time. Examples are:

- *Duplicate claims.* State systems usually contain a front-end edit to reject encounters that appear to be duplicates, though they may be valid adjusted claims or recovered claims.
- *Procedure not covered by state.* One of the advantages of implementing managed care to replace fee-for-service benefit administration is that MCOs can provide services for members that are not covered under the Medicaid State Plan. These services must be provided in lieu of a State Plan-covered service and must be at least as cost-effective as the covered service. State Medicaid Management Information Systems (MMISs) are often designed for fee-for-service data, applying front-end edits that may reject encounters for services the system does not recognize as covered under the State Plan.
- *Retro-member adjustments.* States provide enrollment information to MCOs using the HIPAA-compliant 834 enrollment file format for members who are enrolled with the MCO.

States may retroactively dis-enroll members from an MCO for various reasons. These retroactive changes may create timing issues for encounter submissions if the member does not appear as eligible on the state's system. MCOs are required under contract to pay claims for members on the 834 file, but once a member is retroactively dis-enrolled, the MCO may be able to recoup the claim payment from the provider.

Collection challenges: State issues

The challenges of getting good quality encounter data into a usable format are not limited to the MCOs. Some issues fall on the limitations and legacy practices of state adjudication processes and systems. Many state MMISs date back about 40 years to when federal regulations mandated the mechanization of claims processing and storage systems. When these systems were originally developed, states received 90 percent federal financial participation (FFP) for their development and implementation. In recent years, some states have begun contracting with third parties to operate their MMISs, and others are just beginning to update systems to more modern hardware and software.¹⁰

The key problem with legacy MMIS warehouses is that they were not designed to intake encounter data from MCOs. They were designed to accept claims directly from Medicaid providers and to adjudicate payments for those claims based on fee-for-service reimbursement rules. This leads to many difficulties when collecting encounters into the system:

- *Non-standard claim formats.* When HIPAA mandated the regulation of electronic claim filing, states required some Medicaid providers to continue submitting non-standard (and non-compliant) claim forms to the state. When MCOs begin working with these providers, the providers must change the way they have always billed for Medicaid services because they must submit HIPAA-compliant forms to MCOs. This requires training for the providers as well as a trial-and-error period as the state works out how to collect the same information it has always received in a different format. This tends to be more of an issue for providers, which mostly offer Medicaid-covered or state-funded services such as mental health rehabilitation option services or long-term services and supports.
- *Claim adjudication edits.* MMISs were designed with strict fee-for-service provider reimbursement edits to appropriately adjudicate and pay claims. The way providers bill MCOs to receive payment is not consistent with the way providers have historically been required to bill states. When states begin receiving encounter data from multiple entities, the state must experiment with rejection reasons and determine where adjudication edits can be relaxed. The goal is for the MMIS to receive all necessary information for understanding the encounter, but not require the same strict information as if the claim were being paid under fee-for-service. For example, the

last name of the billing provider may be required for a fee-for-service claim, but because of the inconsistency of receiving encounters from multiple entities, the state may turn off the edit that validates this field for encounter data.

- *Sub-capitated encounters.* An MCO may contract with vendors who manage a subset of benefits on an at-risk basis for the MCO's members. These vendors typically specialize in providing efficient ancillary services such as dental, vision, or transportation. The MCO pays a PMPM capitated premium to the vendor, and the vendor is at-risk for providing all covered services under its contract. Under this alternative payment arrangement, payment is not contingent on the claim encounters submitted to the MCO, so many encounters for services provided may be of poor quality or nonexistent. Because of the payment structure, sub-capitated encounters may not include pricing information, and the state's MMIS may in turn zero-out the utilization or potentially report the encounter utilization in summarized format without an expenditure attributed to it.
- *Other non-standard funding arrangements.* MCOs may have global or bundled case rate payments that they pay for certain episodes of care. Services provided under these arrangements tend to have issues with encounter data similar to the sub-capitated claim encounters noted above.

STRATEGIES TO IMPROVE ENCOUNTER DATA REPORTING AND ACCEPTANCE

As many states have moved to managed care and have a long history of working through the challenges outlined above, some lessons have been learned, and best practices have begun to emerge.

Improve state technology and process

In order to collect and maintain good quality encounter data, states must continue to invest in the development and operation of a regular monitoring process. States that have been successful at the collection of accurate, complete, and timely encounter data have set up such processes, investing in data teams and/or consultants who are responsible for regularly reviewing encounter submissions. Monitoring includes comparing summarized encounter data with MCO financial data by organizing the two different sources into a standard format.

In order to incentivize contracted MCOs to submit complete encounters, states may link the results of these reports to the financial arrangements in the MCO contracts. For example, the state may withhold a percentage of capitation payments that MCOs can earn back by submitting complete and accurate encounter records. Completeness and accuracy may be estimated by summarizing encounter payments PMPM and measuring the variance from the PMPM cost reported by the MCOs in their

financial data or cost report information. States may also require external quality review audits of encounter data versus reported financial data by a neutral third party.

Best practice would suggest that state executive personnel and their actuaries meet on-site with MCO executive personnel and data teams to conduct an initial review during the planning and implementation stage of new encounter submission processes. This reinforces the importance of the process and provides an opportunity for all stakeholders to ask questions and become prepared for the ongoing monitoring process.

Improve state/MCO partnership for results

States want to operate successful managed care programs on behalf of their enrolled members, and MCOs want to provide efficient and quality care to those members while earning a risk-based margin. Bringing the stakeholders together for a partnership at the beginning of the encounter data collection and monitoring process reinforces these goals and, over time, should result in successful processes for states to collect, maintain, and report encounter data. Successful partnerships involve:

- Working together on barriers to submission/acceptance of encounter data.
- Educating the other side to learn expectations and limitations on both sides.
- Collaborating on holding providers accountable.
- Establishing data dashboard summaries.

MCO strategies to improve submissions

Due to contractual requirements, MCOs may establish up-front edits in their claims systems and/or pre-submission edits for the encounter data files. The claim system edits will reject a claim before it enters the claim-processing system if there is a missing or invalid field on the claim that will prevent it from flowing through the state's encounter system edits. The claim rejects to the provider with a reason code that indicates the missing or invalid field, and the provider must resubmit the claim correctly to the MCO. Pre-submission encounter file edits mirror the edits the state has established. These claims are set aside and run through an automatic or manual correction process. This is often a time-consuming, labor-intensive, and expensive process for the MCOs.

MCOs are often challenged with educating providers on their responsibilities to ensure that the provider claim can be converted into an accepted encounter. This is not always required for the provider to receive payment on a claim, so MCOs often include requirements for submitting a clean claim in their provider contracts and provider manuals. Some states allow MCOs to reject claims with missing information while others do not.

MCOs often work with providers to get them registered correctly on the state roster or to educate providers that chronically file claims lacking necessary information.

Some missing or incorrect 837 claim file field elements may be corrected through an algorithm that maps the correct field element. For example, MCOs may be able to map a missing NPI to an encounter using a provider's Medicaid ID number.

The growth of value-based and alternative payment methods for providers may exacerbate the problem of missing data elements for encounter submission. Capitated providers were, and in some places still are, common funding arrangements with physicians and ancillary vendors. These arrangements do not encourage accurate encounter reporting and have created their own challenge to MCOs submitting complete encounter data to states. Many MCOs are dismantling their capitated arrangements to avoid the negative financial impacts associated with poor encounter submissions.

MCO incentives

States have created various incentives for MCOs to improve their encounter data submissions. Some of the incentives included in contracts today are described below:

- *Using encounter data in rate setting.* States are relying on encounter data for the source of base data to produce MCO capitation rates. Incomplete or inaccurate encounter data submission can lead to capitation rates that do not appropriately reflect the managed Medicaid program.
- *Risk adjusting capitation rates.* The adoption of risk-adjusted rates provides incentives for MCOs to improve their encounter data, since the data supports the calculation of beneficiary risk scores. The core tenet of risk adjustment is to recognize disproportionate shares of risk among MCOs and better match payment to risk profile. A byproduct of risk adjustment is heightened MCO awareness to submit encounter data that ensures that their MCO-specific risk score fully reflects their experience.
- *Contract provisions.* States can improve their encounter data with well-thought-out financial and operational contract requirements. These include financial penalties for not meeting certain service-level agreement (SLA) requirements. These penalties could be in the form of liquidated damages, unearned capitation rate withholds, loss of incentive payments, or loss of enrollment in the auto-assignment process. The most common SLA types in MCO contracts are:
 - Timeliness – Days between submitted encounters and paid date such as “100 percent of encounters submitted by the 25th day following the end of the process month.”

- Completeness – Paid claims dollars compared with encounters accepted such as “within 97 percent of costs reported with three-month runout.”
- Accuracy – Percent of encounters accepted (not rejected by the state) such as “97 percent acceptance on each file submitted.”

SLAs will have measurements for each of these, and MCOs can be penalized for not meeting the measurement levels. There can also be two levels of measurement: one to avoid being in violation of the contract, and the other is a higher measure to receive a financial incentive or avoid a financial penalty.

MCO contract incentives should be designed to encourage the desired behavior. They should also be reviewed within the other state requirements and instructions to be sure that they are not in conflict. The situations described in the call-out boxes below are examples of encounter data requirements with unintended consequences.

While MCO incentives are a useful tool, MCOs do not have the ability on their own to repair a broken system. It is critical that states and MCOs work together to improve encounter collection processes by identifying and eliminating barriers.

HOW CMS IS FORCING THE EVOLUTION OF ENCOUNTER DATA COLLECTION

In 2011, CMS launched a pilot of the Transformed Medicaid Statistical Information System (T-MSIS) project in 12 states. From federal fiscal year 1999 until this announcement, CMS collected fee-for-service Medicaid claims and enrollment data on a quarterly basis, processed it into a standard format, stored it in the Medicaid Statistical Information System (MSIS), and

supported a web-based data mart tool that allowed public users to summarize monthly or quarterly information by federal fiscal year. But as states have transitioned more and more to managed care over time, it became clear that having only fee-for-service data available was much less valuable than it had once been. T-MSIS collects both fee-for-service and encounter data, and it is the future of viable Medicaid data. The CMS goal is to develop data marts through web-based tools, detailed but de-identified public use files for purchase, and full-detail Medicaid Analytic eXtract (MAX) files for research applications.¹¹

T-MSIS: The value proposition

CMS oversight of Medicaid programs is difficult because each state and U.S. territory has its own unique set of benefits, eligibility criteria, funding rules, waivers, etc. With the implementation of T-MSIS, CMS will be able to automate some monitoring functions. The following are key points that CMS and the public will be able to review at a glance, rather than through long inquiries and strenuous validation efforts

- Enrollment will be stratified between Medicaid (Title XIX) and CHIP (Title XXI), and both fee-for-service and encounter claims information will be linked to these tables. This will allow users to easily summarize what services different groups received, which providers served them and how often, what those services cost, and how their service utilization patterns differ by waiver or State Plan or in managed care versus fee-for-service.
- Fraud and abuse auditing will be enhanced with the ability to review a combination of Medicare and Medicaid claims to see where providers appear to be having an “impossible day,” in which they see more patients than possible in one day.

Examples of MCO contract penalties

Example 1 – Unintended Incentive

MCO contract has a Timeliness of Encounters SLA measured as follows:
 $(\# \text{ of Encounters } > 30 \text{ days after Paid Date}) / (\# \text{ of Encounters in Files Containing Encounters } > 30 \text{ days After Paid Date})$

MCO submits 10 encounter files.

Submission Option 1:

1 file of 100,000 Encounters with 10 Encounters >30 days, and 9 files of 100,000 Encounters with no Encounters >30 days
 Error Rate = $10/100,000 = 0.010\%$

Submission Option 2:

10 files of 100,000 with 1 Encounter > 30 days in each one
 Error Rate = $10/1,000,000 = 0.001\%$

Example 2 – Workaround

- Claim is paid on an eligible member.
- Member is subsequently retro-termed by the state prior to the submission of the encounter.
- Encounter must be removed before submission to avoid a penalty for accuracy due to a rejected claim.

- Agency demonstrations and delivery reform model analytics will be performed on an ongoing basis to review these initiatives as they are occurring rather than years after they end.

MSIS versus T-MSIS: What’s new?

CMS has invested significant resources in modernizing its data systems from the old MSIS format to the new T-MSIS format. Some of the improvements in the data and innovative new features include:

- Storing and analyzing the data in an Amazon Web Services cloud.
- Receipt and control of states’ data files processed through three tiers of business rules to identify data quality issues.
- Intensive state testing and data reviews prior to approval for official submission.
- Real-time error reports sent back to states to help them identify and fix data quality/gap issues.
- Increasing the sources of data, including managed care plan data and additional provider data.
- Increasing the number of data fields.

Overall, the expectation is that the data from T-MSIS will be a national data set of Medicaid data accessible by the public. There are more stringent requirements for timely submission of data and a better process for validating data to ensure accuracy as shown below:

MSIS Data	T-MSIS Data
Inpatient Claims	Inpatient Claims
Long-Term Care Claims	Long-Term Care Claims
Prescription Claims	Prescription Claims
Other Claims	Other Claims
Beneficiaries (names, SSNs, etc.)	Beneficiaries (names, demographics, etc.)
Encounter Data	Provider – NEW
	Managed Care Plan – NEW
	Third Party Liability – NEW
	Improved Encounter Data

CMS is actively working with states to populate the new T-MSIS. The current timeframes for ongoing and continued population of the database are:

- CMS is accepting states’ data now.
- Expect majority of states to begin submitting their data by the end of summer 2016.
- Initial submissions include “catch-up” MSIS files.
- Regular cadence is monthly submissions.

MSIS vs T-MSIS	
“As Is” MSIS	“To Be” MSIS
200+ Elements	550+ Elements
Quarterly Submissions	Monthly
Poor Data Quality	Submissions processed through business rules
Limiting Data Analytics • Lack of data integration • State accessibility	Data Validation Requirements

SUMMARY

Quality encounter data is necessary for successful Medicaid managed care programs. States and MCOs have partnered to work toward solutions for developing and transmitting complete and accurate encounter data. CMS has also begun partnering with states to modernize the federal collection and standardization of encounter data.

