



**SOCIETY OF
ACTUARIES**

**SOCIAL INSURANCE
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SECTION**

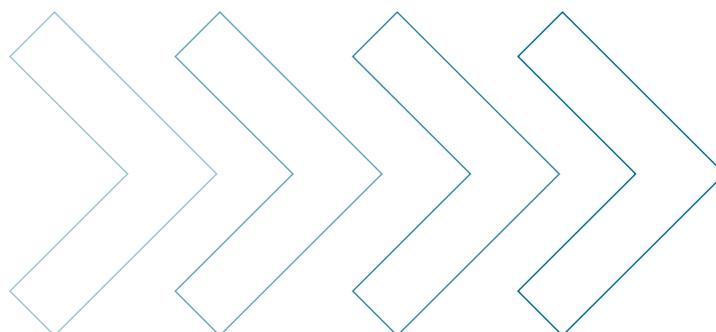
In The Public Interest

ISSUE 19 • JULY 2019

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Chairperson's Corner

By Piotr Krekora

Our council met in April to discuss the direction for our section over the next few years. As you all know, the Social Insurance and Public Finance (SIPF) section is a little different than most other sections: the majority of our members joined other sections before becoming members of SIPF. We are not the first choice for many of SOA members looking to join a section. More than 90 percent of our members belong to other sections as well, compared to approximately 50 percent of members in Retirement and Health sections not affiliated with any other sections. Furthermore, our members practice in all areas of the actuarial profession, making us one of the most diverse sections. As such, SIPF is not serving a specific practice area. Rather, we address topics coming to our minds even if our jobs put us all over the broad spectrum of actuarial practice.

These topics are summarized in our mission statement as: “The purpose of the section is to develop consistent, high-quality continuing education opportunities and sponsor fundamental research into evaluating and managing (1) social insurance programs and (2) benefit plans for government employees and the role of such benefit plans in public finance.” Programs within the section’s purview include social security, government-administered health plans such as Medicare and Medicaid, and other government-sponsored pension and health benefit plans. The section’s purview is not limited to programs in the United States.

My fellow council members pointed out that this mission is more succinctly summed up by the title of our newsletter: *In The Public Interest*. And they are right; articles and presentations that we produced in the past few years covered relevant topics from social security benefits and financial status, through risk management in public sector pensions, to various aspects of Medicaid and the Affordable Care Act. In the public interest indeed.

After a daylong discussion, I left the meeting with a feeling that some changes are in order. Not to our mission; it continues to

be important and relevant enough to stay the course. But we need to adapt to a changing environment. We should expand our activities beyond formal continuing education content. Like venturing into a world of podcasts—SIPF has yet to produce one. Our first step is to nominate a podcast coordinator. If you feel that you or your fellow actuary would be a good podcast coordinator, please do not hesitate to contact the undersigned, our staff partner, or our section specialist. We can use your help.

There is one other characteristic distinguishing us from other sections: we are very mature. That’s right. Compared to other sections, or the SOA in general, we have very few young members. This doesn’t mean that we lack energy; au contraire, my fellow council members and friends are very actively working preparing webcasts, a newsletter and meeting sessions. But we are looking forward to welcoming younger members with fresh ideas and a different worldview. This is the additional area I would like to see changing: getting more new SOA members working with us. Let’s not forget that social security systems are meant to last for decades and serve many generations to come, not just the ones receiving benefits right now. The sooner our younger colleagues join us on our mission, the sooner they start contributing to improving the financial health of those social security systems. After all, young generations are notorious for working in the public interest.

In a way we are being helped by the SOA’s effort to increase engagement amongst young actuaries—our newsletter was the first of the section newsletters to be published in the new, mobile-friendly format. If you haven’t tried the digital and audio edition yet, you should check it out; I liked it. However, revamping the newsletter and making it more attractive will not help much if nobody knows about it. So, I am asking all section members and friends to encourage their younger colleagues to check us out and join the Social Insurance and Public Finance Section. Some of them might become our podcast coordinators or produce other content appealing to young actuaries. But most importantly, we need to be able to pass the baton to our successors who will continue working on improving the financial health of our public security systems, and, in the pursuit of that goal, continue making this planet a better place in which to live. ■



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Letter From the Editor: Please Participate!

By Bruce D. Schobel

In October 2018, after serving for a year as chair of the Social Insurance and Public Finance (SIPF) Section Council, I moved over to the equally demanding job of newsletter editor. Section newsletters are critically important documents within the SOA and the actuarial profession as a whole. They serve as an archive of the section's most important activities, documenting work that the section intends to preserve for posterity. Five years of back issues of this newsletter are accessible on the SOA's website here:

<https://www.soa.org/sections/social-ins-pub-finsocial-ins-pub-fin-newsletter/>

Older issues are available through the SOA office.

Many subjects of intense interest to section members may not be of broad enough interest to warrant publication in *The Actuary*, SOA's most widely circulated publication. Section members hopefully know to look for articles of greatest relevance to them in their own newsletter. This applies to all sections, not just SIPF.

Newsletters, however, don't write themselves. All of the content in this and all previous newsletters was written by individuals—myself among them—who believed that they had information worth sharing with their peers. A certain amount of hubris may be required to look at something that you have done and believe that other people would like to read about it. And the rewards are

not great: Few people will contact a newsletter author and thank him or her for the useful information. But that doesn't mean that it isn't useful. If you have ever found useful information in this newsletter, then consider whether you have something to give back in return.

Some sections have inherent obstacles to publishing their members' work. A lot of the work that actuaries do is proprietary. Employers, plan sponsors and other clients may not desire or agree to the publication of actuarial work that they paid to produce, even if names are changed to protect the innocent—or the guilty, as the case may be. Fortunately, work in the fields of social insurance and public finance tends to be much more unfettered than is the work of most private-sector actuaries. For example, the work of U.S. Government actuaries cannot even be copyrighted, by law, and little to none of it is classified or even confidential (except as it may relate to individual beneficiaries who do have privacy rights).

As editor, I ask every reader of this newsletter to look back on your work during the past few years and try to find something that might be useful—or merely interesting—to other actuaries with interests similar to yours. If you find something and have time to describe it in a few pages, please prepare a draft article and send it to me. You are unlikely to become a famous author, but you will be contributing to the vast body of knowledge that underlies actuarial science. We do have some practical limits on article length, so if your contribution is too long, please attempt to summarize it. Interested readers will be told how to contact authors for additional background material.

Thank you in advance for your contributions to this newsletter, the SOA and the actuarial profession! ■



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REGISTRATION OPENING JULY 1.

Decision-Useful Risk Measures for Public Pensions

By William Forna, Paul Angelo, Randy Dziubek and Todd Tauzer

Actuarial Standard of Practice (ASOP) No. 51 governs the “Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.” ASOP 51 is now effective and requires identification and assessment of funding risks in actuarial valuation. This article will address the new requirements with an emphasis on providing useful information to public pension stakeholders. The authors include consulting actuaries, a public pension system actuary and a rating agency actuary, who will bring three different perspectives to the topic.



Other ASOPs are relevant to pension plan actuarial valuations and include the following:

- ASOP 4—Measuring Pension Obligations and Determining Pension Plan Costs or Contributions
- ASOP 27—Selection of Economic Assumptions for Measuring Pension Obligations
- ASOP 35—Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations
- ASOP 44—Selection and Use of Asset Valuation Methods for Pension Valuations

ASOP 4 has a proposed revision that includes “Investment Risk Defeasement Measure” (IRDM). This will be contrasted somewhat with various Decision-Useful Risk Measures used by practitioners and presented in this article.

ASOP 51 presents several recommended practices:

- Identify risks that may be anticipated to significantly affect plan’s future financial condition
- Assess these risks including potential effects
- Recommend additional assessment if significantly beneficial
- Calculate plan maturity measures that are significant to understanding risks
- Identify historical measures that are significant to understanding risks

The risks to be evaluated under ASOP 51 are:

- a. Investment Risks (different returns from expected)
- b. Asset Liability Mismatch Risk (changes in asset values not matched by changes in liabilities)
- c. Interest Rate Risk (different from expected)
- d. Longevity and Other Demographic Risks (different from expected)
- e. Contribution Risk (not received)

Several risk-assessment methods are discussed in the ASOP and will be presented in more detail in this article. These include:

- Scenario Tests
- Sensitivity Tests
- Stochastic Modeling

ASOP 51 is now effective and requires identification and assessment of funding risks in actuarial valuation.

- Stress Tests
- Comparison of Present Values With Those Calculated at Minimal-Risk Discount Rates

Likewise, several plan maturity measures are discussed in the ASOP and are presented in this article, including:

- f. Ratio of Market Value of Assets to Active Payroll
- g. Ratio of Retiree Liability to Total Actuarial Liability
- h. Ratio of Cash Flow to Market Value of Assets
- i. Ratio of Benefit Payments to Contributions
- j. Duration of Actuarial Liability

Finally, ASOP 51 suggests certain historical measures incorporating risk:

- a. Plan Maturity Measures
- b. Funded Status
- c. Actuarially Determined Contribution
- d. Actuarial Gains and Losses
- e. Normal Cost
- f. Plan Settlement Liability

In the pages that follow, three practitioners share their Decision-Useful Risk Measures for Public Pensions.

PRACTICAL EXAMPLES

This section presents some quantitative risk assessment tools we have used with municipal (city and county) retirement systems that, by law, are funded based on an actuarially determined contribution rate. These systems generally have enjoyed a high level of Board involvement and stakeholder interest in actuarial decisions and results. These systems already have some qualitative and quantitative ASOP 51 risk assessment information in their actuarial reports, for example, the volatility ratios discussed a little later in this article. However, the more detailed quantitative risk assessments have been performed only for some of the systems, and are generally provided outside the actuarial reports. We expect that ASOP 51 may spur additional

interest and discussion of the more detailed quantitative risk assessments.

Volatility Ratios—Plan Maturity Measure and Quantitative Risk Assessment

Volatility ratios (sometimes called volatility indexes) are an easy-to-calculate measure of the relative sensitivity of employer contributions to changes in assets or liabilities. There are two common volatility ratios:

1. Asset Volatility Ratio (AVR): Assets/Payroll
2. Liability Volatility Ratio (LVR): Accrued Liability/Payroll

These ratios are most commonly thought of as maturity measures, along with ratios of retired to active members and ratios of benefit payments to contributions. In particular, ASOP 51 lists (only) the AVR as an example of a plan maturity measure.

We find that the AVR and LVR give a more quantitative indication of future cost volatility than headcount ratios, and thus are more useful as a risk assessment than some other plan maturity measures. Also, while the AVR gets more attention (such as being listed in ASOP 51) we find that the Liability Volatility Ratio better captures intrinsic plan volatility. One way to see this is to note that, as the plan approaches 100 percent funding, the AVR approaches the LVR.

We have found that the volatility ratios take some getting used to, and it takes some practice explaining them to trustees and stakeholders. However, we find they are worth the effort for communicating directional trends in cost volatility and especially for explaining the relative volatility for different tiers or plans.

Here is a simple LVR example. Consider an employer with a general and a safety plan, or a single plan with separate general and safety tiers and costs. Suppose the General Plan has an LVR of 5 and the Safety Plan has an LVR of 10. Then suppose the plan has an assumption change that increases the Actuarial Accrued Liability (AAL) of both plans by 10 percent.

For the General Plan: $AAL = 5 \times \text{Payroll}$, so $\Delta AAL = 50\%$ of payroll

For the Safety Plan: $AAL = 10 \times \text{Payroll}$, so $\Delta AAL = 100\%$ of payroll

This shows that the impact of the assumption change on the employer's contribution rates will be roughly twice as great for Safety compared to General. A similar example using the AVR will show the relative impact of investment experience on the employer contribution rates for the two plans.

For a live example, Table 1 shows the progression of these ratios over time for the General and Safety tiers of a particular county retirement system.

Table 1
Progression of Ratios Over Time

Year	General		Safety	
	AVR	LVR	AVR	LVR
2017	6.4	9.0	12.9	13.8
2016	6.0	8.9	12.2	13.4
2015	6.2	8.9	12.3	13.1
2014	6.2	8.6	12.1	12.9
2013	5.5	8.1	10.8	12.9

Here we see that the AVRs and LVRs are substantially higher for Safety than for General. Using the 2017 results we can observe that, comparing Safety to General:

10% asset loss is **129% vs 64%** of payroll—so Safety rates will be twice as volatile

10% change in AAL is **138% vs 90%** of payroll—so Safety rate impact is over 50% greater

Practical Investment Return Scenario Test

ASOP 51 lists several quantitative risk assessment methods:

- Scenario Tests—impact of future experience (“events”)
- Sensitivity Tests—impact of assumption changes
- Stochastic Modeling—distribution of future experience
- Stress Tests—impact of “adverse changes in factors affecting a plan’s financial condition” (i.e., experience)
- Comparison of valuation present values with present value “using a discount rate derived from minimal-risk investments”

Here is a particular type of deterministic investment return scenario test we have found very accessible and useful for both trustees and employers. It illustrates the projected effect of a single year of investment returns above or below the assumed investment return.

- Baseline: assets earn expected return every year
- Bad news scenario: one-year return of 0%
- Good news scenario: one-year return of 2 times assumed return

Note this is a relatively mild “stress test” compared to some recent proposals that would show multiple years of returns less



than assumed by some specific amount. In practice, we find this particular set of scenarios has several advantages:

- It does not introduce a new and arbitrary good news / bad news assumption parameter like “3% above or below the assumed rate,” which makes it look less like a prediction. Also we find everybody intuitively understands “zero” and “double.”
- Because it is a one-year variation, we find it is more credible than a specific multiyear variation because it shows a realistic range of outcomes. However, because it is a fairly mild “stress test,” it may not be an adequate risk assessment for systems that are already seen as financially stressed.
- Because it is a one-year variation, it can be used by employers to estimate next year’s contribution requirements for budgeting by interpolating based on actual returns as they emerge during the year.

In Figures 1, 2 (Pg. 9) and 3 (Pg. 10), we show the effect of these three scenarios on the funded ratio, the unfunded actuarial accrued liability or UAAL (both on a smoothed assets basis) and the employer contribution rate (aggregating all tiers together).

Finally, while we have not illustrated it here, we sometimes include a graph showing the new baseline scenario together with baseline projection from last year. This shows very clearly the projected effect of one year of actual investment and demographic experience.