Similar to the unique nature of each state Medicaid program, states each have unique data collection file format requirements and methods, which creates unique provider reporting challenges. Limitations such as these make it improbable to report and collect 100 percent of all encounters. Federal regulations may impose penalties when states are unable to submit complete and accurate encounter data to CMS. Now is the time for CMS, states, and MCOs to all work together to break

down roadblocks that may prevent the collection and reporting of quality encounter data.

Encounter data quality can be improved with certain key principles:

- *Standardization of encounter reporting across states.* CMS is working toward this with the requirements of its new proposed regulation and modernization of the T-MSIS claim repository.
- *Modification of MMIS rejection edits.* States may be able to relax front-end edits to better accommodate encounters, recognizing that strict fee-for-service edits may not be appropriate.
- *Modernization of state Medicaid Management Information Systems.* States should continue to invest in updating systems to reflect the evolution of claims data.
- *Collaboration to reduce provider roster issues.* States and MCOs should work together to educate providers and to develop processes that simplify management of provider rosters.
- *Implementation of regular data monitoring.* States can develop dashboard summary reporting requirements to enhance oversight of changes in encounter data quality.
- *Consideration of encounters in value-based payments.* MCOs can establish reporting penalties or incentives when contracting with providers using alternative payment arrangements to ensure complete and accurate encounter submission.
- *Alignment of service-level agreements.* States and MCOs should work together to develop contract requirements that appropriately encourage quality encounter submissions without penalizing for practices that are not in the MCO's control.

As these obstacles continue to be addressed and overcome, the CMS T-MSIS will become a single-source database for all

Medicaid claims data, bringing together both fee-for-service and encounter experience. This new national data set will allow for quality measurement and understanding of costs and effectiveness of Medicaid programs nationwide, goals that are not currently achievable under our historically fragmented system. ■

ENDNOTES

- ¹ Kaiser Family Foundation (March 9, 2015). Medicaid Moving Forward. Retrieved March 23, 2016, from <http://kff.org/health-reform/issue-brief/medicaid-moving-forward/>
- ² Centers for Medicare and Medicaid Services (November 2013). Encounter Data Toolkit. Retrieved March 23, 2016, from <https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Data-and-Systems/Downloads/Medicaid-Encounter-Data-toolkit.pdf>
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- ⁴ U.S. Social Security Administration. Compilation of the Social Security Laws: Payment to States. Retrieved March 23, 2016, from https://www.ssa.gov/OP_Home/ssact/title19/1903.htm. - 2)(A) Except as provided in subparagraphs (B), (C), and (G), no payment shall be made under this title to a State with respect to expenditures incurred by it for payment (determined under a prepaid capitation basis or under any other risk basis) for services provided by any entity (including a health insuring organization) which is responsible for the provision (directly or through arrangements with providers of services) of inpatient hospital services and any other service described in paragraph (2), (3), (4), (5), or (7) of section 1905(a) or for the provision of any three or more of the services described in such paragraphs unless—(xi) such contract provides for maintenance of sufficient patient encounter data to identify the physician who delivers services to patients and for the provision of such data to the State at a frequency and level of detail to be specified by the Secretary.
- ⁵ Centers for Medicare and Medicaid Services (June 1, 2015). Proposed Rule: Medicaid and Children's Health Insurance Program (CHIP) Programs; Medicaid Managed Care, CHIP Delivered in Managed Care, Medicaid and CHIP Comprehensive Quality Strategies, and Revisions Related to Third Party Liability. Federal Register, Vol. 80, No. 104, pp. 31166-31167. Retrieved March 23, 2016, from <https://www.gpo.gov/fdsys/pkg/FR-2015-06-01/pdf/2015-12965.pdf>
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The Sustainability of the New American Entitlement: Actuarial Values and the ACA

By Greg Fann

We were reminded of the importance of Actuarial Values in the Chairperson’s Corner of this publication’s January 2013 edition. I am talking about the virtuous kind, not the calculated results from a pesky spreadsheet. Steven Schoonveld clarified our professional obligation to objectively speak to the sustainability of the financing systems that we manage and to recommend necessary changes. Efficient use of funds, aligned incentives, long-term consumer affordability and equity among participants are fundamental concepts that we require for sustainable programs.¹

The Patient Protection and Affordable Care Act (ACA) has been with us for a few years now. As we are approaching the end of an initial three-year discovery period with temporary risk mitigators,² there have been an increasing number of questions raised by some health actuaries regarding the long-term sustainability of the individual market platform. An instructive article from a landmark Health Section publication analyzes the risks (from a health insurer’s perspective) of participation in the new ACA markets compared to pre-ACA markets and other major lines of business.³ Some major carriers have already caused concern by publicly suggesting a potential individual market exit in 2017 (in particular, United Healthcare has exited most ACA markets) due to predictive difficulty, high claim costs and financial losses.⁴ Market exits have been accelerated by a significant shortfall in risk corridor funds available⁵ due to government decisions to fund only those losses covered by risk corridor gains.

This article discusses the nature of the ACA sustainability challenges and illustrates the uniqueness of the ACA program in the American entitlement system.⁶

ACA BACKGROUND

The ACA, enacted by Congress in 2010, has brought numerous changes to health care markets, but the most notable impact is the transformation of a lower-risk, medically underwritten, individual market to a higher-risk, 2014-and-later, guaranteed-issue market without pre-existing condition exclusions or health status as an allowable rating factor. Federal subsidies of varying

amounts are available to some enrollees to offset the high cost of premiums and cost sharing. These subsidies represent the first major health entitlement spending intended to benefit Americans not eligible for the 1960s-era Medicare and Medicaid programs.

Due to the federal subsidies targeted at middle-income⁷ individuals and families, the size of the individual market has grown significantly among the middle-income population. In addition to the subsidy benefits, another enrollment incentive is the application of a tax penalty (individual mandate) to individuals without qualified health coverage. Surprisingly at odds with legislative intent to attract young, healthy enrollees and the noted sustainability requirements, the mathematical mechanics of the premium subsidy calculations are designed in such a way that federal provisions are more generous to older enrollees.⁸

The next two sections provide a background of the American entitlement framework and explore the unique elements of the ACA subsidies relative to other government programs.

HISTORY OF AMERICAN ENTITLEMENTS

While not necessarily comprehensive, the table below illustrates a history of major entitlement legislation in the United States. As suggested in the table, American public assistance and social insurance programs have focused on serving vulnerable populations and can be grouped into two broad areas, Financial Security and Health Care.

Entitlement spending has grown each year due to population growth, general inflation, increased health care inflation, longevity increases, the Baby Boom generation, and the addition and expansion of major government programs. Budget pressures are significant at the federal and state levels; significant growth of federal entitlements (50-year average annual growth of 9.5 percent from 1960 to 2010⁹) continues to challenge our fiscal systems, and there are legitimate concerns regarding the long-term viability of current programs. In particular, since 1960, the advent of Medicare, Medicaid, Medicare Part D, Earned Income

Population	Financial Security	Health Care
Elderly	Social Security (1935)	Medicare (1965)**
Low Income	Subsidized Shelter & Food (1930s)*	Medicaid (1965)***
Disabled	Social Security (1956)	Medicare (1965)
Middle Income	Earned Income Tax Credit (1975)	ACA Subsidies (2010)****

* Various programs

** Prescription Drug Benefits (Part D) added in 2006

*** Funding shared with states; eligibility rules vary greatly across states; ACA (2010) provided additional federal funding to Medicaid for a newly eligible population (in states that chose to expand)

**** Only available to individuals who do not have access to “affordable” employer-based coverage, either by themselves or through a family member

Tax Credits, and significant Social Security enhancements in the 1970s, have all contributed to the explosive growth in entitlement spending. It was in this challenging environment in 2010 that a current program (Medicaid) was expanded to cover a previously ineligible population (low income, able-bodied, non-custodial adults) and a new entitlement program was developed to partially subsidize health care premiums and costs in an attempt to make health insurance affordable and an attractive value across the income spectrum.

In spite of the significant cost challenges, the recognition that access to affordable health insurance is good for society, coupled with the number of uninsured Americans and the high cost of health insurance, prompted a divided Congress, with direction from the Obama administration, to inject federal funding into the individual health market and overhaul the market rules and pricing structures in the process.

THE ACA ENTITLEMENT

The new entitlement program, offering premium and cost-sharing subsidies to middle income Americans, is a 21st century American experiment unlike any financing mechanism that has been tried before. All prior entitlement legislation has mostly offered cash assistance or benefits that were of inconsequential direct cost to beneficiaries. There have been some notable participation fees, Medicare Part B premiums, for example, but they have generally paled in comparison to the expected benefits. The ACA subsidies formula does not follow this pattern. Due to a contentious debate on the legislation and a political requirement for deficit neutrality (as scored by the Congressional Bud-

The new entitlement program, offering premium and cost-sharing subsidies to middle income Americans, is a 21st century American experiment unlike any financing mechanism that has been tried before. ... The premium assistance formula is complicated and certainly unusual, relative to traditional government and employer provisions for health benefits.

get Office, before dynamic scoring was in play), available federal funds to provide the desired assistance were limited. Congress decided to provide partial premium assistance to individuals and families with incomes up to 400 percent of the Federal Policy Level (FPL). Material cost sharing assistance was also provided up to 200 percent of the FPL.¹⁰

The premium assistance formula is complicated and certainly unusual, relative to traditional government and employer provisions for health benefits. Rather than provide a fixed dollar amount (defined contribution or premium support), contribute a percentage of the premium (an employer-subsidized example) or simply fund the cost of benefits (traditional fee-for-service), government outlays are determined by an indirect calculation that requires a collection of market rates and personal income as inputs. The methodology works like this: health plans participating in a given market submit benefit options (falling into four value tiers, though health plans are not required to offer benefits in each tier) and rates for state review. The state reviews the filings and rates and either approves rates as proposed, rejects the filing, or approves the filing at another rate level (usually lower).

The approved rates for all health plans are then aggregated and the second-lowest-priced plan in the second-lowest value tier is determined to be the benchmark plan. Affordable coverage for each enrollee is determined based on a sliding scale percentage of income. An enrollee can purchase the benchmark plan with an enrollee contribution equal to the calculated “affordable” percentage of his/her income. The remaining premium (benchmark plan premium rate minus enrollee contribution) is the federal subsidy. Enrollees can carry the dollar amount of this subsidy to other plans, either within the same value tier or not, and purchase less expensive or more expensive coverage.

A brief illustrative example of the subsidy calculation methodology is demonstrated below; more extensive calculations can be found in the May 2014 edition of *Health Watch* and the December 2015/January 2016 edition of *The Actuary*.

Figure 1 illustrates the gross monthly premiums for two sample companies, A and B, offering plans in the two lowest-value tiers to sample individuals. Bronze is the lowest tier; Silver is the second-lowest tier.

Figure 2 illustrates the subsidy calculation for a particular income level and age. This is determined by calculating the maximum monthly contribution that an enrollee pays for the benchmark plan (the second-lowest-cost silver tier plan, or ‘B Silver’). Assuming the maximum contribution percentage of 7.50 percent for an individual with an income of \$48,000 (reasonable approximation but not representative of any year), the maximum monthly contribution for that individual is \$300 [$\$48,000 \times 7.50\% / 12$]. The calculated subsidy is the gross monthly pre-

Figure 1

Age	Gross Monthly Premium			
	A Bronze	A Silver	B Bronze	B Silver
24	270	315	300	350
64	810	945	900	1050

Figure 2

Age	Subsidy Calculation			
	Income	Maximum Contribution Percentage	Maximum Contribution	Subsidy
24	48,000	7.50%	300	50
64	48,000	7.50%	300	750

Figure 3

Age	Net Monthly Premium			
	A Bronze	A Silver	B Bronze	B Silver
24	220	265	250	300
64	60	195	150	300

mium of the benchmark plan minus the \$300 maximum contribution from the enrollee.

Figure 3 illustrates the net monthly premiums that enrollees pay for each plan in the market after subtracting the subsidy from the gross monthly premiums.

ACA IMPLICATIONS FOR BENEFICIARIES AND HEALTH PLANS

The result of all of this is different subsidy levels, which vary primarily by age, income, and geographic area, for all enrollees. Significant leveraging of the premium subsidy produces unintended results, where older enrollees pay less for certain benefit plans (those with lower gross premium than the benchmark plan) than younger enrollees at the same income level.¹¹ Consequently, the varying relationships between the subsidy amounts and the full premium create enrollment incentives for some and disincentives for others.¹²

The high cost of health insurance for enrollees who are not heavily subsidized has undoubtedly contributed to the lower than expected enrollment.¹³ These disincentives trouble policymakers and insurance companies alike. In addition to premium levels, consumer complaints have also been focused on high cost

sharing and inadequate networks, both of which have exacerbated enrollment concerns. Erosion of enrollment, especially among younger and healthier people, could complicate risk pool and pricing assumptions. Health plans need to be concerned with not only their own plan enrollment, but also the overall market enrollment for the state, due to the inter-company risk adjustment transfer process.

It has been suggested by health actuaries and other commentators that 2017 may be the telling year to evaluate the market conditions based on carrier participation, as health plans evaluate two years of transitional experience before committing to participate in a riskier market without the temporary risk mitigators. A conclusive understanding may take longer to develop as markets do not change instantaneously. Health plan participation in this high profile market is more involved than an isolated business decision based on a financial forecast. There have been external pressures for health plans to participate in the ACA marketplace since program inception, but the potential of major players to exit may trigger more forceful coercion.¹⁴

From a beneficiary perspective, the significant contributions (premiums and cost sharing) required of many enrollees to receive entitlement benefits is a new phenomenon. Reliance on market prices and consumer behavior to determine inputs to government outlay formulas is new as well. Unlike other entitlement programs, proposed solutions to ACA concerns do not fall in line with traditional thinking of Congressional spending or program adjustments. Since the passage of the ACA, the focus from Washington has been promotion of the program (sometimes targeted at younger ages) rather than increased spending to shore up perceived gaps in the program.¹⁵ This is unusual relative to other programs; the government has not launched an advertising campaign and the President has not solicited contributions to convince people to sign up for Social Security or Medicare (low enrollment is not considered a potential threat), but the budget challenges are frequently discussed.¹⁶ Government actuaries opine every year on the financial outlook of these programs, but the major sustainability inputs are macroeconomic in nature. Suggested changes almost always fall in the realm of adjusting spending formulas or benefits.

In many respects, the uniqueness of the ACA subsidies as an entitlement is the reliance on market forces rather than legislative commitments to meet demographic expectations and economic realities. It is important to understand the current data, but more important to understand the various incentives in effect that will continue to shape the size and nature of the individual market. In my opinion, this unprecedented experiment will require an informed, ongoing actuarial viewpoint (or, preferably, multiple viewpoints) focused on sustainability to preserve the individual health market and the reputation of our profession.

SUSTAINABILITY MEASURES

As discussed in the opening paragraph, our work requires adherence to certain values. Reflecting on these values and our obligations to stakeholders and the public, what are some of the potential concerns with each value in our response to the ACA? Let us revisit each point:

1. **Efficient use of funds:** Federal funds are allotted with the intention of making health care affordable. The mechanics of the ACA subsidy calculations create greater benefits for some enrollees and little or no benefits for others. Could the funds be reallocated in such a way as to be more “efficient”? That is an interesting question, and one that individual states may consider if they choose to take advantage of a new waiver opportunity that will allow distribution of federal funds in a more desirable way.¹⁷
2. **Aligned incentives:** There are incentives that promote coverage for some segments of the population. These incentives vary by age, and may promote an older individual market and a younger group market as employees have a new incentive to retire early and younger individuals may be motivated (due to higher cost of guaranteed issue market, restricted age bands, and subsidy mechanics) to seek opportunities for employer-sponsored coverage.¹⁸ Unfortunately, there are also incentives for individuals to reduce work due to “subsidy cliffs” when earning additional income could significantly reduce the subsidies available. The Congressional Budget Office anticipates that employer and employee incentives embedded in the ACA will reduce work hours by 1.5 to 2.0 percent from 2017 to 2024.¹⁹
3. **Consumer affordability:** For some individuals, enrollee premium contributions are very low or even zero in extreme cases. Due to the “family glitch” and the affordability measure,

The most challenging period for the ACA is still ahead of us, with a riskier market for all participating health plans, waning enthusiasm as the initial promotional value wears off, and a new president who is not personally identifiable with the program.

“affordable coverage” may be available to the employee but not to the family members of an employee who has affordable employer-sponsored coverage.

4. **Equity among participants:** The nature of the subsidy calculations results in greater subsidies and stronger coverage incentives for older individuals. The resulting net premiums fall short of the principle that “differences in rates reflect material differences in expected cost for risk characteristics.”²⁰ As mentioned above as an “efficient use,” federal funds could be distributed more equitably through a state waiver.

The three-year discovery period allowed health plans to test the new program with some risk protections that will soon expire. This provided an incentive to be more aggressive in a price sensitive market. Clearly, health plans will assume more risk in the future. There are also non-financial aspects to consider. It is my (non-actuarial) opinion that enrollment results have benefited from heavy promotion (partially offset due to operational struggles and some negative commentary), general awareness, and excitement related to a new program that has received tremendous attention.

The most challenging period for the ACA is still ahead of us, with a riskier market for all participating health plans, waning enthusiasm as the initial promotional value wears off, and a new president who is not personally identifiable with the program. In my opinion, a long-term sustainability viewpoint will recognize the financial implications and inherent incentives, acknowledge the need of positive outcomes for both health plans and consumers, and appropriately discount the early emotional activity associated with this new marketplace.

ACTUARIAL CHALLENGES

I do not believe it is an overstatement to suggest that the new challenges the ACA creates for health actuaries present greater professional risk than any previous developments in the health care market. Many of these challenges, including developing pricing assumptions for an unknown population in a new market environment with an unknown revenue component,²¹ have been primary topics in health actuarial forums since the ACA regulations were developed.

A different type of challenge is the subjective scrutiny of actuarial practice and attempted coercion to breach our objective professional obligations to justify a particular policy or point of view. If you have followed the career of actuary Richard Foster, you recognize that this is not an entirely new occurrence.²² Pressure from outside of our profession is not limited to policy-related issues. A 2012 survey of American Academy of Actuaries members indicated that the overwhelming ethical concern from a list of 18 choices was “responding to pressure from principals and/or management to select inappropriate assumptions used

in pricing or reserving.”²³ This result was strikingly consistent across all practice areas and employment types.

As health actuarial work has become more public and more connected to policy, the criticism has heightened. The partisan nature of the legislative development and the tendency of people on both sides of the debate to misrepresent (perhaps unintentionally) the law’s impact and twist every data point to their liking has complicated the public’s understanding of the legislation. By and large, the actuarial response has been more measured and actuaries have refrained from drawing premature conclusions.

The politically charged nature of the law has complicated our practice since inception, and the attention and subjective viewpoints have not dampened. Criticism of a 2013 Society of Actuaries-sponsored study on expected claim costs cited actuaries as biased by virtue of being primarily employed by insurance companies and, therefore, aligned with the insurance lobby. The rate review process has brought more oversight and attention to actuarial work and perhaps has made us better—or at least more diligent—at our craft. Even state regulators, who have historically been viewed as the reviewers of actuarial rate development, but not reviewees themselves, are now under a watchful eye as “what used to be a purely analytical exercise is now peppered with political overtones.”²⁴

I believe that this new reality is not a temporary environment that will settle as the ACA market matures and stabilizes.²⁵ Future legislation and regulations will demand our opinions and analyses with the same degree of attention. It is interesting to note that few voices proclaim the ACA to be a solution or a final destination. It is either “a step in the right direction” or bad legislation that should be “repealed and replaced.” As we have seen with financial markets, government intervention drives marketplace changes, which, in turn, creates a recurring need for more government intervention. The ACA is a major change in federal health legislation; market reactions will necessitate legislative adjustments, and actuaries will be asked to understand the implications, measure the impact, and go about their daily duties with a high-intensity, post-ACA-level, spotlight on their work. The challenge of being asked to do more analysis with less information, while under a more intense and subjective oversight microscope, is our present and will be our future.

CONCLUSION

20th century entitlement programs now comprise more than two-thirds of the unified federal budget. As expressed by some commentators, the growth of entitlements could potentially impact other budgetary items and ultimately harm national security and the overall economy.²⁶ The sustainability of these programs is consistently measured in a traditional way, projecting benefit costs and allocating spending. If necessary, Congress will make

As sustainability is threatened by market forces rather than federal budget limitations, the need for Actuarial Values is more acute.

adjustments, sometimes crowding out other important items in the federal budget.

The ACA subsidies need to be evaluated through a different framework. As sustainability is threatened by market forces rather than federal budget limitations, the need for Actuarial Values is more acute. We must appreciate the various incentives for buyers and sellers in the market to understand the long-term sustainability equation. It is important to note that these incentives reach beyond the individual health care market; they impact the labor market and the overall economy. Employers now have new considerations when hiring workers, setting work hours or providing health benefits, and employees have new incentives to seek more work or different work, reduce their work hours, or retire earlier. The high level of health care costs and the disparate subsidies available through the ACA create various incentives that may have long-term implications on the demographics of the labor market,²⁷ which, consequently, will impact the demographics and, potentially, the sustainability of the individual health market.

Actuaries have a strong history of identifying unsustainable models and offering their honest assessments. We do not have to look far for a classic example; a part of the ACA known as the Community Living Assistance Service and Supports Act created a voluntary long-term care program. Due to potential adverse selection and little government support, the actuarial community quickly deemed the program unworkable; it was repealed in 2013. The initial ACA impact to the individual health market has been more nuanced, although that did little to deter early strong conclusions.

We are now at a critical juncture on the ACA timeline, developing pricing assumptions (at the time this article was written) from transitional experience for the 2017 rating period, the year after which two of the initial risk buffers sunset. There is much at stake, and it is imperative for actuaries to boldly offer our objective approach. Our technical skills, experience, and deep knowledge of the regulatory details equip us to submit expert opinions.²⁸

The implications of this law are complicated and require a comprehensive appreciation of incentives for health plans, employers, employees and individuals. The majority of comments that have reached a general audience are not from objective

sources and have obfuscated public understanding; in fact, it was the repeated misperceptions of the legislative impact that initially piqued my interest in writing about the program details. More than other entitlement programs, measuring the sustainability of the ACA is within the actuarial domain. I will continue to advocate for the objective voices of health actuaries to be recognized as trusted experts. I hope you will join me in this endeavor. ■

Author's Note: The views expressed herein are those of the author alone and reflect current information as of May 2016. They do not represent the views of the Society of Actuaries, Axene Health Partners, LLC or its consultants, or any other body.

A thorough examination of the technical components discussed in this article, along with some suggestions on how actuaries can contribute to the public good by correcting simplified explanations and common misconceptions, was published in the May 2014 edition of Health Watch.²⁹



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ENDNOTES

- ¹ "Actuarial Values" – <https://www.soa.org/Library/Newsletters/In-Public-Interest/2013/january/ipi-2013-iss7.pdf> January 2013.
- ² "Temporary Risk Corridors" provide a symmetric sharing of gains and losses from 2014 to 2016. "Transitional Reinsurance" provides specific stop-loss protection against high claims in the individual market from 2014 to 2016. Each of these programs were intended to encourage carrier participation and stabilize premiums in the early years of the new market.
- ³ "The Individual Market and ACA Products: Starting from First Actuarial Principles" – <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> The ACA@5 – August 2015
- ⁴ <http://money.cnn.com/2016/03/30/news/economy/obamacare-patients-blue-cross-blue-shield/index.html>
- ⁵ <http://www.modernhealthcare.com/article/20151001/NEWS/151009996>
- ⁶ In federal budget discussions, spending on public assistance and social insurance programs is collectively referred to as entitlement spending, or entitlements. An entitlement benefit suggests a legislated or established right. Entitlement benefits are, in a sense, legally predetermined and outside of the annual Congressional appropriation process, which is often called discretionary spending.
- ⁷ For purposes of this article, "middle-income" is loosely defined as above the Federal Poverty Level, not eligible for Medicaid, and below 400% of the Federal Poverty Level.
- ⁸ "Implications of Individual Subsidies in the Affordable Care Act—What Stakeholders Need to Understand" <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> May 2014
- ⁹ <http://www.usnews.com/opinion/articles/2012/12/19/the-shocking-truth-on-entitlements>
- ¹⁰ The US House of Representatives has filed suit against the Obama administration alleging that payment of the cost sharing assistance was not authorized. A federal judge ruled in favor of the House but stayed the ruling. As of May 2016, the cost sharing subsidies continue to be paid pending appeal. <http://www.politico.com/story/2016/05/house-gop-wins-obamacare-lawsuit-223121>
- ¹¹ "The True Cost of Coverage" – <http://theactuarymagazine.org/the-true-cost-of-coverage/>
- ¹² "Implications of Individual Subsidies in the Affordable Care Act—What Stakeholders Need to Understand" – <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> May 2014
- ¹³ 2016 enrollment is roughly half of initial expectations. http://www.cbo.gov/sites/default/files/cbofiles/attachments/45231-ACA_Estimates.pdf
- ¹⁴ <http://www.courant.com/business/connecticut-insurance/hc-blumenthal-united-health-affordable-care-act-1216-20151215-story.html>
- ¹⁵ Entitlement legislation is not necessarily an easy process, but getting lawmakers to spend taxpayer money is easier than getting taxpayers to spend their own, particularly if they don't view the product as a good value. There is unanimous recognition that individual market sustainability requires continuous enrollment of young and healthy beneficiaries; hence, the strong promotion and frequent analysis of the market demographics.
- ¹⁶ There is still value in communicating benefit options to all eligible beneficiaries. Medicaid actuaries will point out the 'woodwork' effect; some populations are difficult to reach, and not everyone signs up automatically for benefits even if costs are minimal.
- ¹⁷ "Section 1332 Waivers. Coming Soon to a State Near You?" <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> May 2016
- ¹⁸ <https://soa.org/Professional-Development/Event-Calendar/Podcasts/Health-Section.aspx#ep24> – Episode 14
- ¹⁹ <http://www.aei.org/publication/the-aca-and-its-employment-effects/>
- ²⁰ Actuarial Standard of Practice 12, 3.2.1 http://actuarialstandardsboard.org/wp-content/uploads/2014/07/asop012_101.pdf
- ²¹ Revenue includes the positive or negative adjustment from the risk adjustment process which is a premium redistribution among health plans. The transfer payment amount depends on the demographic and health status makeup of the market is not known until the middle of the next year. For example, health plans develop 2017 rates in early 2016 based on 2015 experience with knowledge of the 2014 risk adjustment settlements.
- ²² <http://www.forbes.com/sites/merrillmatthews/2014/09/30/medicares-former-chief-actuary-speaks-out-about-its-challenges/#40d795a4507f>
- ²³ http://actuary.org/files/Key_Ethical_Concerns_Facing_the_Actuarial_Profession.pdf
- ²⁴ "A Regulatory Perspective on Rate Review Before and After the Affordable Care Act" – <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> The ACA@5 – August 2015
- ²⁵ As discussed throughout this article, long-term market stabilization is not a guarantee. An optimistic viewpoint is that pricing an unknown market in 2014 was difficult, but that a few years of experience to review and price corrections will lead us to a stable marketplace. A less optimistic viewpoint is that legislative or regulatory corrections will be required to facilitate long-term stability in this market.
- ²⁶ <http://www.usnews.com/opinion/articles/2012/12/19/the-shocking-truth-on-entitlements>
- ²⁷ <https://soa.org/Professional-Development/Event-Calendar/Podcasts/Health-Section.aspx#ep24> – Episode 14
- ²⁸ "The Truth-Seeking Debate" – <https://soa.org/Library/Newsletters/The-Actuary-Magazine/2015/june/act-2015-vol12-iss3-tofc.aspx>
- ²⁹ "Implications of Individual Subsidies in the Affordable Care Act—What Stakeholders Need to Understand" – <https://soa.org/news-and-publications/newsletters/health/pub-health-section-newsletters-details.aspx> May 2014

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How Big A Burden Are State and Local OPEB Benefits?

By Alicia H. Munnell, Jean-Pierre Aubry, and Caroline V. Crawford

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INTRODUCTION

In addition to pensions, most state and local governments provide other post-employment benefits (OPEBs), the largest of which is retiree health insurance. Retiree health plans have received increased attention in recent years due to rapidly rising health costs and new reporting guidelines from the Governmental Accounting Standards Board (GASB). These guidelines, which were released in 2004 and became effective in 2007, require states and localities to change the way they account for the cost of retiree health plans from a cash to an accrual basis, essentially applying to OPEB plans the standards used for pensions.