Figure 1
 Projected Funded Ratios (Actuarial Value of Assets Basis)
 Under Three Market Return Scenarios for 2018/2019

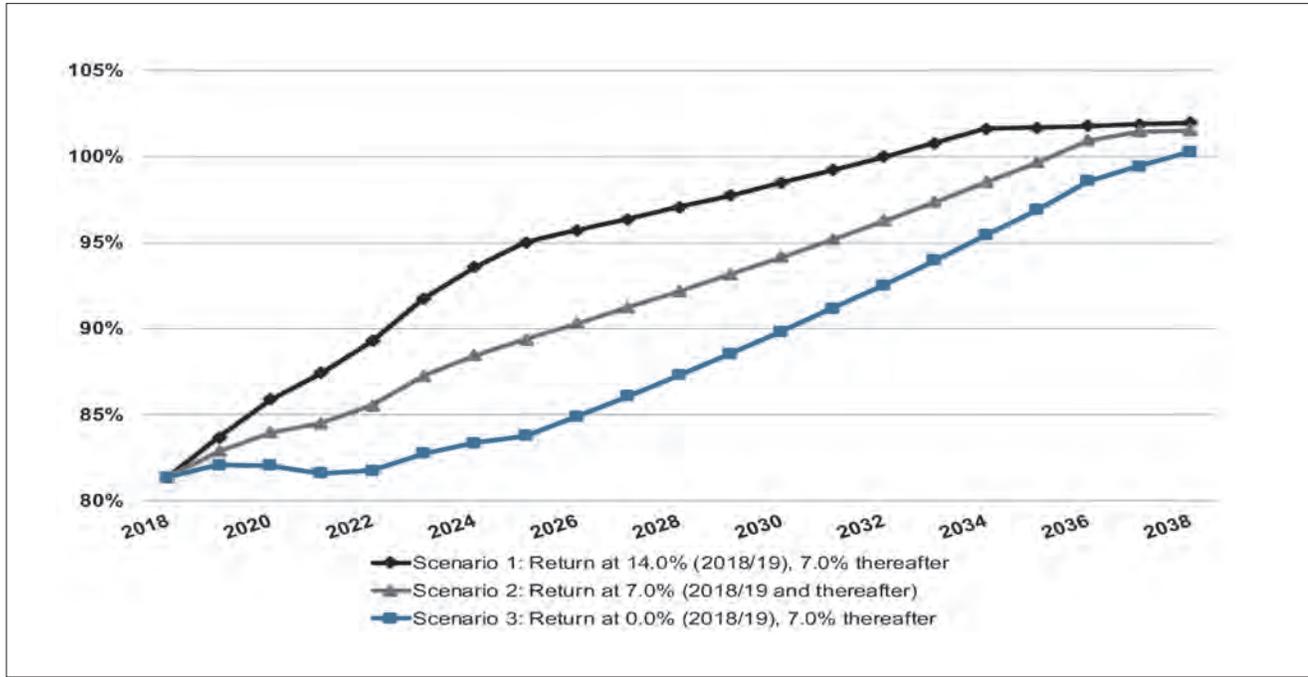


Figure 2
 Projected UAAL (on Actuarial Value of Assets Basis)
 Under Three Market Return Scenarios for 2018/2019 (\$ Millions)

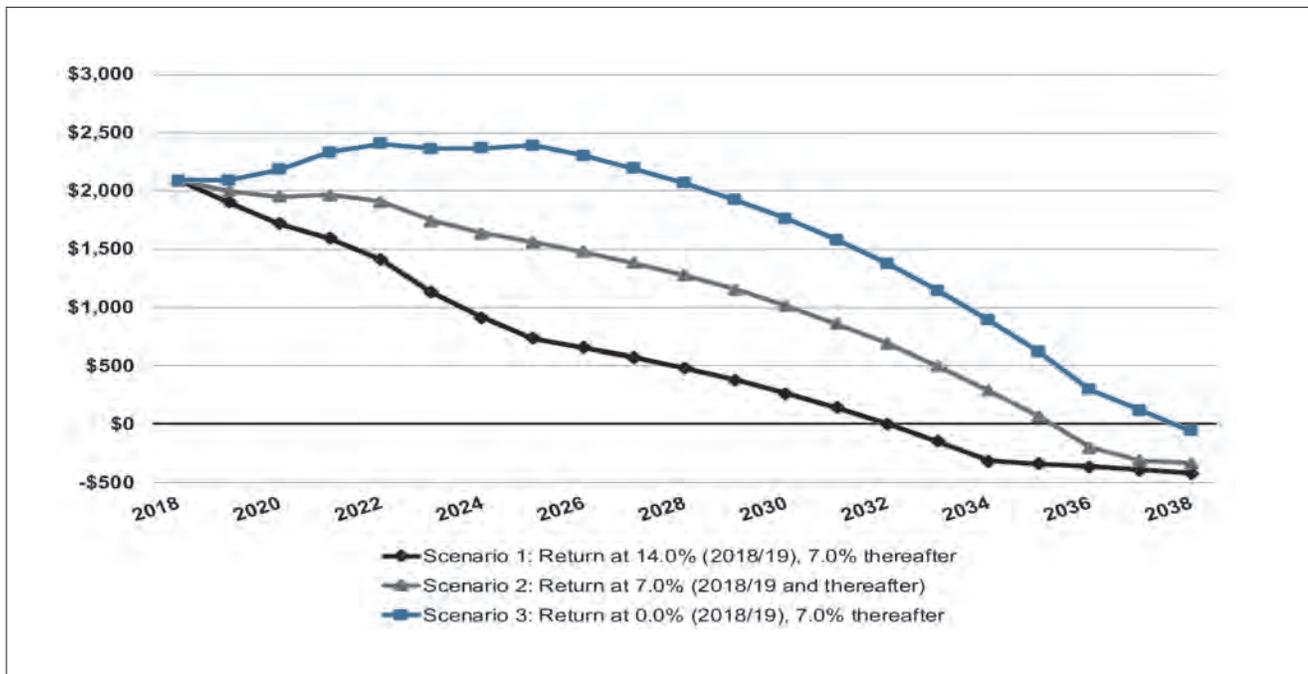
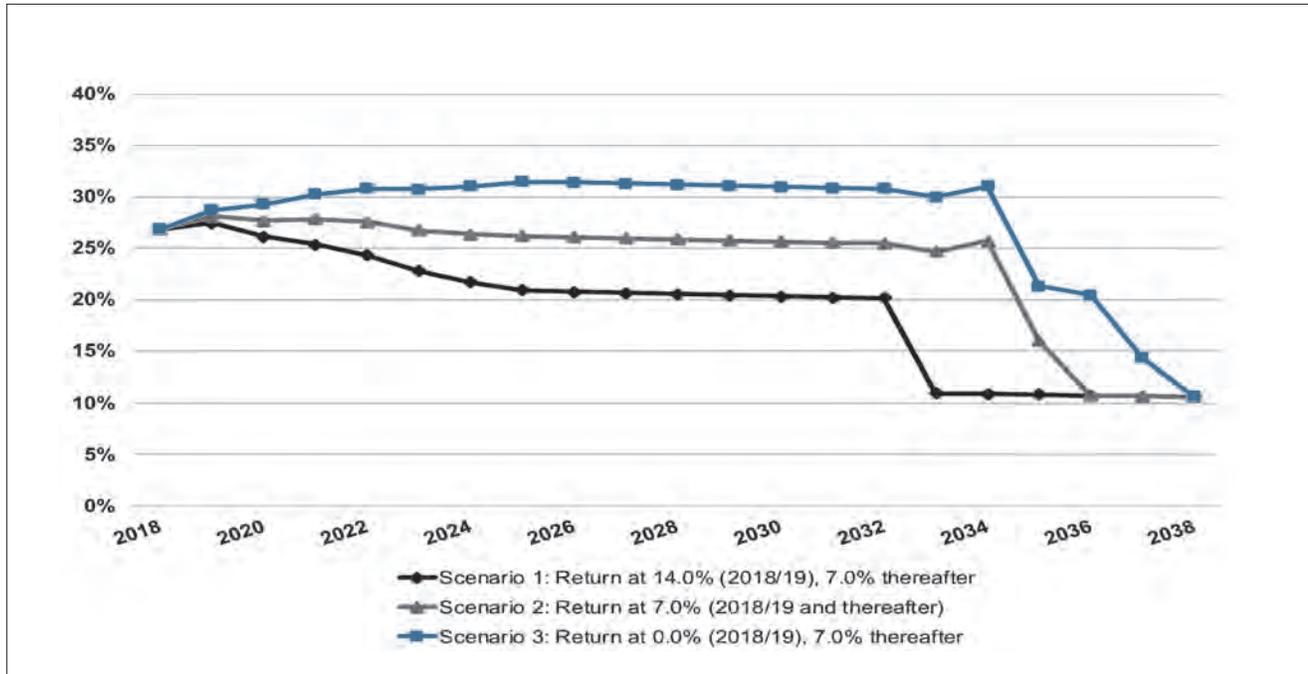


Figure 3
 Projected Employer Contribution Rates
 Under Three Market Return Scenarios for 2018/2019 (% of pay)



Stochastic Modeling

A stochastic modeling projection shows a probability distribution of future outcomes based on a specific matrix of capital market assumptions. This gives a quantified estimate of the likelihood of both relatively normal and extreme outcomes.

We advise retirement systems that, like deterministic projections, stochastic modeling outcomes are also entirely dependent on assumptions, but that dependence is not as apparent as it is with deterministic projections. For example, users of stochastic modeling should consider:

How fat are your tails? The probability of extreme outcomes may be difficult to know with any reliability. If a stochastic model shows that your “probability of ruin” (however defined) is 5 percent, different capital market assumptions with fatter or narrower tails could show results of 7 percent or 3 percent, respectively.

What is an acceptable probability of ruin? Stochastic modeling can assign a likelihood to undesirable outcomes, but cannot say what likelihood is acceptable. This means that stochastic modeling may be more illustrative than specifically decision useful.

While a stochastic modeling report will usually include graphs of the full distribution of stochastic outcomes, it is also helpful to summarize some specific probability results from the full distribution, as in Table 2. The CalPERS case study that follows in the next section also includes examples of such probability summaries.

In conclusion, Figures 4 (Pg. 11), 5 and 6 (Pg. 12) show the full distribution of stochastic outcomes for funded ratio, UAAL and employer contribution rates. We show the 95th, 75th, 50th, 25th, and 5th percentile outcomes, along with the baseline deterministic projection.

Table 2
Specific Probability Results

	Any time in the next 20 years Total Employer Rate Increases by at least		
	5% of Payroll (to 32% of Payroll)	10% of Payroll (to 37% of Payroll)	15% of Payroll (to 42% of Payroll)
Probability	30%	22%	16%

	Any time in the next 20 years Total Employer Rate Spikes in a Single Year by		
	3% of Payroll	5% of Payroll	7% of Payroll
Probability	10%	3%	2%

Figure 4
Projected Funded Ratios (Actuarial Value of Assets Basis)

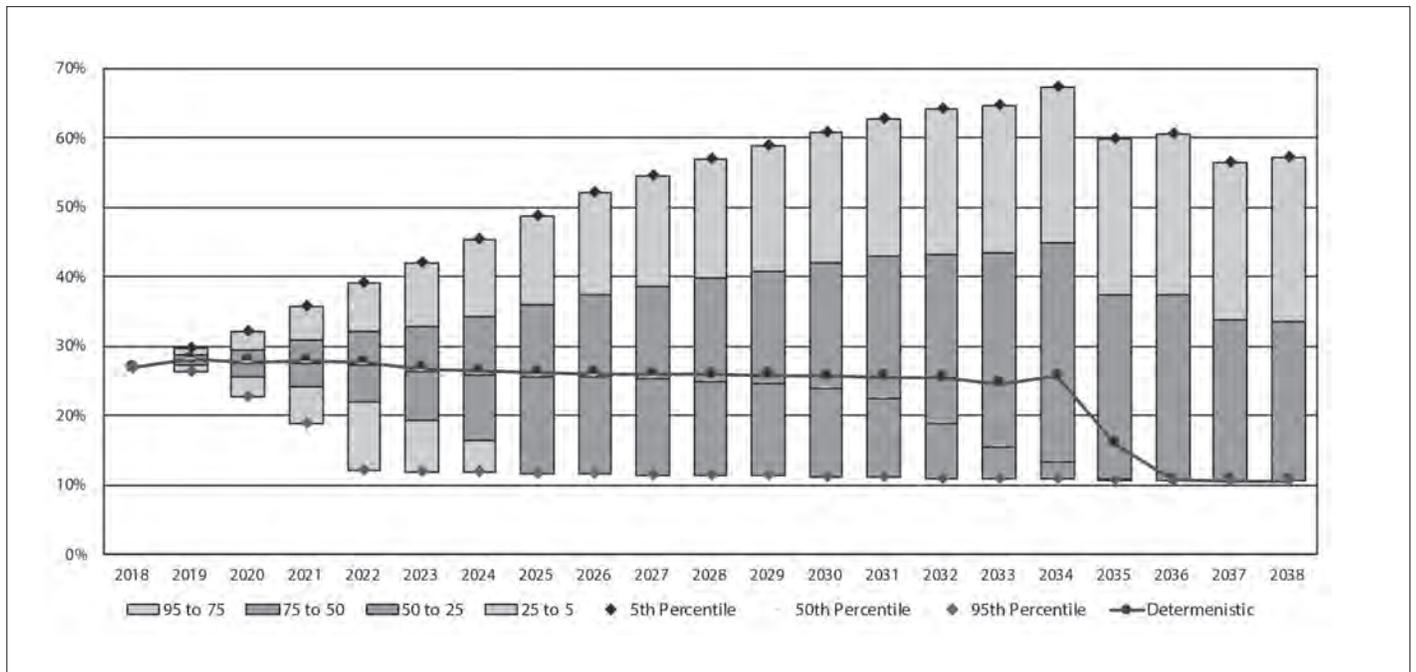


Figure 5
 Projected UAAL (Actuarial Value of Asset Basis) (\$ Millions)