This *brief* provides an updated accounting of OPEB commitments, with data for 2012 or 2013. These data cover virtually all OPEB plans administered at the state level as well as a large sam-

Figure 1: Percentage of Large Private Firms and State Employers Offering Retiree Health Benefits to Active Workers, 1988-2013



Note: Large firms are those with 200 or more workers.
Source: McArdle, Neuman, and Huang (2014).

ple of plans administered by counties, cities, and school districts. The analysis also looks beyond the sample of local governments to estimate aggregate OPEB liabilities for all local governments excluded from our sample.

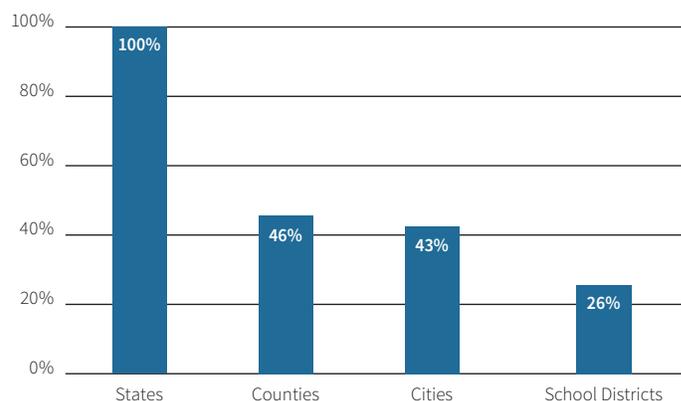
The discussion proceeds as follows. The first section describes the evolution of the new reporting framework. The second section discusses the OPEB sample and introduces our methodology for capturing OPEB liabilities for entities not in our sample. The third section compares OPEB and pension liabilities in the aggregate and discusses the need to use the same discount rate when comparing these liabilities. The fourth section puts the OPEB liabilities in perspective. The final section concludes that: 1) aggregate unfunded OPEB liabilities are estimated to be \$862 billion – nearly two thirds of which is held at the local level; 2) these liabilities are equivalent to 28 percent of unfunded pension liabilities – when pension liabilities are calculated with an interest rate comparable to OPEBs; and 3) while OPEB liabilities are large, several factors limit their potential drain on state and local resources.

THE ACCOUNTING ENVIRONMENT

GASB Statement No. 45, *Accounting and Financial Reporting by Employers for Post-employment Benefits Other Than Pensions*, represented a significant change in governmental accounting and financial reporting.¹ Historically, states and localities offering retiree health insurance and other benefits financed them on a pay-as-you-go basis and reported the annual benefit payment as an expense.² That changed with GASB 45, which essentially applied pension accounting standards to OPEBs.

Specifically, public sector employers must regularly report for their retiree health plans the actuarial accrued liability, the actu-

Figure 2: Percentage of State, County, Local, and School District Payrolls Covered by Sample, 2012



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

ered by a state plan, the liability of all local entities is already accounted for in state plan liabilities. Second, the adjustment for excluded school districts adds very little to Utah’s overall OPEB liability. The reason is that school districts in our sample provide relatively little OPEB benefits, so the adjustment is made on a small base.⁷

AN ANALYSIS OF OPEB LIABILITIES (AND A COMPARISON TO PENSIONS)

The OPEB data collected for each plan include liabilities, assets, and the discount rate (see Table 2). While the following discussion focuses on the results for the whole sample, a separate Appendix provides data for each state and local plan.⁸ The analysis also allocates the liabilities of cost-sharing state plans to participating localities based on the methodology described in GASB 75.⁹ The total reported OPEB liabilities in our sample are \$702 billion. In comparison, because most plans are financed on a pay-as-you-go basis, the assets are a miniscule \$50 billion. Thus, the total unfunded liability that appears in the actuarial reports of plans in our sample is \$653 billion.

However, as noted above, many of the excluded localities are not covered by a state OPEB plan. Adding estimates of the assets and liabilities associated with these excluded jurisdictions (based

Table 1. State and Local OPEB Liabilities for the State of Utah, Millions of Dollars, 2013

Government entity	Annual payroll	OPEB liability
State	\$2,498	\$387
Counties	474	
CRR sample – Salt Lake County	213	99
Excluded Census counties	261	<i>121</i>
Cities	918	
CRR sample – Salt Lake & West Valley	191	113
Excluded Census cities	727	<i>430</i>
School districts	1,921	
CRR sample – Salt Lake & West Valley	341	8
Excluded Census school districts	1,580	<i>37</i>
Total in CRR sample	3,234	607
Total in CRR sample + excluded entities	5,812	1,196

Note: Numbers in italics are estimates.

Sources: U.S. Census Bureau (2012); Salt Lake City and West Valley City CAFRs; Utah state OPEB actuarial valuations; and authors’ estimates.

on the ratio of payrolls as described above) increases the total OPEB unfunded liability by \$209 billion, producing a total of \$862 billion (see Figure 4).

The results also show that, after the adjustment for excluded entities, counties are responsible for \$141 billion, cities are responsible for \$259 billion, and school districts for \$138 billion. Combined, local governments are responsible for nearly two thirds of unfunded OPEB liabilities.

The central question is how big a problem retiree health insurance is for state and local governments. One metric is to compare the unfunded liabilities of the health plans with those of pension plans. Any exercise comparing the size of pension and OPEB liabilities requires using the same discount rate for both.¹⁰ The discount rates used by pensions and OPEB plans are often very different – typically 7.75 percent for pensions and 4.80 percent for OPEB plans since retiree health benefits are usually not funded. Our comparison relies on the OPEB discount rate, so pension liabilities are adjusted using this rate.¹¹ Dividing the \$653 billion of unfunded liabilities of retiree health plans in our sample by the re-discounted unfunded liabilities of pensions shows that retiree health is equivalent to 21 percent of pensions (see Figure 5). On the other hand, adding the excluded localities – which increases OPEB, but not pension, liabilities – raises the ratio to 28 percent.

RETIREE HEALTH COSTS IN PERSPECTIVE

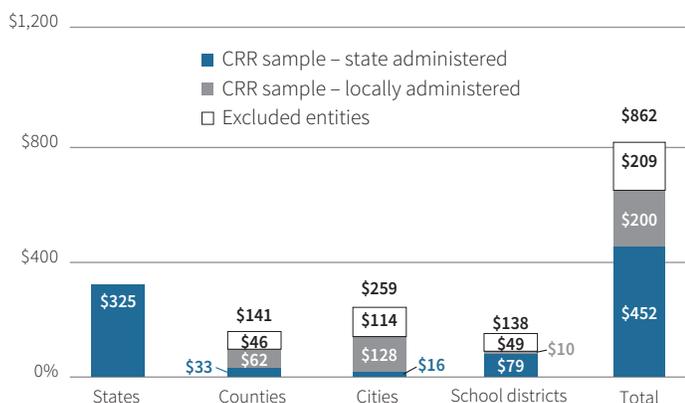
Although the unfunded liabilities associated with retiree health insurance are much larger than generally perceived, several factors should make them less worrisome than those associated with pensions.¹² These include manual levers, such as greater flexibility in adjusting benefits and increasing retirement ages, as well as market factors such as the recent decline in health care cost inflation. In addition, the notion that sponsors should be amortizing existing unfunded liabilities could use some additional thought.

Table 2. CRR Sample of 2013 OPEB Data by Level of Government, Billions of Dollars

State/local plan	Liabilities	Assets	Unfunded liability	Avg. disc. rate
Total	\$702.3	\$49.5	\$652.8	4.8%
States	332.9	8.2	324.7	4.7%
Counties	105.5	10.6	95.0	4.9%
Cities	167.6	22.8	144.8	5.6%
School	96.2	7.9	88.3	4.9%

Source: Authors’ calculations based on various CAFRs and OPEB actuarial valuations.

Figure 4: Total State and Local Unfunded OPEB Liabilities, Billions of Dollars



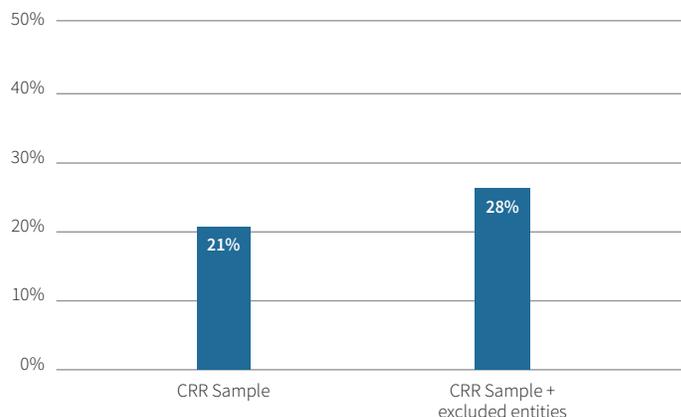
Note: Some components do not add to totals due to rounding. Sources: Authors' calculations based on U.S. Census Bureau (2012); various CAFRs; and OPEB actuarial valuations.

States and localities have some freedom to reduce their commitment to retiree health insurance, at least for new employees, and, indeed, have a rationale for doing so.¹³ Many sponsors contend that the level of retiree health benefits, like pension benefits, should be based on how long the employee worked, instead of providing the same retiree health benefits regardless of years of service. As a result, a large number of states have delinked retirement and health benefits by either having different vesting rules for cash benefits and retiree health insurance benefits and/or pro-rating the contribution that they make towards retiree health benefits based on years of service. For example, some states pay 25 percent of the subsidy for people with 10 years of service and 100 percent for people with 25 years of service, with a sliding scale in between.

In addition to limiting who gets full retiree health care benefits, sponsors have taken a number of steps to limit costs. The most straightforward is to boost deductibles and co-pays and, most importantly, increase the share of the premium paid by the employee. Sponsors were shifting costs to employees even before GASB 45, so the pace is incremental.¹⁴ State and local governments have also reduced their costs through wellness programs, such as annual physical exams, individual counseling, seminars, weight loss and exercise clinics, smoking cessation programs, and gatekeeping efforts.¹⁵

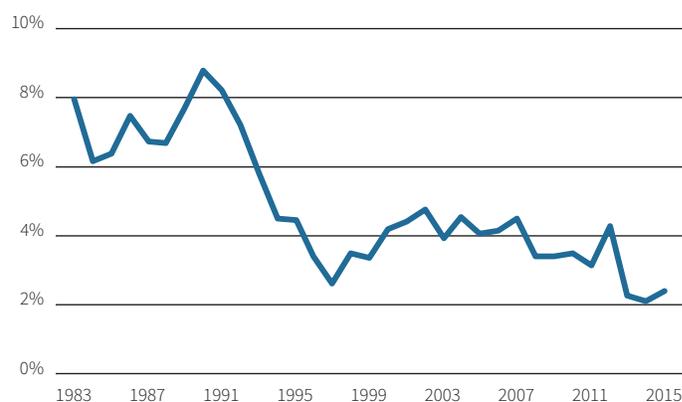
Another positive consideration is the fact that the really expensive component of retiree health insurance – coverage for those under 65 – may decline as sponsors increase retirement ages as part of their pension reforms. For participants over 65, plan sponsors usually require participants to sign up for Medicare, so the public plans simply provide supplementary benefits. In a recent survey of plan changes, 24 out of 32 state plans had

Figure 5: Unfunded OPEB Liabilities as a Percentage of Unfunded Pension Liabilities, Using a 4.8-Percent Discount Rate



Source: Authors' calculations based on U.S. Census Bureau (2012); various CAFRs, OPEB actuarial valuations; and Munnell and Aubry (2015).

Figure 6: Annual Growth in Medical Care Component of CPI-W, 1983-2015



Source: U.S. Bureau of Labor Statistics, CPI-W (2015).

increased their full retirement ages, which means that more retirees will be eligible for Medicare right away.¹⁶

The future burden depends crucially on the cost of health care. The good news is that health care costs have been increasing at a much slower pace than in the past (see Figure 6). At this time, the assumed long-run increase in health costs – roughly 5 percent – used in the actuarial valuations exceeds the annual growth in the Medical Care Component of the Consumer Price Index (CPI). Every 1-percentage-point reduction in the health care cost rate reduces the retiree health liability by about 15 percent.¹⁷

The final issue is the question of funding. States and localities are criticized for not having prefunded their OPEB plans.

... unfunded OPEB benefits are equivalent to 28 percent of unfunded pension benefits – when pension benefits are calculated with an interest rate comparable to OPEBs.

In fact, as discussed, accrual accounting and prefunding were not an issue before the release of GASB 45 in 2004, and private sector firms still do not prefund.¹⁸ Prefunding involves two components: putting aside money to fund future benefits earned each year (the normal cost) and paying off the unfunded liability. In the public sector, it makes good sense on equity grounds to both account for and pre-fund accruing benefits so that the people enjoying the services pay for the full cost of those services. But this principle may be less relevant to funding legacy costs – benefits earned before the recent switch to prefunding. Current taxpayers did not enjoy the services associated with these costs, so they should not bear the full burden. Thus, for these legacy benefits, some governments may choose to continue to pay the bills as they come due. One could argue that plan sponsors who set up a trust and contribute their normal cost (in addition to paying off legacy benefits on a pay-go basis) are properly funding accruing benefits and, for those benefits, should be able to use the expected long-term return as the discount rate.

CONCLUSION

Retiree health plans for state and local workers have been generating increased attention in recent years due to new GASB reporting guidelines, an aging population, and rising health costs. Our analysis of this issue provides a comprehensive estimate of OPEBs with the latest available data. The key takeaways are as follows. First, total unfunded OPEB liabilities are estimated to be \$862 billion, nearly two thirds of which is held at the local level. Second, unfunded OPEB benefits are equivalent to 28 percent of unfunded pension benefits – when pension benefits are calculated with an interest rate comparable to OPEBs. And, finally, while OPEB liabilities are large, several factors limit their potential drain on state and local resources. ■

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The authors wish to thank David Blitzstein, Keith Brainard, Alex Brown, Robert Clark, Joshua Franzel, and Steven Kreisberg for helpful comments.

ENDNOTES

- ¹ Implementation of GASB 45 was phased in over a three-year period, with the largest governments – those with total annual revenues of \$100 million or more – required to report their liabilities in their FY2008 financial statements; see U.S. Government Accountability Office (2009). Also relevant is GASB 43, *Financial Reporting for Postemployment Benefit Plans Other Than Pensions*, which was released shortly before GASB 45.
- ² OPEB costs also include dental, vision, life insurance, disability, and long-term care, but retiree health insurance is the largest component.
- ³ Like GASB 67 and 68 have already done for pensions, GASB 74 and 75 will introduce a blended discount rate and require unfunded liabilities to be reported on the plan sponsor's balance sheet for OPEBs.
- ⁴ Technically, setting up a trust is sufficient for the use of a higher discount rate under GASB 45. However, the use of the more favorable rate only applies to the extent that accumulated resources are estimated to be sufficient to fund required payments.
- ⁵ Amir and Ziv (1997).
- ⁶ Prior research explored retiree health for teachers at the state level only (Clark 2010).
- ⁷ In many jurisdictions, retired teachers often receive an implicit subsidy in that they can participate in the pool for active employees, but school districts make no explicit contributions towards retiree health insurance.
- ⁸ The separate appendix is available at: http://crr.bc.edu/wp-content/uploads/2016/02/SLP48_Appendix.xlsx
- ⁹ For further discussion of the method for apportioning liabilities, see Munnell and Aubry (2016).
- ¹⁰ The discount rate used for valuing future benefits does not dictate how benefits should be funded (i.e. actuarial costs). It values the retirement benefit based on the riskiness of the future benefit being provided. For the purposes of this *brief*, the lower discount rate used by OPEB plans better reflects the security of the promises made for both retiree health and pension benefits. For a discussion on valuing liabilities, see Munnell et al. (2010).
- ¹¹ We revalue liabilities by applying a rule-of-thumb commonly used by actuaries that a 1-percentage-point change in the interest rate tends to yield a 12-15 percent change in accrued liabilities.
- ¹² For further discussion, see Kearney et al. (2009) and Clark (2009).
- ¹³ As opposed to pension plans that have constitutional provisions securing benefit commitments, OPEB plans generally do not have the same type of explicit protections; see Daley and Cogburn (2008) and U.S. Government Accountability Office (2007).
- ¹⁴ Kearney et al. (2009).
- ¹⁵ See Kellar et al. (2014).
- ¹⁶ See Munnell et al. (2013).
- ¹⁷ See Keating and Berman (2007) and U.S. Government Accountability Office (2009).
- ¹⁸ The incentive to prefund OPEB benefits in the private sector is dampened by the few tax-favored funding options available to most firms. While non-profits are able to set up trusts that allow meaningful tax-preferred contributions, most private sector firms are legally constrained to trusts that restrict the level of tax-preferred contributions to insignificant amounts.



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Section Research Update: Other Postemployment Benefits

By Steven D. Bryson

The Social Insurance and Public Finance Section (SI&PF) is currently undertaking a research project regarding the financial health of public sector retiree health systems, also known as “Other Postemployment Benefits,” or “OPEB.” The intended goal of the research is to determine the extent to which OPEB plans in the U.S. are being funded, assess how the funded status of these plans is affected by legal and accounting

requirements, identify the forces that drive unfunded liabilities, and identify the stakeholders who are thereby affected.

As this is being written, the Society of Actuaries research staff and the Project Oversight Group are evaluating competing proposals from potential researchers. By the time these words have been published, we expect that the research will be in full swing. ■



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Let's Talk: Interview with an Actuary in the Public Interest

Questions: Jeffery M. Rykhus

Responses: Derek Osborne

WHAT IS YOUR EDUCATIONAL BACKGROUND?

I went to high school in Montserrat (a small island in the Caribbean which has an active volcano and only 5,000 residents) and to college at the University of Waterloo. I received my FSA in 1999.

WHAT IS YOUR PROFESSIONAL BACKGROUND?

I spent two years with an insurance company in Trinidad, and 18 years with the National Insurance Board (social security) in The Bahamas. During this period I had a brief attachment at the Office of the Chief Actuary (Canada) and multiple actuarial and training engagements with the International Labour Organisation and International Social Security Association. I spent five years leading my own consulting firm and have now spent two years with Morneau Shepell in its recently established Bahamas office.

I served on the Council of the Caribbean Actuarial Association (CAA) for 12 years and was president from 2005 to 2007. I continue to serve on a CAA practice standard setting committee.

CAN YOU SAY MORE ABOUT WHAT YOU ARE DOING TODAY?

I recently joined a private sector Canadian benefits consulting firm (Morneau Shepell). Ninety-five percent of my work is still public sector related—social security systems, government (unfunded) pension plans and funded pension plans for quasi-public sector institutions in the Caribbean.

ARE THERE ANY BROAD GOALS THAT UNDERLIE YOUR ACTIVITIES?

Yes, to educate and inform decision makers and the general public, while promoting proactive reforms where necessary and good governance practices.

- Most governments in the Caribbean do not know the long-term cost of their unfunded civil service pensions.
- Most social security systems suffer from excessive political interference and have few, if any, documented good governance guidelines.

- Public sector institutions are highly resistant to changing the ways they operate, and major policy changes take years to be enacted.

CAN YOU DESCRIBE YOUR STYLE OF WORKING?

Reports and presentations should educate instead of intimidate, language should be simple, not perplexing, and charts should almost always be used instead of tables and numbers. Key decision makers seldom read the entire report; therefore, the executive summary must include all key highlights and necessary takeaways.

HAVE YOU SERVED ON ANY GOVERNMENT ADVISORY COMMITTEES?

I have served in a technical advisory capacity on several government advisory committees dealing with social security reform and the introduction of national health insurance.

IS THERE A SPECIFIC ISSUE YOU WOULD LIKE TO FOCUS ON?

Good governance. The Caribbean has a history of weak governance practices in the public sector. Social security and pensions involve long-term promises and large funds. Politicians typically have short-term planning horizons and wish to spend available funds. In a region where saving rates are low and the majority of workers do not participate in employer-linked private pension plans, national pensions are and will be critical to survival in old age. Therefore, ensuring that Caribbean social security and public pension systems are well-designed, well-administered and well-governed has been at the core of all my work in the public sector.

WHAT PREPARED YOU MOST FOR YOUR PROFESSIONAL ROLE?

I grew up in a family business, actively contributing and working where possible. My parents were very active in various public service organizations and promoted high levels of integrity both at home and in the organizations they supported.

I worked first as an employee in a private insurance company and then in a public sector environment, eventually becoming an advisor to senior government officials. I then led my own small consulting firm. I have, therefore, had the advantage of seeing things from multiple sides, which has allowed me to incorporate various perspectives into the advice that I provide.



Don't be intimidated by senior public officials. Respect is gained when you consistently give impartial and professional advice.

WHAT HAS BEEN IMPORTANT IN HELPING YOU FOCUS ON THE PUBLIC INTEREST?

The need for far-reaching change and new ways of doing things in the Caribbean. The influence that I can bring to important public sector institutions can significantly affect the lives of individuals in vulnerable groups.

WHAT PROFESSIONAL ACCOMPLISHMENT ARE YOU MOST PROUD OF?

Preparing an extensive research document on the State of Social Security in the English Speaking Caribbean that was eventually published and used in university courses. It is still used more than 10 years later.

In the mid 1990s the SOA provided a career planning tool for future actuaries. I fully embraced that tool. The goal that I set for myself back then was to become the premier social security actuary in the Caribbean. I have been told by some that I have achieved that goal.

ARE THERE ANY OTHER ACTUARIES THAT WORK DIRECTLY IN THE PUBLIC INTEREST THAT YOU ADMIRE?

Professor Rob Brown. He was one of my professors at the University of Waterloo, teaching what turned out to be my favorite course—demography. He has written many practical and enlightening papers on social security and public pensions, and I have had the pleasure of presenting with him at several actuarial conferences. I share his passion for sound decision making in the area of public pensions and the need for honest and responsible governance at all levels.

WHAT ARE SOME WAYS YOU HAVE BEEN ABLE TO STAND UP FOR THE PUBLIC INTEREST?

Doing whatever is necessary to ensure that reports that should be laid in parliament (made public) are so laid and shared with the general population. (Quite often, governments postpone laying reports, when they consider the findings unfavorable.)

- Highlighting poor governance practices where they exist.
- Holding my ground (in a public forum) when a government minister suggested ways of selecting board members that were contrary to legislation.

WHAT WAS YOUR MOST REWARDING JOB?

No single job clearly stands out as being “most” rewarding. However, helping to enact reforms which bring about material positive effects, especially when there was extreme resistance at the outset, is always rewarding. Being able to initiate and advise on several important reforms in Montserrat, the island of my birth in which I no longer reside, is at the top of that list, though!!

DO YOU HAVE ANY THOUGHTS TO SHARE WITH CURRENT AND FUTURE ACTUARIES WORKING IN PROFESSIONAL ROLES HAVING A DIRECT IMPACT ON THE PUBLIC?

Don't be intimidated by senior public officials. Respect is gained when you consistently give impartial and professional advice, regardless of who the senior official is and/or the government that is currently in power.

Even when most things may be positive, do not shy away from highlighting any negatives or early warning signals that could indicate trouble ahead. If something goes wrong 20 years after your report is written, those affected and those then in authority won't ask who the government minister or CEO was at the time, they will instead likely ask, “What did the actuary say?”

Be open to different approaches and systems from countries both large and small. Good policy ideas can come from anywhere.

Believe in, and love, what you do! ■



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Living to 100 Section: Socio-Economic Mortality Differentials: An International Perspective

By Kai Kaufhold

“In the midst of life we are in the midst of death, a truer word was never said.”

Thornton Wilder: *The Skin of Our Teeth*, a Play.

As much as we actuaries work with mortality rates in our daily business, calculating probabilities of survivorship and actuarial present values of benefits, it never ceases to baffle me just how little we really know about the drivers of mortality. What do we really know about the ultimate causes of why different groups within society have such varying mortality rates?

Health inequalities by socio-economic status have been the subject of intense study in recent years. In 2005, the World Health Organization launched the Commission on Social Determinants of Health, which produced its report “Closing the Gap in a Generation” in 2008. Since then, similar initiatives have been undertaken at the national level (Strategic Review of Health Inequalities in England post 2010¹) and Europe-wide (European Review of Social Determinants of Health and the Health Divide for WHO Euro). Premature death and higher prevalence of illness in lower socio-economic groups have been linked to a number of different drivers of mortality and morbidity, such as limited access to health care, less awareness of healthy behaviors and healthy nutrition, and the individuals’ disadvantaged living and working conditions. These factors in turn are closely correlated with the level of education, the wealth of an individual and the person’s social context.

The socio-economic differences between different parts of the general population are commonly accepted as the reason why mortality of insured lives observed within the insurance industry is lower, on average, than the mortality of the general population. In a recent study,² Louis Adam of Université Laval in Canada showed the difference between general population mortality, the mortality rates in Canadian social security pensions (Canada Pension Plan and Québec Pension Plan), and defined-benefit (DB) pension plan mortality. However, the differences do not stop there: within DB pension plans there is a difference between public sector plans and pension plans spon-

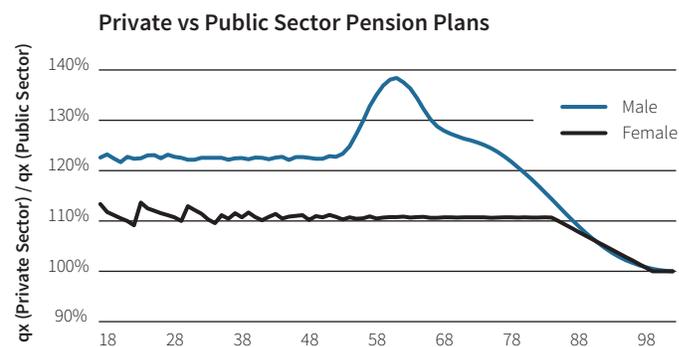
sored by private companies, as shown in Figure 1. At retirement age, male mortality within private sector pension plans is up to 38 percent higher than mortality for male pensioners within the public sector. We can only surmise that the socio-economic cross-section of government employees must be different from the composition of the private sector workforce, leading to this significant difference in mortality experience.

Within any single DB pension plan, we also commonly observe a disparity of mortality rates which corresponds to the different socio-economic levels of the different employee groups. Figure 2 shows the ratio between the observed number of deaths and the expected deaths calculated from a simple age-gender model and shown across pension size, for a group of U.K. pensioners. The group comprising the 5 percent of pensioners with the largest pension amounts has only 60 percent of the mortality of all other pensioners. This is, in itself, already remarkable, but becomes all the more relevant when we consider that this group represents more than 40 percent of the total annual pension benefits.

Such a concentration of benefits within a small group presents a two-fold challenge for the actuarial practitioner. For one thing, the group with the largest financial impact also has the longest survivorship, which is a strain on the funding of the pension plan. In addition, this particular group with a disproportionate share of benefits is relatively small with little experience data. Therefore, sophisticated modeling techniques are needed to properly estimate the mortality assumptions and measure the estimation error at the same time.

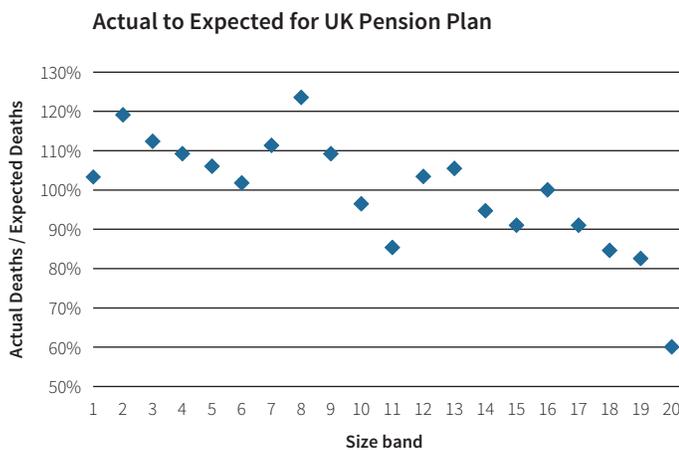
One would be forgiven for thinking that such inequality is specific to certain industries, such as manufacturers or mining companies, where there is a large disparity between the majority of workers and a small number of managers. However, we observe

Figure 1: Comparison of mortality for private sector and public sector pension plans in Canada.