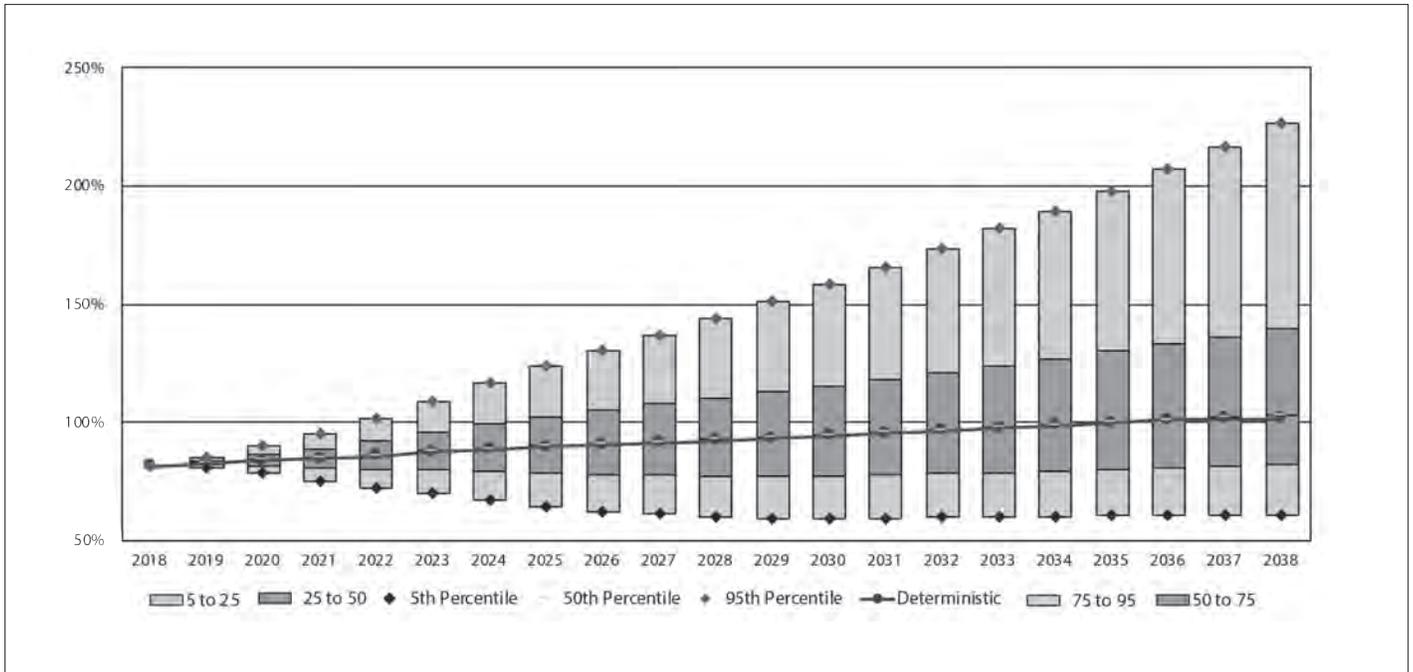
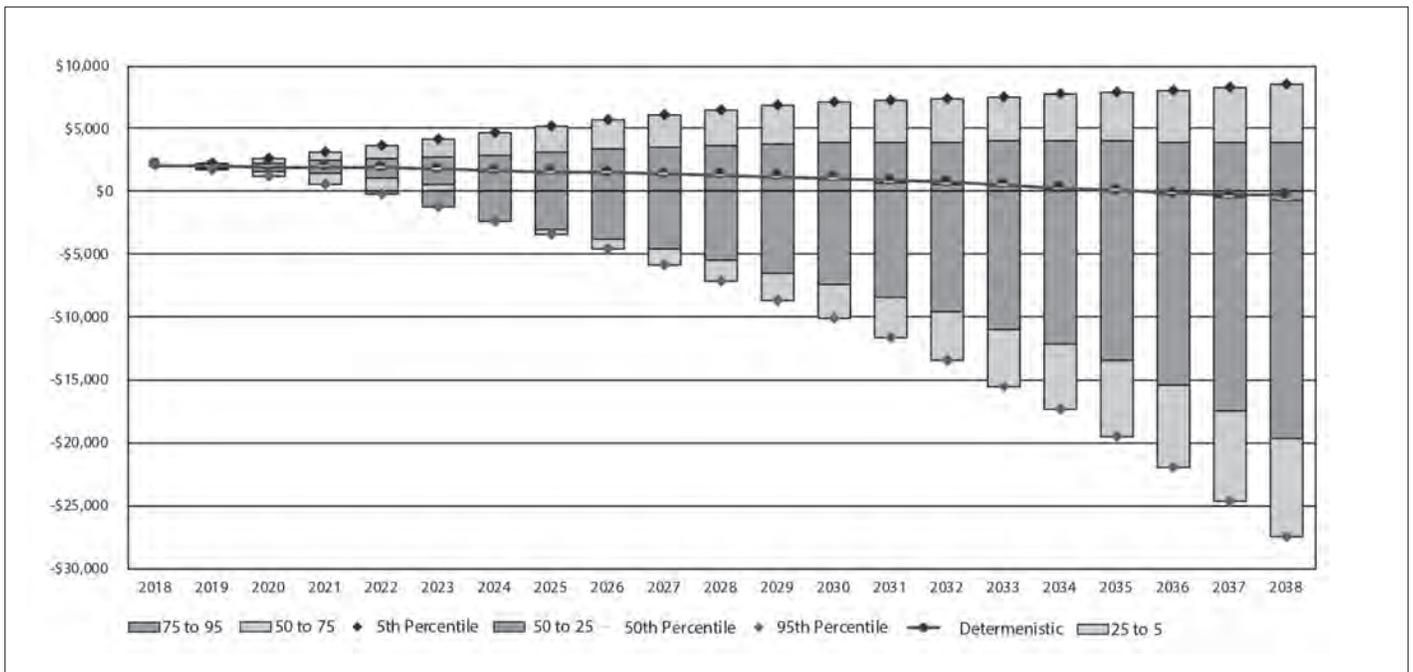


Figure 6
 Projected Employer Contribution Rates



CASE STUDY—CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM (CALPERS)

CalPERS strives to provide comprehensive risk assessments regarding plan funding and sustainability consistent with the Board of Administration’s pension and investment beliefs. Our 4,000-plus annual valuation reports include metrics on plan maturity, sensitivity analysis, and risk analysis to aid in the understanding of how plans are affected by investment return volatility and other factors.

Below is a summary of the specific items included in the CalPERS public agency reports intended to assess and disclose risks associated with the plans. In addition to the annual reports for public agencies, CalPERS produces an Annual Review of Funding Levels and Risks report that looks at the system as a whole. Exhibits from that report are also included below.

Public Agency Annual Valuation Reports

Many of the risk measures and accompanying text within our public agency reports were provided before the effective date of ASOP No. 51. However, others were added recently based on recommendations with ASOP No. 51.

Our participating agencies use this information for short- and long-term budgeting purposes as well as to assist them in making plan-related decisions including:

- Whether to make contributions to CalPERS in excess of minimum requirements
- Benefit-related decisions (limited to the addition of new tiers or minor adjustments to certain plan provisions)
- Whether to contribute to a section 115 trust and the selection of the investment mix for such assets
- Whether to terminate the CalPERS contract
- Whether to request short-term contribution relief
- Staffing decisions (potentially)

Investment Risk

All public agency reports include a four-year projection of required employer contributions under various investment return assumptions. The alternate investment return scenarios are based on the 5th, 25th, 75th and 95th percentile average returns for the projection period. This provides some indication of the likelihood of the alternate scenarios in addition to their impact on required contributions.

Since the projections in Table 3 do not illustrate the impact of a single year “shock” scenario, we also provide the following accompanying text from our valuation reports.

Table 3
Single Year “Shock” Scenario

Assumed Annual Return From 2018–20 through 2021–22	Projected Employer Contributions			
	2021–22	2022–23	2023–24	2024–25
1.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,527,000	\$7,665,000	\$8,766,000	\$10,051,000
4.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,417,000	\$7,339,000	\$8,122,000	\$8,988,000
7.0%				
Normal Cost	11.1%	11.1%	11.1%	11.1%
UAL Contribution	\$7,307,000	\$7,007,000	\$7,450,000	\$7,857,000
9.0%				
Normal Cost	11.3%	11.5%	11.8%	12.0%
UAL Contribution	\$7,128,000	\$6,618,000	\$6,815,000	\$6,936,000
12.0%				
Normal Cost	11.3%	11.5%	11.8%	12.0%
UAL Contribution	\$6,671,000	\$5,652,000	\$5,276,000	\$4,752,000

“Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0 percent or greater than 12.0 percent over this four-year period, the possibility of a single investment return less than 1.0 percent or greater than 12.0 percent in any given year is much greater.”

Sensitivity Tests

Tables 4, 5 and 6 are provided in all public agency valuation reports to provide agencies with expected impacts should long-term experience vary from the actuarial assumptions.

Contribution Risk

CalPERS agencies have the ability to voluntarily terminate their contract. In addition, agencies that do not make minimum

Table 4
Discount Rate

Sensitivity Analysis				
As of June 30, 2018	Plan’s Normal Cost	Accrued Liability	Unfunded Accrued Liability	Funded Status
7.00% (current discount rate)	18.529%	\$233,633,623	\$85,963,182	63.2%
6.0%	22.941%	\$263,189,076	\$115,518,635	56.1%
8.0%	15.123%	\$209,050,385	\$61,379,944	70.6%

Table 5
Inflation (discount rate held constant)

As of June 30, 2018	Current Inflation Rate	-1% Inflation Rate	+1% Inflation Rate
a) Accrued Liability	\$233,633,623	\$219,159,383	\$244,076,865
b) Market Value of Assets	\$147,670,441	\$147,670,441	\$147,670,441
c) Unfunded Liability (Surplus) [(a)-(b)]	\$85,963,182	\$71,488,942	\$96,406,424
d) Funded Ratio	63.2%	67.4%	60.5%

Table 6
Post-Retirement Mortality

As of June 30, 2018	Current Mortality	10% Lower Mortality Rates	10% Higher Mortality Rates
a) Accrued Liability	\$233,633,623	\$238,220,223	\$229,397,264
b) Market Value of Assets	\$147,670,441	\$147,670,441	147,670,441
c) Unfunded Liability (Surplus) [(a)-(b)]	\$85,963,182	\$90,549,782	\$81,726,823
d) Funded Ratio	63.2%	62.0%	64.4%

required contributions are generally terminated involuntarily. If unfunded liability exists at the time of termination, by law future member benefits—including those of existing retirees—are reduced by the percentage necessary to bring liabilities in line with assets. Table 7 provides information regarding the potential reduction in member benefits should the plan voluntarily or involuntarily terminate.

Given the liabilities in this exhibit are determined using Treasury rates, they also provide information regarding investment risk.

Maturity Measures

Each CalPERS public agency valuation report contains maturity measures (see Tables 8, 9 and 10). As suggested in ASOP No. 51, commentary is also provided to aid the user in understanding the significance of the measures.

Annual Review of Funding Levels and Risks

A few months after the completion of the annual reports that establish required contributions for our agencies, CalPERS actuaries produced the Annual Review of Funding Levels and

Table 7
Potential Reduction in Member Benefits

Market Value of Assets (MVA)	Hypothetical Termination Liability^{1,2} @ 2.50%	Funded Status	Unfunded Termination Liability @ 2.50%	Hypothetical Termination Liability^{1,2} @ 3.25%	Funded Status	Unfunded Termination Liability @ 3.25%
\$147,670,441	\$387,818,335	38.1%	\$240,147,894	\$356,508,322	41.4%	\$208,837,881

Table 8

Support Ratio	As of June 30, 2017	As of June 30, 2018
1. Number of Actives	262	261
2. Number of Retirees	398	420
3. Support Ratio [(1) / (2)]	0.66	0.62

Table 9

Ratio of Retiree Accrued Liability to Total Accrued Liability	As of June 30, 2017	As of June 30, 2018
1. Retired Accrued Liability	135,944,167	152,706,032
2. Total Accrued Liability	215,445,500	233,633,623
3. Ratio of Retiree AL to Total AL [(1) / (2)]	63%	65%

Table 10

Contribution Volatility	As of June 30, 2017	As of June 30, 2018
1. Market Value of Assets without Receivables	\$ 138,650,368	\$ 147,419,950
2. Payroll	20,779,907	21,276,242
3. Asset Volatility Ratio (AVR) [(1) / (2)]	6.7	6.9
4. Accrued Liability	\$ 215,445,500	\$ 233,633,623
5. Liability Volatility Ratio (LVR) [(4) / (2)]	10.4	11.0

Risks report that is presented to our Board. This report provides systemwide results that the Board uses to make decisions regarding:

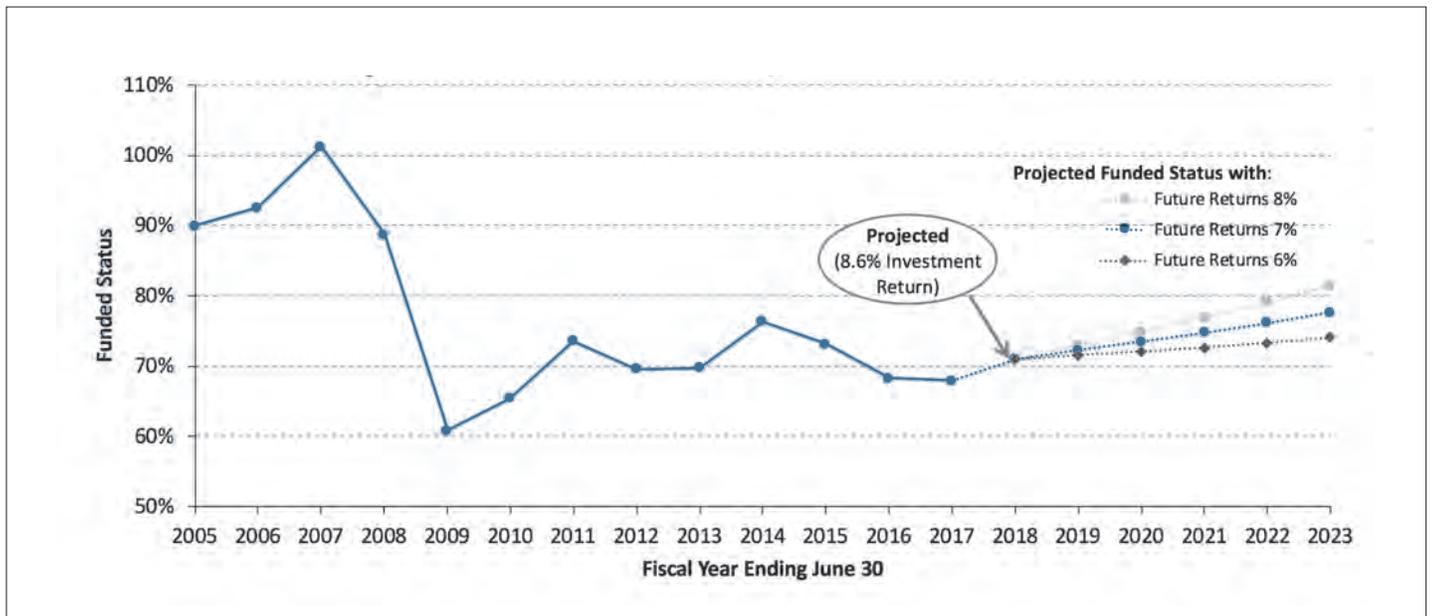
- Investment policy
- Funding policy (including amortization policy)
- Selection of actuarial assumptions (primarily economic)

Figures 7, 8, 9 (Pg. 17) and 10 (Pg. 18) illustrate the results.

Projections of Funded Status

Figure 7

PERF Funded Status Based on Market Value of Assets (June 30, 2005 to June 30, 2018)



Stochastic Analysis

Stochastic analysis is used extensively in the Annual Review of Funding Levels and Risk report to determine the likelihood of future events regarding funded status levels, contribution levels and contribution volatility. This analysis was used recently by the Board to assist in the analysis of proposed changes to the amortization policy which were presented and approved in February 2018.