Source: Canadian Institute of Actuaries, Canadian Pensioners’ Mortality Report, February 2014, Document 214013t1e-1.

Figure 2: Mortality of a typical UK Pension Scheme.



Source: Sample data from longevity.co.uk representing a typical U.K. pension scheme, generated using a model fitted to U.K. pensioner data. Expected deaths are calculated using a Makeham-Perks model fitted with age and gender as the only risk factors. The size bands are created by sorting the pensioners by annual pension amount and subdividing them into 20 quantiles.

such socio-economic differences in mortality even within relatively homogenous groups. Consider a German public sector pension scheme, for example, which we studied in 2013.³ The top 5 percent of pensioners by annual pension amount received around 16 percent of the total benefits, which indicates a lower degree of disparity than in the previous example from the U.K. Nevertheless, this select group displayed mortality rates more than 25 percent lower than the pensioners within the bottom 85 percent of pension amounts. So, even despite being a relatively homogenous group (public sector pensioners) in Germany, a country that prides itself in being egalitarian, there were mortality differentials that had a substantial impact on the overall level of pension liabilities.

Taking this result one step further, we analyzed the mortality of a group of pensioners who one might assume not only to be homogenous with respect to mortality, but also who would be expected to have equal access to excellent health care options: retired medical doctors. In Germany, there are separate mandatory pension plans for certain professions, such as doctors, architects, lawyers or chartered accountants. Since all members of such a pension plan have the same level of education and belong to the same broad socio-economic class, we would expect that their mortality rates would be relatively homogenous, too. Nevertheless, we were able to observe a mortality differential of up to 20 percent between the average and those retired doctors who receive the largest 5 percent of annual pensions. Such a differential can neither be explained by different levels of education nor by the “poorer” doctors not being able to afford proper

health care. It only goes to show that we still do not completely understand the drivers of mortality. Might it simply be that the most successful doctors also are the longest lived, or could it be that those doctors who are aware of their good health have an incentive to make higher contributions to the pension plan? Another possible explanation is that doctors who have longer careers and accumulate greater benefits over a longer period of time tend to be healthier. It is also possible that pension size just happens to be correlated with a different driver of mortality, such as the year-of-birth cohort. Maybe the cohorts of doctors who were able to make the greatest contributions to their pension plans just happen to belong to the year-of-birth cohort with the greatest mortality improvements.⁴ The investigation is still ongoing on this last project, as it is on many different projects which intend to improve our understanding of the drivers of mortality and socio-economic mortality differentials.

Beyond these practical challenges, the wider implications of this phenomenon are perhaps even more important. The fact that wealthier people with a greater share of the pension pot also live longer raises questions of social injustice. A number of countries are already actively considering changes to their social security systems to differentiate retirement age across different groups, giving those individuals with shorter than average life expectancy the chance to retire early and, at the same time, delaying retirement for the higher socio-economic groups. Many questions remain about socio-economic mortality, drivers of mortality and modeling of future mortality. The upcoming Living to 100 Symposium to be held Jan. 4–6, 2017, in Orlando, Fla., will allow you to explore these topic areas and many more. Researchers from different countries will present their findings on trends in death by cause, the drivers of mortality, future mortality trends and socio-economic differences in mortality, and leaders in the biology of aging will present their perspective on the latest research on how to extend the number of healthy years of life. Since 2002, the Living to 100 Symposium has been held every three years, giving researchers the opportunity to present current findings and discuss them with practitioners from the insurance indus-

Socio-economic differences pose a challenge to the actuarial practitioner: The lives with the largest pension benefits and thus the largest financial impact also have the longest survivorship. ...

try and other stakeholders. Enhance your knowledge and join us in learning more about mortality and how to avoid it at the Living to 100 symposium!⁵

You can also find monographs of past symposia with contributions from leading experts in demography, biology, medicine and actuarial science at the Living to 100 website, LivingTo100.soa.org. ■



Kai Kaufhold is managing director of Ad Res, an actuarial consulting firm in Cologne, Germany. He is a member of the organizing committee of the Living to 100 Symposium. As a former life reinsurer, he has been studying longevity and mortality risk for more than two decades.

ENDNOTES

- ¹ The Marmot Review: Fair Society, Healthy Lives. <http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review>
- ² Canadian Institute of Actuaries: Final Report – Canadian Pensioners' Mortality, Pension Experience Subcommittee-Research Committee, February 2014.
- ³ Richards, S.J., K. Kaufhold and S. Rosenbusch (2013) Creating portfolio-specific mortality tables: a case study. *European Actuarial Journal*, 2(3), 295-319.
- ⁴ While the cohort effect is not quite as pronounced in Germany as it is in the U.K., it is nevertheless present in general population mortality experience. On the cohort effect see:
- Willets, R.C., A.P. Gallop, P.A. Leandro, J.L.C. Lu, A.S. Macdonald, K.A. Miller, S.J. Richards, N. Robjohns, J.P. Ryan and H.W. Waters, (2004) Longevity in the 21st Century, *British Actuarial Journal* 10, IV, 695 – 898.
- Richards, S.J., J.G. Kirkby, and I.D. Currie (2005). The importance of year of birth in two-dimensional mortality patterns. *British Actuarial Journal* 12, I, 5-61
- ⁵ Registration will soon be available at LivingTo100.soa.org.

Understanding the Argument for Market Valuation of Public Pension Liabilities

By Kent Smetters and Andrew G. Biggs

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Most public-sector employees participate in traditional defined-benefit pension plans, which promise them a fixed monthly retirement benefit for life. These benefits are generally calculated as some percentage of the employee's final salary multiplied by the number of years of employment. Defined-benefit pension plans differ from defined-contribution ones such as 401(k) and 403(b) plans that are common in the private sector, in which the employer contributes to the employee's investment account each year but makes no promises regarding the actual benefit the employee will receive at retirement.

Accounting for the finances of defined-benefit pension plans requires comparing the assets the plan holds today with a stream of benefits that can extend decades into the future. Making such comparisons requires "discounting" future benefit liabilities to the present, a process that subtracts annual interest from the future dollar amount until a "present value" is determined. The policy debate regards the appropriate discount rate to utilize in making such calculations. A higher discount rate will reduce the present value of plan liabilities and, all other things equal, portray a plan as being better funded. Likewise, lower discount rates generate higher measured liabilities and lower levels of plan funding.

Determining the appropriate discount rate to use is a function of the goals of pension policy as a whole. Pension accounting and funding rules should be designed to help plan stakeholders better achieve their policy goals. These stakeholders can include pension managers, elected officials, public employees and retirees, holders of state and municipal bonds, and taxpayers, all both present and future. In the public pensions accounting debate, however, these policy goals are often left unstated. Making these goals explicit illustrates the deficiencies in the current pension accounting rules and points the way toward better methods.

The goals of pension plan stakeholders constitute what economists refer to as an "objective function." The pensions literature

indicates that two goals are widely shared across most public pension plans. First, in a defined-benefit pension plan, the benefits retirees and other beneficiaries receive should be free of risk. Unlike defined-contribution plans, for which value changes from day to day with returns in the market, defined-benefit plans are intended to be guaranteed. This goal is embraced at many levels, from the design of benefit formulas, to communications with public employees, to laws and constitutional provisions that protect accrued pension benefits.

Second, each generation of taxpayers should fully fund the benefits accruing to public employees at that time, rather than shifting those costs to future generations. Although pension benefits may not be payable for years or decades in the future, those benefits compensate services rendered by public employees today. Because today's taxpayers are the beneficiaries of those services, current taxpayers should fully fund the compensation of public employees who provide them. The Governmental Accounting Standards Boards (GASB) refers to this standard as "interperiod" or "intergenerational equity," saying that it means that "taxpayers of today pay for the services that they receive and the burden of payment for services today is not shifted to taxpayers of the future."¹ Inter-period equity requires that future taxpayers be insulated or, in economists' terms, "immunized" against the risk of being forced to pay for pension benefits accrued in the past.

We can thus say that a pension plan might be considered "fully funded" if it satisfies both of these goals—if it can provide guaranteed retirement benefits to plan participants without imposing additional costs on future generations. Lacking these two criteria, the very idea of being fully funded loses meaning. If a pension plan counts toward its funding the right to at any time reduce benefits to retirees or return to the taxpayer for additional funding, then any public plan should be considered "fully funded." This reasoning makes little sense.

However, under current pension accounting rules promulgated by the GASB, a pension could consider itself fully funded even if its current assets had less than a 50 percent probability of being sufficient to pay for the benefits the plan has currently promised. Under these circumstances, even a supposedly fully funded plan either would be unable to guarantee payment of full benefits or would have to impose a contingent liability on future taxpayers to supplement plan funding should the need arise. By focusing on the lower standard of the mere expectation of being able to pay benefits while ignoring the fact that those benefits must be paid, current pension accounting standards fail to assist pension stakeholders in achieving the widely held policy goals of producing guaranteed benefits to retirees without shifting costs to future taxpayers.

In recent years, the economics profession has challenged current pension accounting rules, arguing that they fail to capture the full value of pension liabilities and therefore encourage plans to become underfunded. Most of the economists involved in these challenges are employed as academics in think tanks or in government agencies where they are not directly involved with managing plans or setting pension accounting standards. Individuals more closely tied to public pension plans, including the GASB, public pension actuaries, and employee interest groups, have pushed back against this challenge.

However, economists' underlying arguments are poorly understood, with the result that the public often misconstrues the issues at hand in the pension accounting debate. For instance, many believe that when economists argue that public pensions should not discount their liabilities at the 8 percent interest rate that pensions assume for their investments, they are claiming that actual investment returns will be lower than 8 percent. Similarly, some believe that because economists advocate using lower discount rates to value pension liabilities, they are arguing that public pensions should hold only low-risk investments in their portfolios. Neither belief is correct.

In fact, most economists believe that pension liabilities should be valued using low discount rates even if pensions continue to invest in stocks and other risky but high-return assets and even if their assumptions regarding future average investment returns are accurate. However, the theories and assumptions underlying a fair-market valuation approach are so ingrained among economists that, in many cases, the proponents fail to make these background arguments explicit. This allows misunderstandings regarding the pension accounting debate to continue. Properly understood, the economic argument motivating the movement for fair-market valuation differs from the way it is often portrayed in the news media.

This paper first reviews how public pensions value their liabilities under current GASB rules. Next, we outline the standard approach to valuing liabilities from an economic point of view and what this market-based approach implies for public-sector pensions and their funding levels. Following that, we provide examples designed to better convey the qualitative principles regarding the economic approach to pension liability valuation.

The emphasis here is not on detailed calculations of how fair-market valuation would affect pension funding in states and cities around the country, nor the increased budgetary burden the pensions might impose.² Likewise, the emphasis is not on how defined-benefit pensions might be reformed in light of information conveyed via more accurate accounting rules.

Rather, the intent is to provide readers with a better handle on the simple intuition that lies behind the economists' call for

GASB accounting rules help pension plans calculate a “best guess” ... a roughly 50 percent probability of being able to meet its benefit obligations ...

fair-market valuation of public pension liabilities. Those who follow the debate are aware that economists argue for using lower discount rates to value public pension liabilities but often are unaware of why economists believe what they do. This paper aims to better articulate those beliefs.

BACKGROUND ON PUBLIC EMPLOYEE PENSION PLANS

Most state and local governments provide a defined-benefit pension plan for public employees as part of their overall compensation.³ These plans generally provide for retirement, disability, and survivors' benefits and may either supplement or substitute for Social Security benefits. Around three-quarters of all state and local government employees take part in an employer-provided pension plan, with coverage rates among full-time employees being significantly higher. Around 80 percent of public employees have only a defined-benefit pension, with 14 percent having only a defined-contribution pension and 6 percent having both.⁴

State and local pensions work similarly to defined-benefit pensions in the private sector. Once vested, an employee becomes entitled to a benefit based on a percentage of final salary—ordinarily an average of earnings over the last three to five years—multiplied by the number of years of service. Public pensions typically pay benefits equal to around 2 percent of final earnings per year of employment, although these replacement factors can differ from place to place, in particular based on whether the employee also participates in Social Security. Some public-sector employees take part in Social Security while others are not covered by Social Security and receive their principal retirement income from their employer's program.⁵

Unlike private-sector pensions, which are managed under the federal Employee Retirement Income Security Act, state and local government pensions do not in general fall under federal law. For that reason, protections afforded to accrued pension benefits vary state to state. In practice, however, once earned, pension benefits are in general considered to be very safe. Most states grant accrued pension benefits legal protections under contract law or state constitutions.⁶

In a number of states, not only are accrued benefits protected but so is the right to accrue future benefits; as a result, the current terms on which benefits are accrued also may not be altered. In a 2012 case from Arizona, even the government's ability to increase employee contributions was restricted based on the idea that the full terms of the pension plan in place at the time an employee was hired may not be altered in future years. More broadly, the often-substantial political power of public-sector employees—along with basic precepts of fairness—generally precludes reducing or eliminating their benefits after they have earned them. In this paper, when we refer to pension liabilities, we are for the most part referring to benefits already accrued rather than the right to accrue future benefits.

Public-sector pensions are financed through a combination of employee and employer contributions and investment earnings. Contribution rates vary from program to program, as do the criteria by which rates may be altered. In some cases, contribution rates are set by law, while in other cases contributions are automatically adjusted based on regular actuarial valuations of plan financing. The average employee contribution rate as of 2009 was 6.4 percent of wages, according to the Public Plans Database, although contributions vary significantly from plan to plan.⁷ In addition, some public employees have their formal contributions “picked up” by their employers, a fact not captured in the Public Plans Database. One aspect of the controversial reforms passed in Wisconsin in 2011 was a prohibition on government employers picking up employee pension contributions.

According to the most recent asset data available via the Public Fund Survey, 52 percent of pension funds are allocated to equities, 26 percent to fixed investments such as bonds, 6 percent to real estate, 11 percent to “alternative” investments such as hedge funds and private equity, and 3 percent to absolute/real return investments.⁸ The share of assets held in equities has risen significantly from the early 1980s, when only around one-third of pension portfolios were in stocks. A more recent trend is the shift to alternative investments, which promise higher returns than equities but with greater risk. The increase in the share of risky investments held by pension funds highlights the need for an improvement in accounting rules governing public-sector pensions.

PLAN VALUATION UNDER GASB ACCOUNTING RULES

Pension plans measure their financial health by comparing the value of their assets to that of their liabilities. The difference between assets and liabilities is referred to as the unfunded liability, while the ratio of the two is referred to as the funding ratio. Public sector pensions perform these calculations using guidelines issued by the GASB. Although GASB rules are not legally binding, a government must disclose if its calculations do not follow them.

Because a benefit payment made in the future is less valuable and less costly to finance than a payment made today, it is necessary to discount future benefit payments to the present to make them comparable to the value of plan assets. Discounting is a process similar to compound interest. While compound interest begins with a current dollar amount and adds interest to determine the future value, discounting begins with the future value and subtracts interest each year until a present value is arrived at.

The present value of a plan's liabilities depends on the interest rate at which the liabilities are discounted. Under standard actuarial accounting as outlined by GASB, a public pension plan discounts its liabilities using the return it expects the portfolio of assets it holds to generate. The average expected return on assets used in such valuations is currently slightly below 8 percent. The discounted value of plan liabilities is then compared to the value of assets to calculate the plan's funding ratio (assets divided by liabilities) and its unfunded liability (assets minus liabilities).⁹

Present values of plan liabilities also are used to calculate the plan's annual required contribution. This amount reflects the contribution the plan sponsor would need to make in a given year to both fund benefits accruing to employees in that year and to gradually pay off any unfunded liabilities from prior years.

The effects of changes in the discount rate can be dramatic. Under GASB accounting, the same plan, with the same assets and future benefit payments, could reduce its measured liabilities by nearly one-fifth by shifting from a portfolio with an expected return of 7 percent to one with an expected return of 8.5 percent.

When public pension liabilities are discounted at an 8 percent average interest rate, plans were around 77 percent funded, on average, as of mid-2010, and unfunded liabilities were equal to about three-quarters of \$1 trillion. And the situation could appear significantly worse if a different interest rate had been used in the calculation.

THE FAIR-MARKET VALUATION CRITIQUE

GASB pension accounting rules are essentially designed as a guide to funding. If a pension plan accurately predicts the average return on its portfolio over very long periods, and if the annual ups and downs of investment returns even out over the shorter periods of several decades in which pension funding is most relevant, then a plan that makes its annual required contributions calculations using the average return on the plan's portfolio will be able to precisely meet its benefit obligations over time.¹⁰

However, GASB accounting standards have been challenged by a movement among economists that is sometimes referred to as fair-market valuation. This approach argues that liabilities for public-sector pension plans should be valued in ways consistent

with economic theory and with how pension liabilities and other liabilities are valued in private financial markets.

The problem, economists point out, is that while there are several “ifs” in the description of how GASB accounting rules guide pension funding, there are few if any “ifs” with regard to the payment of benefits. Public employee pension benefits are intended to be guaranteed, they are described to employees as being guaranteed, and in most states they carry strong legal protections. Pension liabilities calculated using rules that include so many “ifs” will not be accurate or helpful to policymakers when the pension plan in the sponsoring government has no discretion with regard to paying benefits.

Put another way, GASB accounting rules help pension plans calculate a “best guess” annual contribution that gives the plan a roughly 50 percent probability of being able to meet its benefit obligations. Assuming the plan has correctly pegged the ultimate return on its investments, over any given period of time—even decades—the annual fluctuations in returns mean that the return actually received is almost sure to be either above or below the projection. Thus, even a “fully funded” plan has only a roughly 50–50 chance of generating returns sufficient to pay full benefits. But legally guaranteed pension benefits must be paid with 100 percent certainty. Thus, under GASB accounting rules, there is a mismatch between the plan’s legal requirement to pay benefits and its probability of being able to do so.

Economists argue that the discount rate used to value future pension liabilities should reflect the fact that pension benefits are guaranteed, even if the returns on a pension’s investments are not. More formally, the discount rate applied to the liability should be based on the risk of the liability, not the risk of any assets used to fund that liability. While there is some disagreement regarding how risky accrued public pension benefits actually are, economists are united in believing that the appropriate discount rate is a function of the liability rather than of the assets.

Moreover, this is how financial markets value liabilities. If a pension sought to transfer its liabilities to a private insurance company—something common in the United Kingdom, though for tax reasons not in the United States—the insurer would base its price on the size and risk of the liabilities, without reference to the risk or expected return of the asset backing those liabilities. The reason is that the investment portfolio can be changed at any time to any combination of risk and return the pension chooses, but the liabilities, if guaranteed, must be paid regardless.

Some academic research has concluded that accrued public pension benefits are actually less risky than explicit debt issued by state and local governments. In a 2009 paper, Jeffrey Brown and David Wilcox argue that, in the cases of New York City in the 1970s and Orange County, California, in the 1990s, pension

benefits continued to be paid even as those governments essentially defaulted on their explicit debts.¹¹ More recently, the city of San Bernardino, California, delayed repayment on so called “pension obligation bonds,” which are issued to the public as a means of financing pension benefits, but continues to pay benefits to retired public employees.¹² Likewise, Stockton, California, is currently in bankruptcy proceedings and plans to impose a repayment penalty on municipal bondholders while maintaining full benefit payments to public retirees.

In some cases, however, governments have sought to reduce accrued benefits via reductions in annual cost-of-living adjustments or other postretirement benefit increases. In nearly all cases, however, public employees have sued over such reductions, and most of these cases await resolution. If such reductions prove to be legally permissible, then a somewhat higher discount rate might be warranted. For instance, the bond rating agency Moody’s has recently announced that it will value public pension liabilities using the yield on high-quality corporate bonds, a similar standard to that applied to private-sector pension benefits.

Regardless of how the legal suits over cost-of-living reductions are resolved, public-sector pension benefits indisputably carry much less risk than the assets used to finance these benefits. Thus, while economists have not reached an agreement on what the right discount rate is to apply to public pension liabilities, they are united in believing that the 8 percent assumed return on pension assets is the wrong discount rate.

THE MYTH OF TIME DIVERSIFICATION

The most common argument made by investment managers for using a high discount rate is that the long time horizon of pension funds makes it possible to take on more stock market exposure with little additional risk. Indeed, a widely held belief is that time itself can help diversify risk. For example, as American Funds, one of the largest mutual fund providers, puts it: “In general, the more time you have to invest, the more risk you can afford to take.”¹³ Or, as even the US Securities and Exchange Commission states: “An investor with a longer time horizon may feel more comfortable taking on a riskier, or more volatile, investment because he or she can wait out slow economic cycles and the inevitable ups and downs of our markets.”¹⁴ Economists widely reject this view, however.

... while there are several “ifs” in ... how GASB accounting rules guide pension funding, there are few ... “ifs” with regard to the payment of benefits.

Economists argue that the discount rate used to value future pension liabilities should reflect the fact that pension benefits are guaranteed. ...

For example, as Nobel Laureate Paul Samuelson elegantly argues:

Invest for the long term, the theory goes, and the risk lessens. Is the dogma true as told? Alas, no. . . . Most of the time the buy-and-hold common stock investors do beat their more cautious neighbors; and, as the time horizon N becomes larger, the odds do grow that the bold holders of stock will win the duel. But it is also true that a longer time horizon brings bigger losses when an inevitable loss does occur. . . . Ask yourself: Will stepping down toward a poverty level, when that rarely but inevitably does happen, outweigh for me the pleasures that occur in those likely outcomes when my equity nest egg does increase?¹⁵

Or, as Zvi Bodie and Rachele Taqqu recently put it: “If you hear the catchphrase that an investment portfolio has a 90 percent chance of getting to your goal, remember to flip the statement on its head. Ask how much you stand to lose. Then weigh the consequences.”¹⁶

One impetus for the belief in time diversification comes from the belief that younger people should hold relatively more stocks and move toward bonds as they age. Although it is true that economic theory suggests that younger people should generally invest more in risky assets relative to older people, the actual reason has nothing to do with time horizons: it is because younger people actually hold a large asset that is not necessarily highly correlated with stock returns, namely their human capital, which is equal to the present value of their future wages. In essence, holding more stocks in their accumulated assets at an early age allows them to maintain a fairly constant amount of risk across their entire net worth, which includes the present value of their human capital. As they age, more of their human capital is converted into accumulated assets, so they should shift away from stocks in their accumulated assets to maintain a constant amount of risk across their entire net worth.¹⁷ The actual amount of risk depends on the importance of investors’ goals and their tolerance if they do not achieve them.

But this argument has nothing to do with time. Moreover, it does not apply to a pension system, which does not face a depreciating human capital asset like an individual saver. Instead, for time diversification to work, stock prices must manifest some prop-

erty like mean reversion, where low prices are predictably followed by high prices and vice versa. But that could be true only if market prices were inefficient. Although some potential evidence exists of mean reversion over short trading periods, most analyses fail to reject standard random models consistent with efficient pricing.¹⁸ If mean reversion were persistent enough to justify the “time diversification” hypothesis, there would be considerable market pressures to eliminate it, as it effectively leaves a lot of money on table.

A second potential impetus behind the time diversification hypothesis comes from focusing on random probabilities alone while ignoring the true value of the risk. Specifically, stakeholders—be they investors or the taxpayers who must make up for pension losses—place more weight on dollars received when they are poor than when they are rich. For example, suppose someone gave you \$1,000. Ask yourself: would you be happier to receive that additional \$1,000 if you had no money previously or if you had \$1 million? Of course, the vast majority of people would choose the former, because an additional dollar is least valuable when you already have a lot of money.

Economists more formally express this real-world preference with the idea of “diminishing marginal utility.” Specifically, marginal utility captures the additional happiness from receiving one extra dollar. That should be quite high when you have no money to start with. But as you make more money, the additional utility of receiving an extra dollar, while still positive, should decrease.

Now ask yourself, suppose that you have \$1 million today in assets, but there is a 5 percent chance that you could lose it all, maybe in the market or because of a personal liability. Suppose that you could transfer some of that \$1 million to a time in the future where you otherwise would have no money. How many dollars would you be willing to forfeit from your \$1 million today to ensure that you have at least \$1 after a loss that otherwise would leave you penniless? Empirically, most people would be willing to give up over \$50 today to ensure that they have \$1 available after the loss. Of course, due to diminishing marginal utility, that “intrapersonal exchange rate” declines with subsequent dollars transferred between these two situations: a person might be willing to pay only \$49.95 today to ensure that a second dollar is available after the loss.

Hence, when we think about risk, we should not think about probabilities alone: we ought to incorporate the value of risk aversion. Indeed, if marginal utility did not increase as people lose money, then the entire discussion about whether pension funds should invest in stocks would actually be irrelevant. A market full of risk-neutral people would buy equities whenever the expected return exceeded the safe bond yield, thereby eliminating any potential gain from investing in stocks. In other words,



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the so-called “equity premium” is actually just a “risk premium,” which compensates people for risk.

To see the importance of risk aversion, let’s consider a slightly more detailed example. Suppose that you have \$100,000. You have two options for what to do with that money. First, you can simply hold it, not investing it and not taking any risk.¹⁹ Or you could try to increase your wealth by rolling a standard six-sided die where the values of 1, 2, 3, 4, 5 and 6 correspond to the rates of return.

To incorporate the potential for both gains and losses, you earn a percentage rate of return on your wealth in a given year equal to whatever the die produces minus three, all times 10 percent. So,

for example, if you roll a 4 then you get $(4 - 3) \times 10\% = 10\%$, but if you roll a 2, you earn $(2 - 3) \times 10\% = -10\%$. The potential outcomes are shown in Table 1.

Since the expected average die roll is 3.5, the expected return from the outcomes shown in Table 1 is 5 percent, larger than the 0 percent return from taking no risk. In other words, the “risk premium” is 5 percent per year. The standard deviation, a measure of investment risk, is about 17.1 percentage points. Altogether, therefore, the risk shown in Table 1 is similar to stock investing.²⁰

Naturally, you are quite happy if you can double your money to \$200,000. But you will also be quite miserable if you lost half of your wealth and ended up with only \$50,000. If you are like most risk-averse people, the utility you gain from doubling your money will be much smaller than the utility that you lose from losing half of your wealth. Doubling your money might allow you to travel the world; losing half of it requires you to cut back on your food budget, keep your house colder during the winter, or even declare bankruptcy.

We can think of \$200,000 as your “bliss point” and \$50,000 as your “ruin point.” In the case of a pension fund, obtaining its bliss point will allow it to pay a larger level of benefits than it otherwise could afford; hitting ruin might require sudden benefit cuts or tax increases, often during a time when the economy is also doing poorly.

Given these facts, should you roll the die? At first glance, you might say that it all depends on your time horizon. Since the roll of the die produces an expected additional 5 percent return each year, then the “law of large numbers” should allow you to buffer the low returns with the higher expected returns. But that reasoning is incorrect once we properly incorporate the importance of risk aversion.

Table 2 shows the results from 5,000 simulations over a 100-year period from rolling the die. The third column shows that the chance of obtaining the \$200,000 bliss point without first falling to the \$50,000 ruin (bankruptcy) point does indeed increase across longer holding periods. For example, over the next decade, there is a 26.3 percent chance of hitting the bliss point. For an investing period over the next 20 years, this probability increases to 51.6 percent. Over enough time, the probability increases and converges to a value around 84 percent.

However, notice that the probability of hitting the ruin point also increases over time, since there is also more chance for failure. There is a 4.4 percent chance of ruin over the next decade, but that increases to around 13 percent at longer time horizons.

Although the probability of success at longer time horizons is much higher than the probability of ruin, a person who is suffi-

Table 1

Illustrative Outcomes From Roll of a Single Die	
Die Outcome	Return in Year
1	-20%
2	-10%
3	0%
4	+10%
5	+20%
6	+30%

Table 2

Potential Outcomes from Repeated Rolls of a Single Die		
Time Period (Number of Investing Years)	Chance of Obtaining Ruin over Period (%)	Chance of Obtaining Bliss without First Ruining (%)
10	4.4	26.3
20	8.7	51.6
30	10.5	64.2
40	11.5	72.0
50	12.3	76.7
60	12.6	79.7
70	12.8	82.2
80	12.9	83.3
90	13.0	84.0
100	13.1	84.4

ciently risk averse might nonetheless prefer to not take this gamble, instead keeping her original \$100,000 safe. She places more utility weight on a dollar at the ruin point than on a dollar at the bliss point. In other words, stocks do not become safer over longer holding periods. The potential for bliss and ruin both grow.