Maturity Measures

Figure 8
Ratio of Active to Retirees

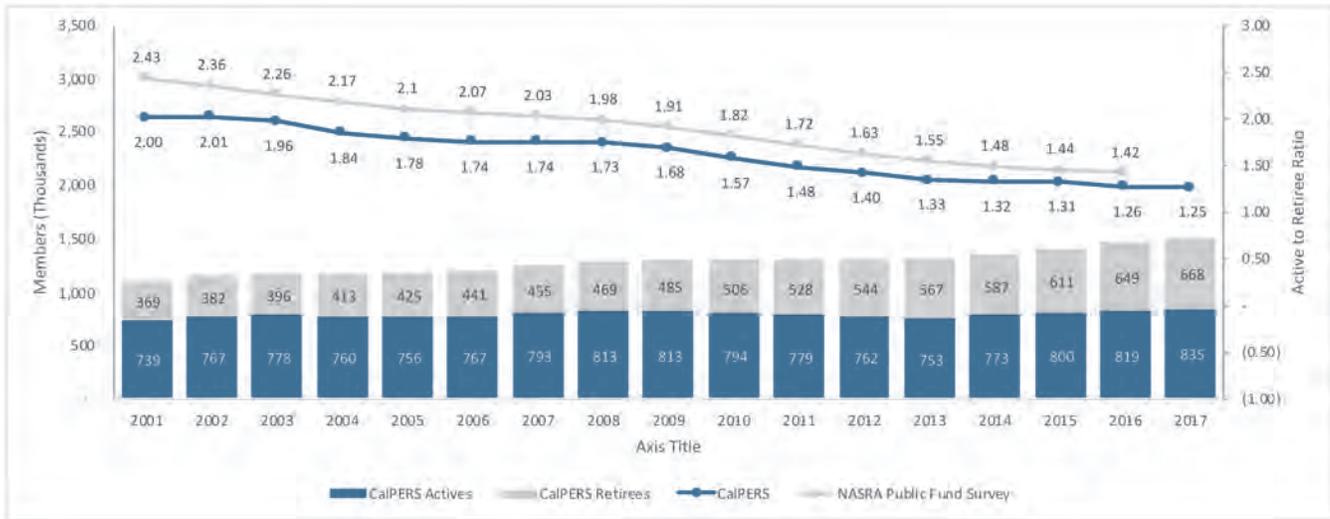


Figure 9
Ratio of Retiree Accrued Liability to Total Accrued Liability

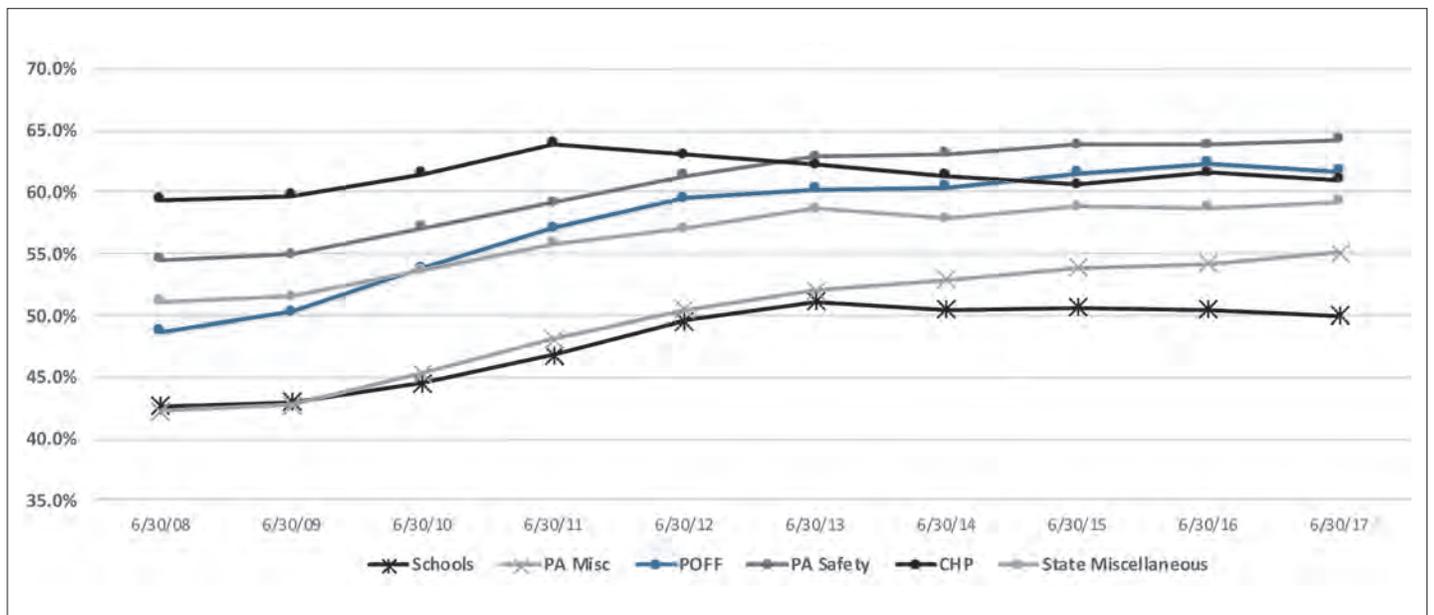


Figure 10
Asset Volatility Ration (MVA to Payroll)

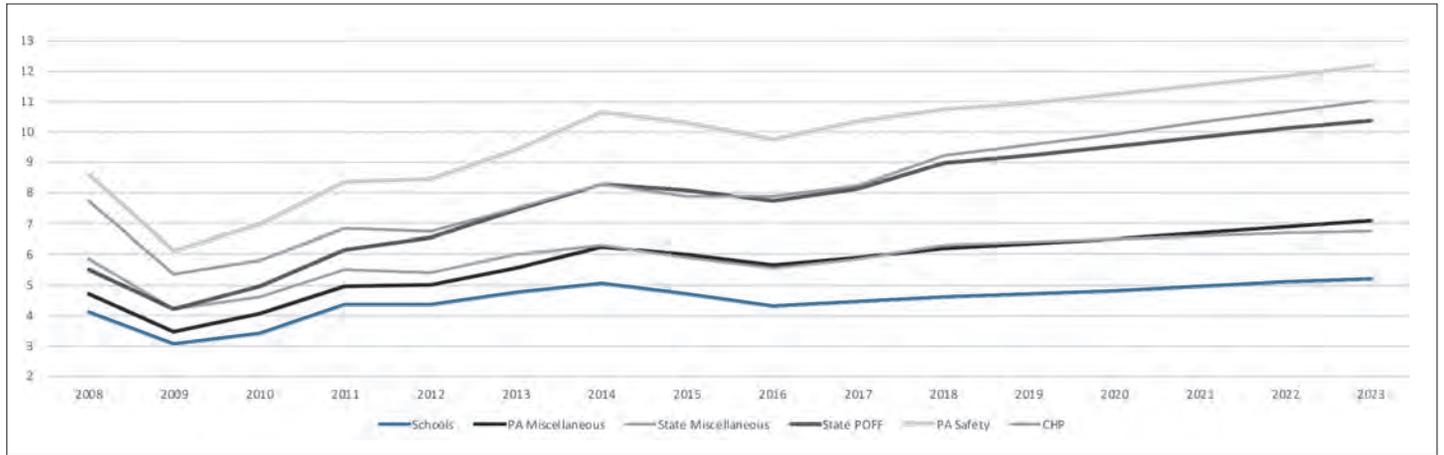


Table 11
Probability of Falling Below Given Funding Level (at any point in next 30 years)

Plan	40%		50%		60%	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	< 1%	< 1%	6%	1%	48%	24%
Schools	< 1%	< 1%	3%	1%	33%	22%
CHP	< 1%	< 1%	15%	2%	100%	100%
POFF	< 1%	< 1%	6%	1%	52%	26%
PA Miscellaneous	< 1%	< 1%	5%	2%	38%	27%
PA Safety	< 1%	< 1%	9%	4%	54%	43%

Table 12
Probability of Employer Contribution Rates Exceeding Given Level (at any point in next 30 years)

Plan	30% of Payroll		35% of Payroll		40% of Payroll	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	100%	100%	73%	56%	32%	28%
Schools	25%	36%	4%	11%	< 1%	1%
PA Miscellaneous	45%	53%	11%	23%	1%	6%
Plan	50% of Payroll		55% of Payroll		60% of Payroll	
	2017	2018	2017	2018	2017	2018
CHP	100%	100%	100%	100%	100%	87%
POFF	97%	80%	69%	52%	38%	32%
PA Safety	97%	100%	78%	79%	54%	61%

Figure 13
Probability of Employer Contribution Rate Increases of Selected Magnitudes (at any point in next 30 years)

Plan	3% of Payroll		5% of Payroll		7% of Payroll	
	2017	2018	2017	2018	2017	2018
State Miscellaneous	18%	53%	< 1%	12%	< 1%	6%
Schools	21%	41%	< 1%	7%	< 1%	4%
PA Miscellaneous	3%	40%	< 1%	9%	< 1%	5%

Plan	5% of Payroll		7% of Payroll		9% of Payroll	
	2017	2018	2017	2018	2017	2018
CHP	25%	59%	1%	27%	< 1%	12%
POFF	8%	47%	< 1%	18%	< 1%	9%
PA Safety	12%	55%	< 1%	20%	< 1%	10%

Actual exhibits from the 2018 report are provided in Tables 11, 12 and 13.

The report templates used by the CalPERS actuaries are reviewed annually. We continually discuss possible additions or improvements—especially in the critical area of risk analysis—internally as staff and with our outside stakeholders.

RATING AGENCY PERSPECTIVE

As a credit rating agency, S&P Global Ratings provides intelligence to the marketplace on the potential ability and willingness of an issuer to meet its financial debt obligations in full and on time, a concept we identify as creditworthiness. For U.S. state and local governments, evaluation of creditworthiness encompasses several factors beyond an entity’s ability to meet its pension promises. However, pensions play a key role in our assessment of creditworthiness because of their continual and increasing pressure on states’ and municipalities’ finances, especially when considering the legal and political protections generally afforded pensions.

Our pension assessment starts with an examination of the current funded position and size of liabilities and contributions, but quickly focuses in on funding discipline metrics such as prudent assumptions, contribution practices, effective amortization of the unfunded liability, and related risk metrics including demographics. We are interested in knowing what kinds of historical decisions and practices have led to today’s position, and similarly how today’s policies will drive potential progress and cost trajectory going forward. In short, we endeavor to anticipate the potential for and scale of accelerating payments and increasing budgetary stress over time in light of a municipality’s complete financial profile.

To aid us in this determination, we use several risk metrics of our own, two of which will be highlighted here. The first, described in S&P Global Ratings’ U.S. States Methodology, is our minimum funding progress (MFP) metric, which compares total contributions to the sum of the service cost, interest cost on the NPL, and 1/30th of the NPL, as an annual snapshot of contribution effectiveness. We generally view negative amortization or even static funding poorly in credit analysis, especially when it lingers over a period of time. Figure 11 displays that recently only nine out of 50 states have met or exceeded this metric. Given that we consider the MFP a measure of “minimum progress,” it is clear that in our view there is room for significant improvement within contribution practices. We also examine whether or not (indicated by gray or blue respectively) all state plans in aggregate consistently and fully follow actuarially based contributions as another indicator of liability management over time.

Figure 12 examines the discount rate, asset allocation mix, and plan maturity for the largest pension plan in each state. Investment volatility is constantly in the news as a major driver of cost variation for pension plans, but we firmly hold that a plan’s tolerance to that investment volatility depends on many factors, including but not limited to the demographic profile of the plan. This is one of the reasons why we believe there is little analytical support for us to adjust all plans by one single uniform discount rate, even under the level cost method. And as plans grow more mature, the contribution rate sensitivity to investment volatility increases, even as plans have been increasing their allocation to complex and risky assets. The top left corner of Figure 12 represents high risk plans that are both more mature and have more risky investment portfolios.

We endeavor to anticipate the potential for and scale of accelerating payments and increasing budgetary stress over time in light of a municipality's complete financial profile.

While both assessments shown here are survey-based and not necessarily reflective of future deviations from expected values, the provisions of ASOP 51 still fit well into our forward-looking assessment of cost trajectory. In fact, we even have a score adjustment based on whether or not the issuer has a “credible

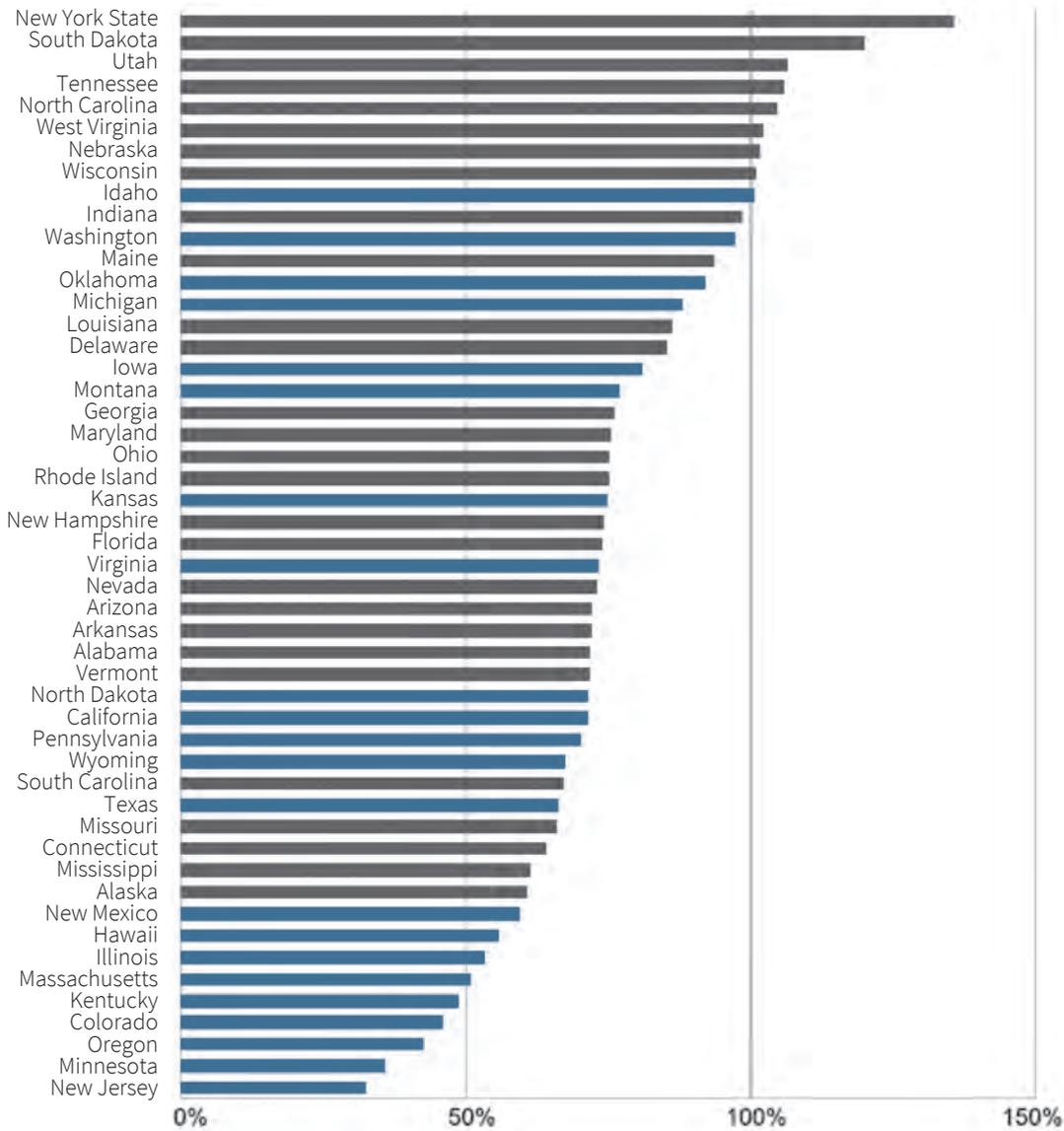
plan” in place to understand and address pension risk, which in my opinion speaks directly to the heart of the ASOP.