Moreover, because stock prices are correlated with the rest of the economy, success and failure in stock investments will not happen in isolation from what is happening in terms of economic growth, tax revenues, unemployment, and other factors. As Washington State's actuary has written with regard to its own pension plans' experiences: "Weak economic environments were correlated with weak investment returns. Lower investment returns created the need for increased contributions at a time when employers and members could least afford them."²¹ Likewise, good times for the pension fund's investments will be correlated with good times in the economy, when everyone else is flush and the value of an additional dollar is low.

ILLUSTRATING CONTINGENT PENSION LIABILITIES

For these reasons, risk—or the lack of risk—should be factored into the pension valuation process. Exactly how much value investors place on risk is already reflected in market prices. For example, the average return to equities above bonds, known as the "equity premium," reflects the expected increased compensation the investors demand if they are to accept the additional risk of stocks. If investors did not care about risk, then the equity premium would disappear. Properly accounting for risk, therefore, requires using fair-market valuation that incorporates market prices.

How exactly does fair-market valuation help policymakers measure whether they are properly accounting for risk in pensions? An example helps illustrate.

Consider a pension that owes a guaranteed lump sum payment of \$1 million in 15 years' time. Under GASB accounting rules, if the plan invests \$301,194 today—the present value of \$1 million discounted at an 8 percent interest rate²²—it can call itself fully funded. This investment path is illustrated using the blue line in Figure 1.

But according to fair-market valuation, if the pension's payment is indeed guaranteed, it should be discounted at a riskless interest rate. If the riskless return is 4 percent, the true value of the liability is \$548,812, almost twice as much upfront as is required under the actuarial approach using the 8 percent rate. This is represented as the gray line in Figure 1. This illustration should demonstrate why most pension interests—governments, public employees, plan managers, and so on—prefer the actuarial approach.

If the pension's assets have an expected return of 8 percent, then investing \$301,194 today will deliver an expected payoff of \$1 million in 15 years. The problem is that assets with an expected return of 8 percent cannot produce such a return with certainty,

meaning that the portfolio's value after 15 years will almost surely end up being higher or lower than the desired \$1 million. In other words, rather than a single blue line in Figure 1 representing investment in risky assets, a better representation is a blue area showing a range of possible outcomes, roughly half of which exceed the \$1 million goal, with the remaining half falling short.

No matter how well a pension plan manages its investments, it cannot generate 8 percent returns with certainty. The actual return the plan receives is based on the luck of the draw. Given that the benefits must be paid 100 percent of the time, a plan that has only a 50 percent chance of being able to meet its obligations is not "fully funded" in the way that most laymen would interpret the term.

In reality, a plan seeks to neither overshoot nor undershoot its goal. If the plan's investments exceed their projected return, that means the initial contribution could have been smaller. In other words, the plan "overcharged" current taxpayers. Alternately, if the investments come up short of their goal, the plan will not be able to pay what it owes and must turn to the taxpayers for a bailout. In that case, the plan will overcharge future taxpayers to compensate past public employees who did not work for them. In either case, the principle of intergenerational equity will have been violated.

However, financial products called "options" provide a solution. A "call option" allows the pension plan to sell off any surplus if the plan's investment turns out to be worth more than \$1 million. A plan that sells a call option can use the proceeds to offset the cost of the initial investment, thereby eliminating the costs of overshooting the pension's goal and protecting today's taxpayer against being overcharged.

Likewise, a "put option" can be purchased to top up the difference between the assets' actual value and \$1 million if the investment comes up short. The put option protects against outcomes in which the plan's investments fall short and so protects tomorrow's taxpayer. Barring some truly catastrophic collapse of financial markets, the plan will always be able to pay exactly the promised \$1 million, with no wasted money, if it first invests \$301,194 in stocks or other high-returning assets and then sells a call option to dispose of any surplus and purchases a put option to cover any shortfall.

This means that the cost of truly fully funding the \$1 million future liability—meaning funding it so that it is guaranteed to be paid without recourse to a taxpayer bailout and without any wasted surplus—is the \$301,194 initial investment minus the proceeds from selling the call option, which total \$11,436, plus the cost of purchasing the put option, which is \$259,053. The net cost is \$548,812, precisely the same as if the liability had been discounted and funded using the 4 percent riskless rate of return.²³

The difference between the liability's value when discounted at the 8 percent rate used under current GASB standards and when discounted at a riskless interest rate represents the value of the contingent liabilities that have been placed on future taxpayers based on funding decisions made today. This cost is not a worst-case scenario, as some seem to believe. Rather, it represents the price that future taxpayers would willingly pay to rid themselves of the risk of being called on to make good on promises that were made by, and should have been paid for by, today's taxpayers.

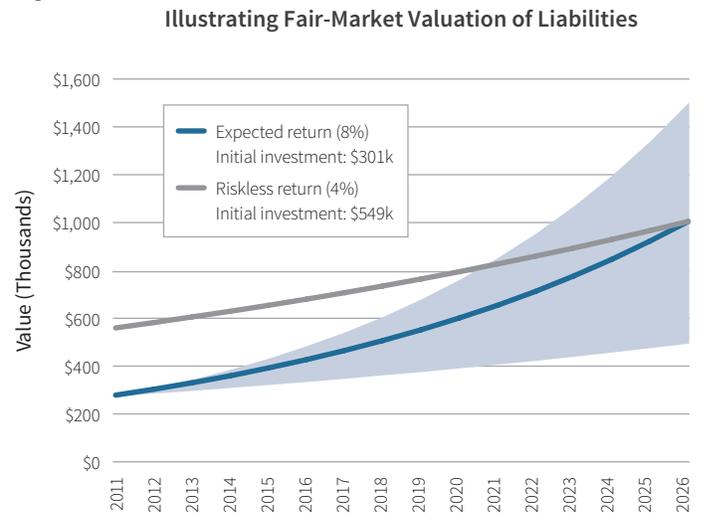
A more conservative pension might invest larger amounts in safer assets, increasing costs for current taxpayers but leaving smaller contingent liabilities on future generations. Alternately, a more aggressive plan might make smaller upfront contributions but invest them in riskier assets. This reduces costs today but generates a matching increase in the value of the contingent liability on future taxpayers. In either case, though, the total cost of the liability will be the same regardless of how the plan chooses to invest.²⁴

This example of a pension plan required to fund a \$1 million future liability also illustrates that fair-market valuation is not an academic exercise with no relevance to the actual investments public pensions make. When economists say that a pension should apply a discount rate of, say, 4 percent to its liabilities, they are not assuming that the plan invests in safe assets that yield a 4 percent return. The cost of the put and call options is determined in the market and based on the riskless return available in the market and the risk of the investments the plan holds. In other words, it makes sense to discount riskless pension liabilities using a riskless interest rate even when the plan itself invests in riskier and higher-returning assets. The fair-market valuation approach captures both the full range of possible investment outcomes and the welfare values that real-world individuals place on those outcomes. It is current actuarial standards, in which a risky investment portfolio is assumed to earn a constant rate of return, that differ from reality.

Finally, this example again illustrates that the value of the liability does not shrink because public pensions invest over long time horizons, as pension and public pension actuaries sometimes claim. If "time diversification" made stocks less risky over long periods, then put options protecting an investor against

poor market returns would become cheaper as the exercise date on the option was pushed out. In fact, the opposite is the case: long-dated options are more expensive than short-dated options. This reflects that fact that while the variation in average stock returns becomes smaller over long periods, the variation in the actual dollar amounts that investors receive grows larger. As the blue shaded area in Figure 1 shows, the longer a stock is held, the wider the possible range of outcomes the investor may face.

Figure 1.



Source: Authors' calculations.

CONCLUSION

The fair-market value of a pension's liabilities represents the answer to the question posed at the outset of this paper: what is the cost of fully funding future benefits such that there is risk neither to beneficiaries nor to future taxpayers? Lower costs are possible if elected officials wish to acknowledge risk to either of these parties—that is, if they allow that full funding includes the possibilities that benefits may be cut or that the plan may return to future taxpayers for a bailout when planned funding falls short. But in such a scenario, any pension plan may be considered fully funded, rendering the term meaningless for policymakers and the general public.

A better approach takes full funding to mean that accrued benefits can be paid without extracting additional resources from the taxpayer. The fair-market valuation method tells us the costs of achieving full funding. And it incorporates a number of truths from economics and finance: that stocks pay higher returns because they are more risky; that the risk of stock investments does not disappear over long holding periods; and that individuals, either as investors or taxpayers, do not value gains equally with losses. Finally, valuing guaranteed pension liabilities using a riskless discount rate does not imply that pensions must invest only in bonds. Rather, it merely shows that the value of a guaranteed

A better approach takes full funding to mean that accrued benefits can be paid without extracting additional resources from the taxpayer. ...

pension benefit is independent of the returns on risky investments used to fund that benefit.

Public pension accounting is undergoing changes as the GASB looks to revise its rules through the recently introduced Statements 67 and 68, even if these do not alter the basic logic—or illogic—of how public pensions value their liabilities. Moreover, public plans themselves are being reformed in a number of states, principally through higher employee contribution rates and lower benefits for newly hired employees. But pension financing will not truly be stabilized until plans first adopt better standards for determining how much they truly owe. ■

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ENDNOTES

- ¹ Governmental Accounting Standards Board, “The User’s Perspective: Interperiod Equity and What It Means to You,” June 2009, www.gasb.org/cs/ContentServer?c=GASBContent_C&pagename=GASB%2FGASBContent_C%2FUsersArticlePage&cid=1176156731381.
- ² On the latter point, see Robert Novy-Marx and Joshua D. Rauh, “The Revenue Demands of Public Employee Pension Promises,” *American Economic Journal: Economic Policy* (forthcoming).
- ³ Defined-benefit plans base retirement benefits on a formula deriving from the employee’s earnings and years of service; any investment risk is borne by the plan sponsor.
- ⁴ Alicia H. Munnell and Mauricio Soto, “State and Local Pensions Are Different from Private Pensions,” Center for Retirement Research, November 2007.
- ⁵ For individuals spending part of their careers in public employment not covered by Social Security and part under Social Security–covered employment, the Government Pension Offset and Windfall Elimination Provision may affect the Social Security benefits they or their spouses are eligible to receive.
- ⁶ Amy Monahan, “Public Pension Plan Reform: The Legal Framework,” *Education, Finance & Policy* 5 (2010).
- ⁷ See the Public Plans Database at <http://pubplans.bc.edu/pls/apex/f?p=1988:3:0>.
- ⁸ Survey data are available at www.publicfundsurvey.org.
- ⁹ Pensions currently use a value known as actuarial assets in calculating unfunded liabilities and funding ratios. Actuarial assets differ from the market value of assets in that rates of return applied to the assets are smoothed, generally over a five year period. In revisions to accounting rules published in June 2012, the GASB announced that plans must use the market value of assets for such calculations. Doing so would, as of the present at least, reduce measured funding ratios by around 10 percentage points.
- ¹⁰ This is true only if the plan discounts its liabilities using the geometric mean, or compound return, on its investments. However, many plans base their discount rates on their investments’ arithmetic mean return, which for risky assets is always higher than the geometric mean. Although it is a distinct point from the financial economics critique of pension discounting, this error means that even a plan that achieves its projected investment returns may be unable to meet its accrued obligations in full.
- ¹¹ Jeffrey R. Brown and David W. Wilcox, “Discounting State and Local Pension Liabilities,” *American Economic Review* (May 2009).
- ¹² Arleen Jacobius, “San Bernardino Votes to Delay City’s Pension Bond Payments,” *Pensions & Investments*, July 25, 2012.
- ¹³ American Funds, “Develop an Investment Strategy,” <http://americanfundsretirement.retire.americanfunds.com/planning/strategy/what-is-asset-allocation/time-horizon.htm>.
- ¹⁴ US Securities and Exchange Commission, “Beginners’ Guide to Asset Allocation, Diversification, and Rebalancing,” www.sec.gov/investor/pubs/assetallocation.htm.
- ¹⁵ Paul Samuelson, “Dogma of the Day,” *Bloomberg Personal Finance* (January/February 1997).
- ¹⁶ Zvi Bodie and Rachele Taqqu, *Risk Less and Prosper: Your Guide to Safer Investing* (Hoboken, NJ: Wiley, 2012), XVII. Emphasis in original.
- ¹⁷ See Zvi Bodie, Robert C. Merton, and William F. Samuelson, “Labor Supply Flexibility and Portfolio Choice in a Life-Cycle Model,” *Journal of Economic Dynamics and Control* 16 (1992): 427–49.
- ¹⁸ The strongest case for mean reversion was provided by James M. Poterba and Lawrence H. Summers, “Mean Reversion in Stock Prices: Evidence and Implications,” *Journal of Financial Economics* 22, no. 1 (1988): 27–59. Subsequent papers found little evidence, especially when an outlier period was removed. See, for example, Myung Jig Kim, Charles R. Nelson, and Richard Startz, “Mean Reversion in Stock Prices? A Reappraisal of the Empirical Evidence,” *Review of Economic Studies* 58, no. 195 (1991): 515–28.
- ¹⁹ In reality, of course, you could earn a risk-free short-term bond return that covers inflation and some small real yield merely to compensate you for being patient.
- ²⁰ If anything, it is a bit more favorable than stock investing since the standard deviation on US stocks is closer to 20 percent and also includes some fatter negative tails (negative skew).
- ²¹ Office of the State Actuary, “Washington State 2009 Actuarial Valuation Report,” October 2010; and Office of the State Actuary, “2010 Risk Assessment: Moving Beyond Expectations,” August 31, 2010.
- ²² Throughout the example, present values are calculated using continuous discounting for consistency with options pricing; differences from periodic discounting are small. The present value equals the size of the future payment divided by the exponential of ($r \cdot n$), where r is the annual discount rate and n is the number of years until the future payment will be made.
- ²³ The listed numbers contain a one-dollar discrepancy, reflecting rounding error.
- ²⁴ This result is based on a principal known as “put-call parity.” See H. R. Stoll, “The Relationship between Put and Call Option Prices,” *Journal of Finance* 24 (December 1969): 801–24.



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