As pension risk always ties back to current and future financial impact for us, we especially see great value in full baseline and stressed projections of liabilities and costs going forward. It's surprising how many plan sponsors don't know what their estimated costs would be in five or ten years even if all assumptions are met. That lack of information can lead not only to poor financial planning over time, but also to potentially ill-informed perspectives and choices in benefits or funding practices that could have cost ramifications for decades to come.

The more ASOP 51 causes real and growing pension risks to be taken seriously, discussed in earnest, understood, and ultimately acted on from both the plan and plan sponsor perspective, the better the outlook will be for all parties involved.



Figure 11
State Plan Minimum Funding Progress



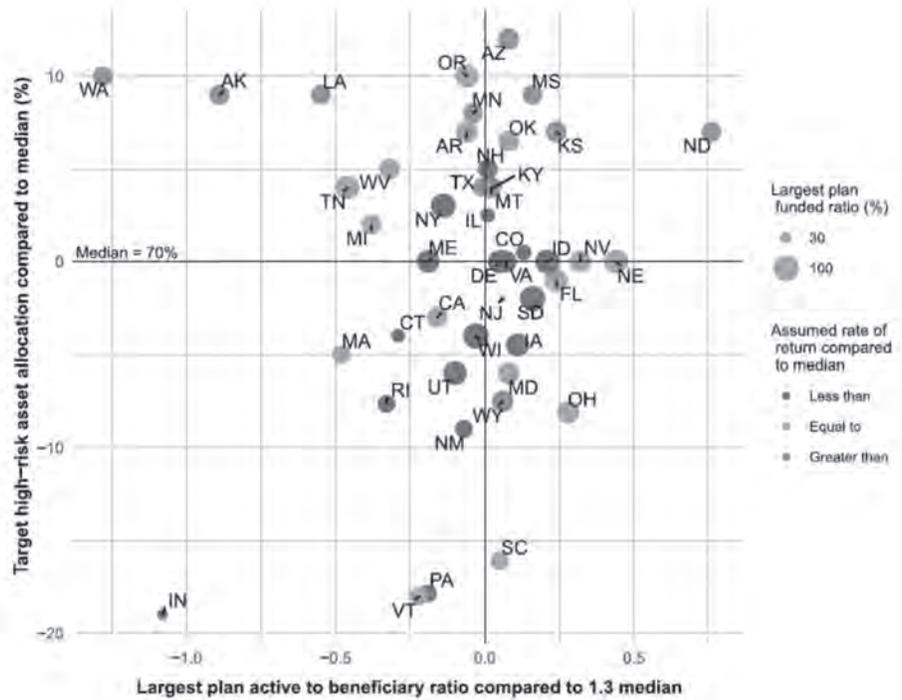
Total plan contributions to accounting measures for annual minimum funding progress

Blue: Pension contributions do not have an actuarial basis or are not usually fully funded. **Gray:** Pension plan contributions are actuarially based and usually meet or exceed required levels. *Alabama pension figures include the Alabama Employees' Retirement System agent plan measured as of fiscal 2016 as reported in the state's unaudited fiscal 2017 comprehensive annual financial report (CAFR). \$The funded ratio for Tennessee reflects 2016 plan information for the state's agent plans as reported in Tennessee's fiscal 2017 CAFR.

Source: S&P Global Ratings.
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Chart 12
Plan Demographics and Target Asset Allocations Largest State Pension Plans

Indiana’s pre-1996 Teacher’s Retirement Fund and Washington’s Public Employees’ Retirement System (PERS) Plan 1 are closed to new entrants. This Figure excludes information for Alabama, Georgia, Hawaii, and North Carolina because 2012 or 2017 targeted asset allocations for the largest plan were not available in the Public Plans Database (PPD). Missouri State Employees’ Retirement Systems is an outlier, with a 25 percent reduction in its targeted high-risk asset allocation since 2012 and falls outside the chart plot area.



Source: Pension plan and state reports. Investment allocation information from PPD. Copyright ©2018 by Standard & Poor’s Financial Services LLC. All rights reserved.

CONCLUSIONS

ASOP 51 requires identification and assessment of funding risks in actuarial valuation. The purpose is to provide useful information to public pension stakeholders. The various approaches illustrated above have been found to be useful by these experienced practitioners. As ASOP 51 is implemented, these measures and other risk assessment measures will be incorporated to enhance the understanding of public pensions. ■



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LIVING to 100

SOCIETY OF ACTUARIES
INTERNATIONAL SYMPOSIUM

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Mark your calendars for the 2020 Living to 100 Symposium, Jan. 13–15, 2020, in Orlando, Florida. Expert presenters will explore the latest longevity trends, share research results and discuss implications of a growing senior population. This prestigious event brings together thought leaders from around the world to share ideas and knowledge on increasing life spans. Registration and conference details will be available in summer 2019.



Participating Organizations

The following organizations have agreed to participate in this research endeavor with the Society of Actuaries as of August 2018. To view the current list, visit Livingto100.SOA.org.

Actuarial Society of South Africa

Actuaries Institute Australia

American Academy of Actuaries

Canadian Institute of Actuaries

Conference of Consulting Actuaries

Employee Benefit Research Institute

International Longevity Centre–UK

Office of the Chief Actuary, Canada (within the Office of the Superintendent of Financial Institutions)

Pension Research Council and Boettner Center for Pensions and Retirement Research of the Wharton School

The Actuarial Society of Hong Kong

Investments and Wealth Institute

American Geriatric Society

International Actuarial Association

LOMA

LIMRA

Government Actuary's Department (UK)

The Institute of Actuaries of Japan

Women's Institute for a Secure Retirement (WISER)

Institute and Faculty of Actuaries

Visit LivingTo100.SOA.org for more information

Annual Ranking of the ACA's First Decade

By Greg Fann

On Dec. 24, 1895, the United States Senate was in session to vote on a military affairs bill concerning employment of former Confederate officers. The Senate didn't vote again on Christmas Eve until 2009. The latter occurrence, a federal health care overhaul, signaled dramatic change in the health care landscape in the 2010s.

The Patient Protection and Affordable Care Act (ACA), colloquially known as Obamacare, was passed by the House and signed into law by President Obama in March 2010. As the ACA is now in its 10th year, it is useful and instructive to consider the rocky path of its inaugural decade.

The layout of this article is a ranking of the first 10 years of the ACA in a countdown-style format. The ranking order is obviously subjective in nature; details, references, and rationale are provided with each year. While I think the general indicators of the ACA's high and low points are compelling, other commentators may logically choose a different ordering based on alternative measures. For example, I concerned myself with market sustainability devoid of future funding challenges and did not consider the impact on the federal deficit as a ranking variable. Also, I didn't contemplate difficult-to-measure societal costs such as motivations for companies to limit the number of full-time employees or incentives for individuals to minimize personal income.

While this article is hopefully more entertaining than a typical health insurance research paper, it is not a novelty exercise; it's a serious reflection of the ACA history, the challenges encountered, and the notable successes. Hopefully, it's also engaging and jam-packed with insights (abundant references to time-relevant quotes and articles are included) to consider as the ACA prepares for the 2020s.

Although the ACA has broad impact on the health care system, the endurance of the legislation relies on the sustainability of the individual market which it fundamentally reshaped in 2014. Accordingly, the rankings are aligned with individual market success and its outlook. Relevant factors include consumer

satisfaction and popularity, enrollment success, flexibility to improve, functioning mechanics, general market confidence, insurer profitability, legal challenges and victories, number of participating insurers, operational aspects and premium levels. On to the countdown. ...

#10. 2016

In the third and final year of ACA markets having the benefit of training wheels (reinsurance and risk corridors), it was clear that the ACA was not ready for the real world. Numerous complications¹ arose after a relatively smooth-sailing prior year. Enrollment was less than half² of its original projected size, the population was skewed (older and sicker), insurer losses were substantial, and there was no cohesive plan³ to address the challenges. Assessment of blame included "self-inflicted wounds by Obama and his administration"⁴ as well as allegations directed toward the usual suspects.

2016 was also the year that serious concerns regarding the ACA risk adjustment methodology became publicly apparent. In March, the Centers for Medicare and Medicaid Services (CMS) acknowledged this through facilitation of an industry conference and the release of a white paper.⁵ Adjustments to the risk adjustment methodology dominated the annual 2018 regulation,⁶ which was finalized⁷ in 2016, marking President Obama's final fingerprints on his namesake law.

The risk adjustment challenges were so widespread that one of the first two Strategic Initiatives of the Society of Actuaries (SOA) Health Section Council (charged to investigate ACA markets and challenges) devoted its focus⁸ exclusively to ACA risk adjustment complications while downplaying other pervasive concerns. A series of papers from a diverse group of actuaries had a common theme and mirrored comments⁹ submitted in response to the proposed annual ACA regulation; the papers focused on risk adjustment inequities,¹⁰ volatility and solvency anxiety, and disadvantages for low-cost insurers who effectively manage care.¹¹ As the Trump administration navigates its way through the ongoing legal challenges,¹² unresolved methodology concerns still remain¹³ today. The common theme expressed in the series of actuarial papers led to an unfortunate conclusion that "we all want young people to enroll in the market with only two exceptions: young people and the health plan that would likely enroll them."¹⁴

In May, U.S. District Judge Rosemary Collyer ruled¹⁵ that the ACA's cost-sharing reduction (CSRs) subsidies were not appropriated by Congress and billions of Treasury funds were unconstitutionally spent. While this decision was regarded as a large blow to the ACA, it had a silver (pun intended) lining that manifested in 2018.

The troubled market catalyzed proposals¹⁶ from Republicans in Congress that also included federal subsidies to support the individual market (direct federal funding for this market began with the ACA), but in the form of age-based tax credits rather than income-based subsidies and ACA-like mechanics.¹⁷

Bad news seemed to repeat itself with CO-OP plans falling like dominoes and major companies exiting markets, prompting fear of some counties potentially having no insurers in place. Democrats joined Republicans in expressing doubts about the ACA's structural mechanics. Minnesota Governor Mark Dayton stated that "the reality is the Affordable Care Act is no longer affordable"¹⁸ and later utilized state funds to absolve some of the damages. At a campaign event in October, former President Bill Clinton referred¹⁹ to the ACA framework as a "crazy system" and said the subsidy structure (limited to certain income levels) in an inflated premium environment was "the craziest thing in the world." His description of premium cliffs was visibly clear with a simple graph-plotting²⁰ of premium rates by income level.

The best opportunity to correct ACA markets (without additional federal spending) in 2016 was the same as it is today. Section 1332²¹ of the legislation allows states to develop innovation waivers and flex some of the ACA's rigid rules to attract a broader population. Unfortunately, tangible opportunities were not well communicated and promulgation of guidance²² was released too late for states to make sweeping changes for 2017. Also, the guidance was arbitrarily inflexible²³ and offered little more than "reinsurance waiver" options that some states

adopted. If allowed to be used appropriately, Section 1332 would allow states to correct premium subsidy imbalances²⁴ and attract a broader market.²⁵

At the time, my assessment of the market outlook was gloomy due to regulatory inaction and lack of appropriate attention. I was concerned that stakeholders didn't fully appreciate that the long-term market viability relied on financial fundamentals rather than the pomp and circumstance²⁶ of the ACA's early years. I wrote²⁷ "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."

The difficult environment influenced the presidential election. In an exit poll, NBC reported that voters who thought the ACA was an overreach "are breaking decisively for Trump, 80 percent to 13 percent."²⁸ Donald Trump's victory obviously took some wind out of the ACA sails. In startling reality, his presidential actions have circuitously stabilized ACA marketplaces; but Mr. Trump was elected under a mantra of "repealing and replacing" the ACA, and expectations were clearly in sync with his campaign platform. The year ended with ACA markets in rough shape, insurer exits and high premium increases, consumer frustration, and anticipation²⁹ that the remaining days of the ACA experiment were numbered.

#9. 2013

Near the end of 2013, the implementation efforts came into public view. The beginning stage of ACA operations did not align with its solid legislative and legal successes. As many states declined to establish their own exchanges, the majority of states relied on the federal exchange model. Initial reports of "website is experiencing technical difficulties" were soon discovered to be grossly understated. The implementation rollout was disastrous and President Obama's first appointed HHS Secretary Kathleen Sebelius accepted responsibility³⁰ for the debacle,³¹ saying "You deserve better ... I apologize ... I'm accountable to you for fixing these problems and I'm committed to earning your confidence back by fixing the site." Predictably, initial enrollment³² was light and skewed toward older enrollees more likely to have medical conditions.

The year ended badly on other fronts as well. After earning the *Politifact.com* "Lie of the Year" award³³ with "If you like your health care plan, you'll be able to keep your health care plan," President Obama allowed states to extend "transitional" (aka grandmothers) plans for several more years, effectively



changing the ACA enrollment dynamics. By this time, insurers had already locked and loaded their initial rates for ACA markets, and the rule change caught insurers and their actuaries³⁴ off-guard. The midyear changes plagued markets in the initial years; insurers rely on tight margins with premiums established well in advance. Insurers need to understand the rules³⁵ up front to appropriately develop annual premium rates. While it's tempting to immediately solve an isolated problem, "government leaders could logically be insensitive to potentially inflicting market damage" and wound government's reputation as a reliable business partner.³⁶

Key stakeholders were troubled as well. A controversial 2.3 percent excise tax on medical devices in the ACA legislation went into effect in 2013. Labor unions said the ACA was highly disruptive, claiming it would drive up the costs of union-sponsored plans, "ACA will shatter not only our hard-earned health benefits, but destroy the foundation of the 40-hour work week that is the backbone of the American middle class."³⁷

After building momentum through the preimplementation years, 2013 was a setback and clearly the ACA's worst year before going live in 2014.

#8. 2017

2017 will forever be known³⁸ as the ACA's year of high rate increases and the failure of repeal efforts. It's also the only year of the ACA beyond the "training wheels" phase when insurers were reimbursed for CSR payments, and the limited one-year metric did not indicate the unadjusted ACA framework was sustainable. Insurers exited³⁹ ACA markets, and the uninsured rate began⁴⁰ its post-ACA climb. In the second round of the SOA Health Section Strategic Initiatives focused on ACA markets, a 2017 article noted, "It is often asked if the individual market is sustainable long term and if these issues can be fixed."⁴¹

The year began with President Trump's first executive order directing the Health and Human Services agency "to interpret regulations as loosely as allowed to minimize the financial burden on individuals, insurers, health care providers."⁴² This set a new direction⁴³ that provided expanded market flexibility. Much of the 2017 focus, however, was on federal legislative repeal efforts.

2017 will forever be known as the ACA's year of high rate increases and the failure of repeal efforts.

The other initial Strategic Initiative ("Evolution of the Health Actuary") of the SOA Health Section Council was led by SOA Board Member Joan Barrett.⁴⁴ In writing about the state of individual markets and potential legislative disruptions, she spoke of high rate increases, insurers dropping out of markets, and levels of market uncertainty that one might think would have been appropriate in 2014, not three years into the program. I echoed these comments on a podcast⁴⁵ about Section 1332 waivers, "I don't think anyone really believes that the markets have settled, and the waivers actually could bring some stability to the markets if they are tailored in the right way."

Despite warnings⁴⁶ to the contrary, the ACA was unwaveringly touted as a one-size-fits-all solution for everyone not eligible for other coverage. In reality, the unbalanced incentives caused the market to fall 12 percent short of the required⁴⁷ 40 percent of enrollees in the 18–34 age range. In June, the former Acting Administrator of the CMS Andy Slavitt acknowledged recognition of the imbalance and his satisfaction with the uneven pricing dynamics producing winners and losers. In an interview with National Public Radio, he said "The problem our country has is how to help people who are in the lowest economic straits, who have the most health challenges, get access to affordable coverage and, indeed, get well. The problem we don't have is how to help 27-year-olds get cheaper insurance. That's just not a national concern for us right now."⁴⁸

That admission was a far cry from ACA-architect David Cutler in 2013 advocating that ACA markets would be attractive to young men, "I don't think it (3:1 age curve) will have a huge impact because it will be offset by the subsidies. Many young men have relatively low incomes. Thus, the premium they face will not be the full amount, but rather the amount net of the subsidy. Put another way, the ACA has limits on the share of income that people will pay for health insurance. These limits are sufficiently low that the price will not be a prohibitive factor in determining whether to buy coverage or not."⁴⁹

While the mechanical combination of the ACA rating rules and unbalanced premium subsidies continued to afflict markets, legislator attention on market challenges was uncannily misdirected toward a "secret sabotage document"⁵⁰ that sought to close loopholes⁵¹ and was quite underwhelming from a scandalous viewpoint. With relief not coming through federal legislation or robust Section 1332 efforts, two unlikely remedies surfaced in 2017.

In May, an actuarial study⁵² revealed that the demographic imbalance might be partially resolved by employers accessing the individual market for their employees. Notably, this activity suggested that individual markets offered some attractive value for employers.⁵³ Key findings of the study included:



Overall, it was a bad year for the ACA. A significant improvement in financial results, stemming from large rate increases, is the only factor that keeps 2017 in the single digits on this list.

#7. 2014

The enrollment implications⁵⁶ of the ACA's rating rules and pricing mechanics came into view, with influences from the Supreme Court ruling on mandatory Medicaid expansion and President Obama's decision to allow transitional plans. The regulatory rating rules flirted with violations of actuarial principles, which the ACA tried to overcome with a mix of federal subsidies, a shared-responsibility payment requirement for those avoiding coverage, and general promotional efforts. The first of the three is the lifeblood of the market, and the market would collapse without this financial assistance. The second was weak and largely unenforced before being repealed. The third had some short-term value but fundamentally does not offer long-term value or sustain markets.

Rather than directly addressing the "important" problem of high health care costs,⁵⁷ the ACA provided financial incentives for low-income individuals to obtain health insurance coverage, but simultaneously created an "urgent" problem of disrupted insurance markets, which shifted focus away from the more important problem.

The ACA's redesign of market rules complemented by an allotment of federal funds was effective in providing insurance incentives to previously uninsured individuals. At the same time, it increased premiums and disadvantaged some prior individual market consumers. The unbalanced incentives created a skewed market⁵⁸ and sustainability challenges.

Whether or not commentators believe it is the right social policy, almost everyone agrees that the ACA's largest challenge is the disallowance of health status as a classification of pricing risk. In highlighting the dangers of broad risk classes in a general insurance sense, Actuarial Standard Of Practice No. 12⁵⁹ warns in the background section: "Failure to adhere to actuarial principles regarding risk classification for voluntary coverages can result in underutilization of the financial or personal security system by, and thus lack of coverage for, lower risk individuals, and can result in coverage at insufficient rates for higher risk individuals, which threatens the viability of the entire system." Actuarial principles are not theoretical ideas that can be overcome by sheer force in a practical world. Highlighting the importance of actuarial mechanics, WellPoint Chief Executive Joseph Swedish admitted⁶⁰ "the critical ingredient in terms of how our business operates ... without actuarial analysis, we really are shooting in the dark." The actuarial implications were decipherable⁶¹ and expected to change enrollment dynamics of individual and group markets.

- Relative to expectations and alleged sustainability requirements, the ACA did not attract the targeted cross section of members in the individual market. The rating requirements and the unbalanced allocation of tax subsidies attracted an older and sicker population. This resulted in higher average costs and less favorable risk adjustment settlements for insurers, both of which have necessarily increased future premium rates.
- With the current framework and resulting population, the individual market will continue to struggle with sustainability. Population changes could be brought about by different incentive structures through legislation, intelligent use of waivers via Section 1332, or through employer subsidies and material changes in distribution channels.
- Migration of workers from the traditional group market to the individual market will lower the average age and increase stability in the individual market.

In October, President Trump stopped⁵⁴ reimbursing insurers for CSR payments after receiving a legal recommendation from the Department of Justice. The market benefit of this action had been previously discussed,⁵⁵ but general public understanding of the paradoxical implications and market benefits is lacking, even in today's lower premium environment.

2017 ended with tax legislation that repealed the individual mandate penalty (effective in 2019), concerning some stakeholders and putting the 2012 Supreme Court decision back into focus.

HHS Secretary Sebelius announced her resignation in April and left the post in June. Her replacement Sylvia Burwell was favorably viewed as a capable administrator, less partisan and possessing less animus⁶² toward the insurance industry than her predecessor. She served for the remainder of President Obama's time in office.

A public relations nightmare occurred later in the year. Rich Weinstein, a Philadelphia-based investment adviser researching his options after his insurance plan was canceled for not meeting ACA standards, uncovered an incriminating video. It contained footage of one of the primary ACA architects stating that the ACA would not have passed had its promoters been honest with the public. Dr. Jonathan Gruber, an MIT professor noted for building econometric models for state insurance exchanges, was a consultant engaged by the Obama administration to help craft the ACA. At an academic conference explaining the ACA development, he said⁶³ "This bill was written in a tortured way to make sure the CBO did not score the mandate as taxes. ... Lack of transparency is a huge political advantage. Call it the stupidity of the American voter, or whatever." Unsurprisingly, Dr. Gruber's role in the ACA was largely downplayed by the Democratic political class after the video surfaced. Mr. Weinstein also discovered⁶⁴ Dr. Gruber's comments, which eventually led to the Supreme Court ruling on the applicability of premium subsidies in federal exchange markets. This exposure was obviously damaging to the reputation of the self-proclaimed "most transparent administration" in history.⁶⁵

Going into 2014, many consumers without health insurance or dissatisfied with their current coverage were cautiously optimistic about the new markets. Most prospective enrollees hadn't read the details of the legislation, so they didn't grasp the impact of the rating rules and the premium subsidy dynamics until they started shopping. When they shopped, their shopping was limited to their own insurance options, so their perspectives were likewise limited. Of course, the ACA impacted everyone differently, so everyone had different opinions. Due to the high cost of health care, sentiments were strong on both sides. Depending on where a consumer lived, his or her age and income, the ACA may have provided an easier opportunity to obtain health insurance. At the same time, a consumer might have been satisfied before the ACA and had their premiums doubled for a higher deductible plan with a skinnier network. "Affordability" didn't really translate to everyone, so initial consumer satisfaction with the law and the validation of the claim of "affordability" was a bit of a mixed bag.

#6. 2010

Americans have always been deeply divided on the appropriate level of government involvement. Due to its emotional nature, those seeking a heavier hand have historically viewed health

care as an opportunity to make inroads. In 1961, Ronald Reagan said,⁶⁶ "One of the traditional methods of imposing statism or socialism on a people has been by way of medicine. It's very easy to disguise a medical program as a humanitarian project; most people are a little reluctant to oppose anything that suggests medical care for people who possibly can't afford it."

The ACA legislation was divisive and contentious from the beginning. The vitriolic accusations of problems in the health care system weren't limited to political opponents. In his first State of the Union address, President Obama said⁶⁷ that his health care overhaul would "protect every American from the worst practices of the insurance industry." Americans were sympathetic toward that accusation, as it came on the heels of a 39 percent premium increase that was later determined to include calculation errors.⁶⁸ The legislation was unquestionably partisan and garnered no Republican votes. House Republican leader John Boehner said⁶⁹ Americans "are angry that no matter how they engage in this debate, this body moves forward against their will."

A lack of legislative consensus is usually followed by implementation and legal challenges, so it wasn't hard to predict future turmoil. As I wrote⁷⁰ about the importance of consensus in 2017, "Major legislation that lacks consensus often presents execution challenges. The ACA was passed by the narrowest of margins. In fact, the replacement of a U.S. senator changed the political makeup in the Senate, and the House of Representatives accepted the Senate bill without modification to avoid the Senate having to vote again. Many 'drafting errors,' which would normally be resolved through a conference committee, remained in the final legislation. Due to a continued lack of consensus, many issues (which virtually everyone acknowledges are real problems) remain unresolved. This was not a surprise to health care economist Michael Bertaut,⁷¹ who summarily concluded⁷² "a bill that essentially rerouted \$3 trillion a year and reformed every facet of health care in the United States would guarantee endless warfare."

In an SOA *Health Watch* interview⁷³ published in September, Grace-Marie Turner⁷⁴ said, "You know you had 30 percent approval for passage of this legislation, so you've passed a major overhaul of the health care system with the majority of the American people opposed. I think that makes it so much more difficult for this to work and for people to accept it, and we are a law-abiding country."⁷⁵

While the ACA remains a deeply divisive issue today, Americans are more accepting of its place in the health care landscape. Many people still object to the legislation, but they find it more tolerable in a less heavy-handed environment. Some ACA proponents are concerned with the new "escape options"⁷⁶ available

(while seemingly having little problem with the old ones⁷⁷), but the goodwill may actually help the ACA more than it hurts it. With these changes, the ACA is more popular than it's ever been, but it took nine years and equally divisive modifications that were violative of original ACA ideals to get here. Let's hope that the next major structural change in our health care landscape commences with a larger degree of consensus.

#5. 2011

While 2011 was the only quiet year in the public sphere, those in the insurance industry alternatively referred to the ACA as the AEA. That's the Actuarial Employment Act, and the characterization was a fair assessment. Federal grants for Rate Review brought premium mechanics into the public spotlight. States were pushing back⁷⁸ on the restrictive minimum loss ratio (MLR) requirements. Notably, Florida's Insurance Commissioner expressed unease with the requirement likely reducing the involvement of insurance agents in the process, stating, "I am especially concerned about how the MLR requirements will affect the role of health care agents who are critically necessary to help consumers in this increasingly complicated health care landscape."

Insurers who were not well positioned to participate in ACA markets were investigating how the ACA might damage their competitiveness. Through a consulting engagement, a pivotal moment in my career was catalyzed⁷⁹ by a detailed analysis⁸⁰ of ACA mechanics. After completing this project, my day-to-day work gradually shifted from tactical calculations to strategic assessments of market dynamics.

In November, the Supreme Court agreed to hear arguments brought by 26 states and the National Federation of Independent Business alleging that elements (including the individual mandate) of the ACA were unconstitutional. From a market sustainability standpoint, the American Academy of Actuaries went on record⁸¹ stating that the individual mandate (or an alternative mechanism that would "encourage broader participation") was essential. Plaintiffs in *Texas v. Azar* (2018) referenced the Academy's position in their arguments against severability.

#4. 2012

In the year of President Obama's reelection, the ACA survived a monumental federalism-based challenge with a landmark 5-4 Supreme Court decision that memorialized the shared responsibility payment as a legitimate "tax" assessed by Congress. The decision energized ACA supporters and renewed excitement toward the 2014 kickoff.

#3. 2015

At the five-year mark, the SOA Health Section published *The ACA@5: An Actuarial Retrospective*.⁸² As I wrote⁸³ in 2016, it

"provided a comprehensive look back at the work of actuaries related to the implementation of the ACA. At the time, there was a general sense of cautious optimism regarding the ACA. The early implementation struggles had been resolved; market participation was active for buyers and sellers; and several legal battles that reached the U.S. Supreme Court had been weathered."⁸⁴ An interesting and concerning observation of changing dynamics in one phase of actuarial work was presented⁸⁵ by regulators, "What used to be a purely analytical exercise is now peppered with political overtones. ... The fact that a rate increase is actuarially justified may not mean that it is politically palatable."

While certainly not out of the woods, there was cautious optimism as operational aspects had been fixed and many insurers who took a "wait and see" approach in year one participated in year two. Enrollment also grew, as it had taken some consumers time to warm up to the new markets.

The ACA had its second major Supreme Court battle, this one regarding the allowance of crucial premium subsidies to continue to flow to federally based exchanges. Premium subsidies, the lifeblood of the ACA markets, made the ACA a front page story⁸⁶ again after a period of ACA quietness in the news cycle. A court decision, precipitated by Mr. Gruber's comments⁸⁷ on subsidy eligibility, had ruled⁸⁸ "that the Internal Revenue Service (IRS) had broadened the ACA language 'an Exchange established by the State' to also include fallback exchanges established by the federal government (in states that did not establish an exchange) with regard to the issuance of government subsidies (technically 'tax credits') to assist individuals with health insurance premiums and benefit cost sharing." The Supreme Court overruled this decision.

The annual premiere meeting of health actuaries featured a well-received session that included House Budget Committee Chair and future HHS Secretary Tom Price. He spoke about legislative goals of establishing equity between individual and group markets.

After a challenging beginning, ACA markets rebounded in 2015 with more insurer confidence and enrollment increases driving

With these changes, the ACA is more popular than it's ever been, but it took nine years and equally divisive modifications that were violative of original ACA ideals to get here.

the uninsured rate down. The market improvements and a second major Supreme Court victory resulted in 2015 being an overall good year for the ACA.

#2. 2018

The largest and swiftest annual market improvement occurred in 2018. The impact of the improved financing clearly outweighed the scaling back of promotional efforts, which was alleged to foretell the worst open-enrollment season ever.⁸⁹ The improved dynamics surprised⁹⁰ many commentators.

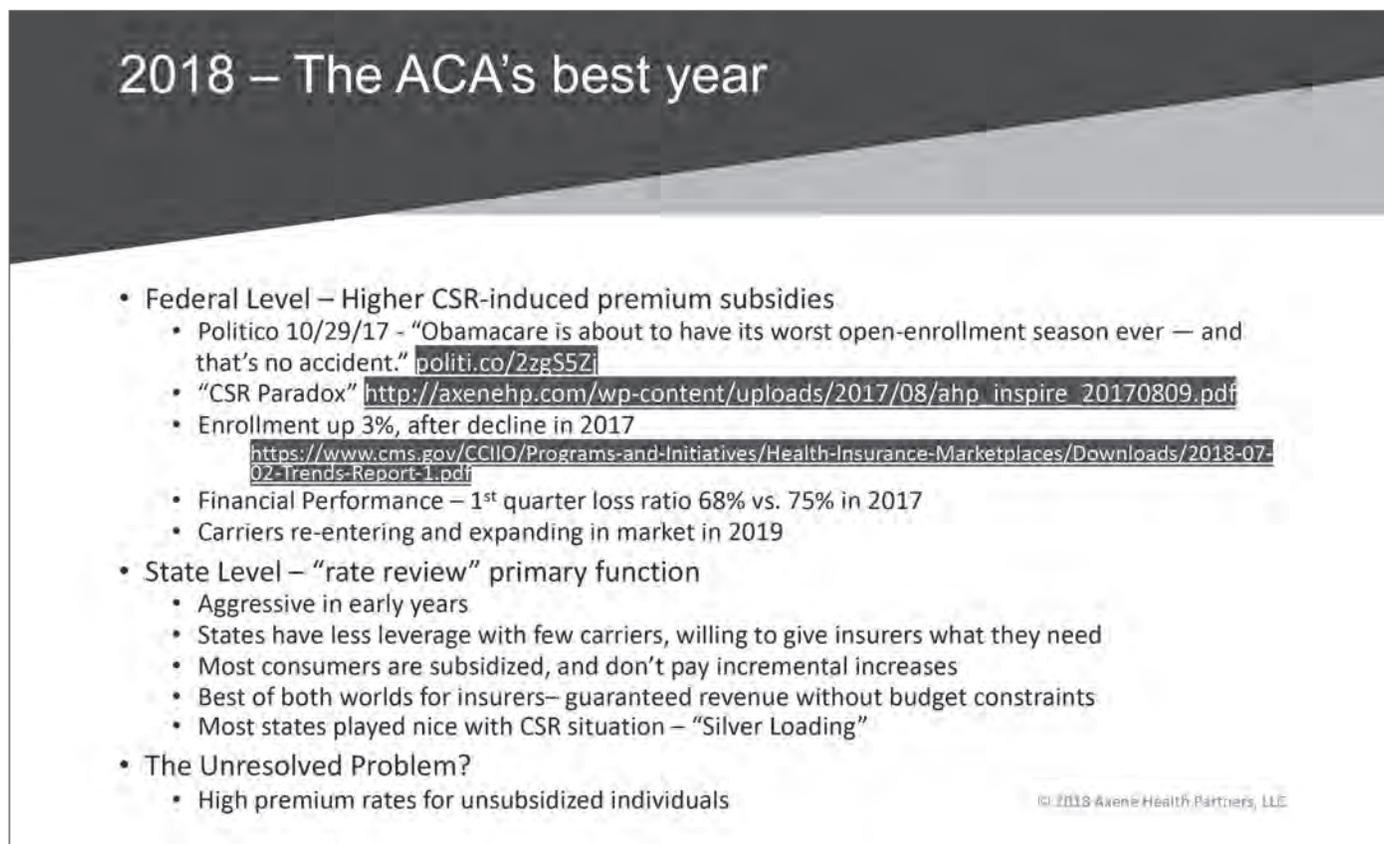
The catalyst for the change in direction was President Trump's decision to discontinue CSR funding, which paradoxically benefited markets. This decision received encouragement⁹¹ from several of his critics⁹² who took the time to understand its subtleties, but the directional ramifications were mostly misunderstood⁹³ by others. While the false narrative around the CSR impact caused some consumer confusion, some of us took time to assist consumers and explain⁹⁴ the new benefits and options to the general public.

The change marked a pivotal point⁹⁵ in The Evolution of the Individual Market, as “the favorable new environment attracted enrollment in 2018 that was larger than expected by some observers, particularly those who give more credence to non-financial measures such as government-sponsored outreach efforts.” The market results⁹⁶ generated some surprises. While enrollment significantly exceeded expectations, insurer profitability⁹⁷ skyrocketed to record levels. In October, new Section 1332 guidance brought additional interest⁹⁸ to the improving markets. Larry Levitt of the Kaiser Family Foundation plainly described⁹⁹ the settled environment in November, “At this point, the market looks pretty stable.”

In the final article¹⁰⁰ for the second ACA-focused Strategic Initiative, I answered the earlier question about whether the ACA was sustainable:

“The enhanced premium subsidies have made coverage for low-income enrollees more attractive and have likely improved the risk mix. 2018 enrollment was more robust than many commentators expected, and the uninsured rate fell after rising in 2017. Insurers

Figure 1
Improving Market



are experiencing record profitability, and that is reflected in the rate reduction in 2019. Competition is returning, and consumer popularity is also increasing. Polling should continue to rise as more people learn of the repeal of the individual mandate, which was consistently regarded as the ACA's least popular provision. The expansion of alternative options won't help ACA market enrollment, but it will likely improve consumer sentiment for those individuals who have been unable to find an ACA solution. The improved market dynamics, a split Congress and increasing popularity affirmatively answer the question posed throughout this series: Is the individual market sustainable in the long-term?"

In a presentation to actuaries in the summer, I claimed that 2018 was the ACA's best year. For reasons we are about to find out, it didn't hold the #1 slot very long. (See Figure 1)

#1. 2019

After a mass exodus in 2017 and 2018, insurers returned¹⁰¹ to ACA markets in 2019. The beneficial market changes reignited interest, and the number of state-level insurers¹⁰² increased 17 percent in 2019 after a 28 percent reduction in 2017 and a 21 percent reduction in 2018. Despite the warnings¹⁰³ regarding repeal of the individual mandate penalty, insurers were not skittish to return. In fact, they did so with premiums 2 percent lower¹⁰⁴ than in 2018.

Figure 2
ACA Popularity

In 2019, nearly 80 percent of eligible enrollees were again able to obtain coverage for less than \$75 per month,¹⁰⁵ and enrollment in ACA markets remains steady.¹⁰⁶ Legislative disruption, which could generate more unintended consequences,¹⁰⁷ is unlikely to materialize in the split Congress. The new environment is also more accepted¹⁰⁸ by the health insurance industry.

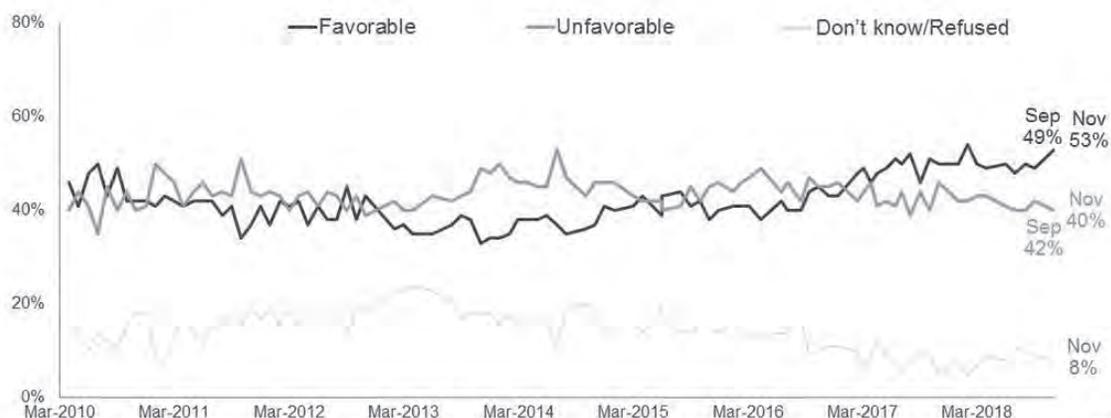
The lower premiums, the greater competition, and the flexibility to purchase off-market options has led to increasing popularity and a signaling of long-term stability. A split Congress and improved consumer satisfaction have calmed the potential of any serious repeal efforts. Most states that missed the CSR-based opportunities in 2018 righted that ship in 2019.

Additionally, the new waiver flexibility¹⁰⁹ signals further improvement opportunities in 2020. Leveraging the market turnaround in 2018, attracting more carriers, and providing states the opportunity to broaden their market appeal within the ACA framework make 2019 the ACA's best year yet. (See Figure 2)

As I said in the latest Strategic Initiative article, "the single risk pool dogma has softened. There is growing recognition that the individual market can run on the fuel from premium subsidies rather than government coercion. Solutions involving 'splitting risk pools' are no longer automatically viewed as attempts to

Post 2016 Election Tracking Poll Finds Slight In ACA Favorability, Largely Driven By Democrats

Given what you know about the health reform law, do you have a generally favorable or generally unfavorable opinion of it?



SOURCE: KFF Health Tracking Polls. See topline for full question wording and response options.





undermine the ACA and have been floated (along with solutions within risk pool) as policy proposals by both major political parties.” David Anderson, an academic thought leader on ACA dynamics, argues¹¹⁰ “a cap and a split market are not necessarily opposing policies.”

2019 will be remembered as the year that helped those most harmed by the ACA. While the 2018 CSR action significantly boosted financial assistance for lower-income consumers, it did nothing to help people ineligible for premium subsidies, the group most harmed. David Anderson aptly calls these people “the only ones without help.” The recent relief for this group, including the striking of the penalty for avoiding ACA markets and allowing off-market alternative options to be utilized, improves these consumers’ situations albeit through non-ACA solutions. It’s not a perfect scenario by any stretch. Like the ACA itself, President Trump’s footprint of “improvement for some and exit opportunities for others” is clunky. It’s not a strategic policy framework, but a series of disjointed changes that has favorably shifted the rules for the market’s two significant eligible population groups. Nevertheless, it has transformed the 2016–2017 environment and improved the ACA’s outlook. The catalyst for the ACA legislation itself was “a critical mass of people without solutions in the marketplace of last resort.” You know what the catalyst for ACA repeal is? It’s the same thing; “a critical mass of people without solutions in the marketplace of last resort.” We will likely not all agree on what “solutions” are, but today we have more popular ACA markets, lower premiums, more participating insurers, people not being forced to purchase overpriced health insurance products, and perhaps a lower uninsured rate. We’ll have to wait and see for the last one. The ACA initially provided new solutions for the previously uninsured but left “a critical mass of people without solutions.” We can’t say

for certain that this problem was solved in 2019, but the outlook is certainly better than previous years.

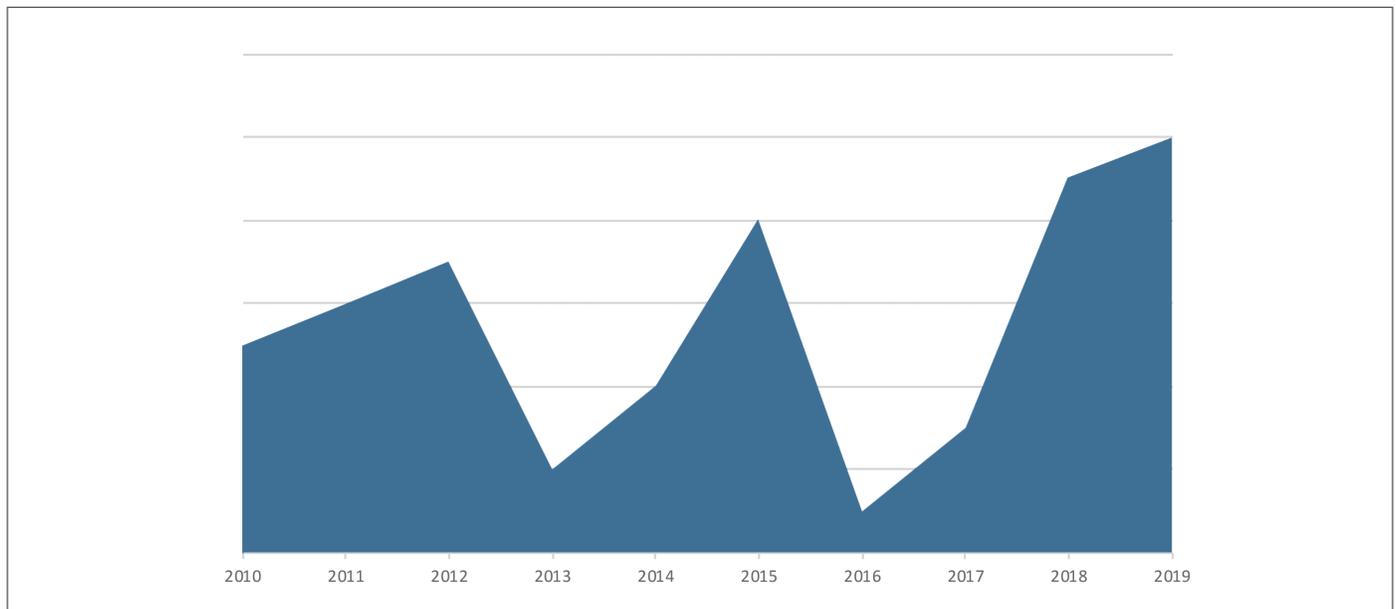
2019 should be a solid year for the ACA in all measures. 2020 should be better, but there will be more state variation as states learn how to leverage the new ACA dynamics at different speeds.

CONCLUDING THOUGHTS

Figure 3 chronologically shows the performance reflected in the countdown. Notable setbacks have been the operational challenge of exchange implementation in 2013 and the financial challenges along with lackluster interest in ACA markets in 2016. The recent market success is largely due to divergence from the original ACA ideals, which includes increased funding through a paradoxical channel and allowances to utilize non-ACA coverages for the population without reasonable ACA solutions.

At its core, the ACA is still the ACA. The problematic dynamics that plagued markets in 2016 and 2017 are still embedded in the insurance mechanics in 2019. We still have the family glitch. We still have subsidy cliffs. We still have no ACA-compliant solution for people who earn more than 400 percent of the Federal Poverty Level. We still have the goofiness of inverted age curves that lead to only older people having free coverage. A legislative solution in a split Congress is unlikely, and tentative “bipartisan” agreements in recent years have not seriously addressed the ACA’s structural issues. Fortunately, there is little else that needs to be done at the federal level right now. The new stability in the ACA markets, opportunities to optimize enhanced federal subsidies, and new innovation opportunities clearly put the ball in the states’ court. The state opportunities to leverage the enhanced federal funding and address the ACA’s unintended consequences are tremendous.

Figure 3
The Ups and Downs of ACA Marketplaces



The ACA has had its share of bumps and bruises, but it's lasted and persevered through the changing political landscape. While it hasn't offered solutions for everyone, it has provided strong incentives for many previously uninsured people to obtain health insurance. It has also clearly created problems and we should all acknowledge that, even if it has enormously benefited us personally or the people we care most about.

The ACA's recent success relies on humility. It works great for some people, but right now (without Section 1332 properly implemented), it doesn't work for others, and there are better options out there for a small minority of the population. Recent efforts to demonize everything that's not ACA-centered to detract from the ACA's shortcomings is unfortunate and an unnecessary course of action toward long-term sustainability. We can champion ACA markets, but we should recognize that ACA markets are overpriced with income-based incentives, and that actuarially priced markets targeting those with poor ACA incentives can peacefully coexist.

I am sometimes asked, "What is the key to understanding ACA dynamics?" I always smile and say, "Never start with intentions." The paradoxical impact¹¹¹ of CSR defunding is not a quirk that states were able to sneak into the process. It's intrinsic in the ACA math. In 2014, I explained¹¹² why older individuals would pay less than younger individuals at the same income level for the same level of coverage. In 2015, I explained¹¹³ why high premium rate increases would result in some individuals actually paying less due to the subsidy structure. In 2018 (published in 2019), I explained¹¹⁴ why steepening the age curve to attract

young adults may actually result in younger people paying relatively more. In 2019, I explained¹¹⁵ why a 2 percent aggregate premium reduction with more competition would actually result in some people having to choose between a higher premium or changing insurers. ACA math works in unintended directions (it's not fully understood but it's not a huge secret either¹¹⁶), and implications are almost always misrepresented in the public sphere, sometimes carelessly but without intent.

In some circles, Democrats have been accused of deliberately constructing an unworkable program in hopes of springboarding toward a more government-centric framework. Likewise, Republicans have been accused of "sabotaging the ACA at every turn." I don't know definitively if either of these accusations warrant investigation, but it's not a relevant question in assessing the ACA markets and consideration of such would only pollute the results of the unspoiled countdown you just read. If you take off your politically tinted glasses and look at the ACA landscape via a reasonable assessment¹¹⁷ of objective measures, you'll realize that the ACA markets are stronger than they have ever been. The conjecture that no one wanted things to turn out this way is completely irrelevant. The ACA's 10th birthday will be its best ever, even if it is celebrated alone. ■



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A Variable Benefit Plan for the Public Sector

By Brian Murphy

Three important risk areas in pension funding are investment return, inflation and mortality.

In a pure defined benefit plan, the plan sponsor bears all of the risk and reaps all of the rewards related to these and all other risk areas. Bad experience drives the Actuarially Determined Employer Contribution (ADEC) upward while good experience pushes it downward. If the experience happens within relatively narrow bounds, the ADEC will tend to move within a relatively narrow range and, assuming the plan sponsor has no particular financial problems, all will be well. That hasn't happened lately though. In fact, experience has been volatile for a long time and some plan sponsors do have financial problems.

In the 1980s and 1990s investment gains were so overwhelming that by 2000 many plans had become fully funded years ahead of schedule. In many cases, contribution rates plummeted, or permanent benefit increases were negotiated, or both. Then came the Millennium and along with it, the burst of the tech bubble and the credit crisis. Both of those events hammered the holdings of almost every pension fund and made previous contribution reductions and benefit increases appear to have been ill advised. ADECs increased rapidly to levels close to or above those that had been in effect 20 years prior. The increases in ADECs occurred just as plan sponsor revenues were declining due to the ensuing recessions. One municipal plan sponsor representative, who was likely not alone in his impressions, spoke of a “dizzying rate of contribution increase to unsustainable levels” and ultimately closed the city’s pension plan. (In fact, in that instance, contribution rates had increased from a nominal amount to a level just above the normal cost.) In other cases, future benefit accruals were reduced, retiree Cost-of-Living Allowances (COLAs) were cut, and new lower tiers of benefits were introduced for new hires. (See, for example, National Association of State Retirement Administrators [NASRA]: “Spotlight on Significant Reforms to State Retirement Systems,” December 2018.) There were also some well-known municipal bankruptcies that were blamed partly on municipal pension plans. Many of these problems were caused to a large

extent by asset volatility and the manner in which a traditional DB plan design responds to it.

Amid all of this, the shining light, the beacon on the hill, the lamp that gives light to the house, is the State of Wisconsin’s variable benefit plan. Well, that may be a flowery exaggeration, but it is not an exaggeration to say that the Wisconsin Retirement System’s (WRS) variable benefit features have allowed it more stability than most of its sister plans have experienced. The WRS has deviated relatively little from being fully funded throughout the 1990s and 2000s. ADECs that were 11 percent at the end of the 1980s, dropped to 9 percent in the early 2000s and are currently just more than 13 percent of pay. Some of the decreases and some of the increases were brought about by legislated changes, rather than by the response of the plan design to external forces. Without those changes, ADECs would have been yet more stable than they actually have been.

Pressure seen elsewhere for wholesale plan changes failed to gain traction in Wisconsin. According to a May 9, 2018, *BloombergOpinion* article titled “Wisconsin’s Pension System Works for Everyone”:

There’s been some pressure on states in recent years to shift from pensions to DC plans. In 2011, newly elected governor Scott Walker and the Republican majority in the Wisconsin Legislature passed a law ordering state officials to look into moving [in] that direction. In 2012, the heads of the three state agencies charged with this task—two of them Walker appointees—turned in a report that effectively answered, *Why on earth would we ever want to do that?* And really, why would they?

AN EXAMPLE PLAN

Systems other than Wisconsin have also implemented different versions of variable benefit plans, with varying degrees of success, and all of those models are certainly worthy of study. This article, however, limits itself to treating an idealized variable benefit plan that contains the main features of the Wisconsin Plan. The author has added some features to the design and modified others in order to better reflect current conditions and to incorporate some lessons from prior experiences. (See Table 1)

Amid all of this, the shining light, the beacon on the hill, the lamp that gives light to the house is the State of Wisconsin’s variable benefit plan.

Table 1
Example Plan

Normal Retirement Age	67 with 5 years of service.
Early Retirement Age	55 with 20 years of service; actuarially reduced.
Final Average Compensation	Average of highest 5 out of last 10.
Employee Contribution Rate	4% of pay.
Benefit Computation	<p>At retirement, a participant's benefit is the greater of the Guaranteed Minimum Benefit "GMB" and the Money Purchase Minimum "MPM" as described below:</p> <p>The GMB is 1.3% times final average compensation times service (actuarially reduced if appropriate).</p> <p>The MPM is the annuitized value of twice member contributions with interest credits as described below; annuitization calculated at 4%.</p>

Vesting:	5 Years.
Vested termination benefit	Normal or early retirement benefit depending on when the member takes the benefit. Member may also take a refund of contributions with interest in lieu of a vested retirement benefit.
Nonvested termination benefit	Refund of contributions without interest.
Death-in-service and Disability benefits	Not important for this discussion.
Optional Benefit Forms	Based upon 4% interest and (unisex) valuation mortality.
Actuarial assumptions	
Investment Return Preretirement	6%.
Investment Return Postretirement	4%.
Mortality Table	Current, fully generational.
Accounting	Nonretired and retired assets separately maintained. At time of retirement, a reserve transfer from the nonretired to the retired reserve is made based upon 4% interest and valuation mortality assumptions.
Actuarial Value of Assets	Typical 5-year smoothing based on 6% return assumption.
Interest Crediting	Interest is credited (or debited) to all reserves including employee accounts based upon the rate of earnings on the actuarial value of assets.
Asset Allocation	All assets are comingled for investment purposes. Target allocation is designed to produce a long-term median return of 6%.
Post Retirement Adjustments (PRA)	This plan does not provide a COLA as such. Instead, retiree benefits may be increased or decreased within limits based upon the results of the actuarial valuation. Retiree benefits can never fall below the Guaranteed Minimum Benefit and will not be increased beyond a level that can be justified by inflation.

This plan design divides risk among present retirees, future retirees, and the plan sponsor.

RETIREE RISK SHARING

Since in most plans today, half or more of the liabilities are due to retirees, let's first discuss retiree risk sharing. Retiree risk sharing occurs primarily through the operation of the Post Retirement Adjustment (PRA) feature. Retired assets are tracked separately from nonretired assets although they are invested in the same manner. When a person retires, either directly from active service or from deferred vested status, an amount of money is transferred from the active reserves to the retiree reserves sufficient to fund a nonincreasing benefit assuming 4 percent return and valuation mortality. At the end of each year the actuary performs a valuation of retired lives (assuming 4 percent future investment return) and reports the ratio of (actuarial value of) assets to liabilities in the retiree reserve. If the ratio is greater than 100 percent, a Post Retirement Adjustment (PRA) is granted, and everyone gets the same percentage adjustment. If it is less than 100 percent there is a negative PRA, which means that retiree benefits are reduced in order to restore the ratio to 100 percent.

There are a few exceptions though.

- Regardless of experience, no retiree's benefit can be reduced below the GMB amount due to a negative Post Retirement Adjustment. This can lead to an unusual situation. If there is a succession of bad experience, and therefore a succession of negative PRAs, the benefits of some people may have already been reduced to the GMB level. If that occurs, since the benefits of such people cannot be further reduced, then the benefits of everyone else will be reduced by a larger percentage than the ratio of assets to liabilities would otherwise suggest.
- Post Retirement Adjustments are limited to the rate of inflation. Inflation is measured over the one-year period ended on the valuation date. Regardless of the ratio of assets to liabilities, everyone's PRA is limited to the same inflation percentage (that is, there is no individual PRA bank). There is, however, an aggregate PRA bank. Asset amounts, if any, that are not needed to fund the inflation-limited PRA are transferred to a separate Post Retirement Adjustment stabilization reserve. All or a part of the stabilization reserve can be released to prevent or ameliorate negative Post Retirement Adjustments and, therefore, also the unusual situation just described.
- The PRA (whether positive or negative) for people who retired in the year ended on the valuation date is prorated based on month of retirement.

Retirees also share in the mortality risk. If there is a mortality gain or loss, or if there is an experience study and the mortality table is updated in either direction, there will be an effect on the liability measure for existing retirees, but there will be no effect on the retiree assets. There will, therefore, be an effect on the ratio of assets to liabilities, and, hence, on the PRA.

This plan protects retirees from inflation to a certain extent, but once there is a year in which inflation exceeds the PRA that can be provided, that piece of inflation falls on the retiree. The PRA bank is intended to mitigate the effect of inflation on retirees, but it probably cannot eliminate it.

FUTURE RETIREE RISK SHARING

Future retirees share in investment risk—and in potential rewards. A period of relatively high interest credits prior to retirement can increase the projected Money Purchase Minimum Benefit (MPM) benefits over the Guaranteed Minimum Benefit (GMB). If preretirement investment experience is subsequently unfavorable, the increase in projected benefits for future retirees is effectively rolled back due to a reduction in interest credits to member accounts. This is loosely similar to the operation of the retiree PRA.

At actual retirement, the interplay between the GMB and the MPM determines the initial retirement benefit. The GMB is 1.3 percent times final average compensation times service. Regardless of plan experience, future retirees will get at least the GMB at retirement. However, the MPM may produce a greater value. For the MPM calculation, twice the member account, with interest credits at the rate of return on the actuarial value of assets, is annuitized at retirement. The result is compared with the GMB and the greater amount becomes the initial retirement benefit. *The MPM does not become a guaranteed benefit at retirement, though. Only the 1.3 percent GMB is guaranteed.*

Future retirees also share to a certain extent in mortality risk because changes in the mortality table affect the factors used to calculate the MPM.

Table 2 shows how the MPM would affect an individual under various return scenarios. The example person was hired at age 35 with an initial pay of \$30,000 and always received 2.75 percent pay increases. Investment return was always 6 percent

This plan design divides risk among present retirees, future retirees, and the plan sponsor.

Table 2
Money Purchase Minimum Benefit Under Various Return Scenarios

Age	Retirement		Final Average Salary (FAS)	GMB Minimum Benefit	MPM Minimum Benefit Depending on Account Credit for 10 years prior to Age 55		
	Service	Early Factor			6%	10%	2%
55	20	0.354	\$47,614	\$4,382	\$6,772	\$9,162	\$5,013
56	21	0.383	\$48,923	\$5,115	\$7,556	\$10,131	\$5,660
57	22	0.416	\$50,268	\$5,981	\$8,418	\$11,194	\$6,374
58	23	0.451	\$51,651	\$6,965	\$9,366	\$12,363	\$7,161
59	24	0.490	\$53,071	\$8,114	\$10,412	\$13,648	\$8,030
60	25	0.533	\$54,531	\$9,446	\$11,563	\$15,061	\$8,989
61	26	0.580	\$56,030	\$10,984	\$12,834	\$16,617	\$10,050
62	27	0.633	\$57,571	\$12,791	\$14,236	\$18,331	\$11,221
63	28	0.691	\$59,154	\$14,879	\$15,783	\$20,221	\$12,517
64	29	0.756	\$60,781	\$17,323	\$17,493	\$22,306	\$13,952
65	30	0.829	\$62,453	\$20,192	\$19,385	\$24,608	\$15,540
66	31	0.909	\$64,170	\$23,507	\$21,479	\$27,154	\$17,302
67	32	1.000	\$65,935	\$27,429	\$23,801	\$29,973	\$19,258
68	33	1.000	\$67,748	\$29,064	\$26,379	\$33,099	\$21,433
69	34	1.000	\$69,611	\$30,768	\$29,245	\$36,571	\$23,854
70	35	1.000	\$71,525	\$32,544	\$32,437	\$40,432	\$26,553

except for the 10 years immediately preceding retirement. For those 10 years, Table 2 shows alternates of 6 percent, 10 percent and 2 percent. All dollar amounts are annual.

At least in this case, the expected condition (the 6 percent column) is that the money purchase minimum value would provide a greater initial benefit than the 1.3 percent GMB-defined benefit for retirement ages through age 64. For common later retirement ages, the GMB would be greater than the MPM benefit. If, however, there were an extended period of good experience (the 10 percent column), the money purchase MPM benefits would increase and would dominate the GMB at all illustrated ages. Similarly, if there is bad experience (the 2 percent column), the value of the MPM benefit drops, causing the GMB to be the dominant benefit at all but the youngest retirement ages. The 2.75 percent pay increase assumption was somewhat arbitrary. It was chosen to be close to what has been observed in some large plans over the past 30 years. The use of a lesser pay increase assumption would make the MPM appear more valuable than the GMB more often than the chart indicates, and conversely.

EFFECT ON DEFERRED VESTED BENEFITS

Accounts for deferred vested people are subject to interest crediting in the same manner as accounts for active plan participants and at retirement, benefits are determined in the same manner as for members who retire directly from active service. The effect of the MPM can provide a kind of partial indexing to

these benefits. The GMB is frozen, while the MPM moves up with interest crediting. Essentially, such people share in investment risk, but for them, it is often mostly reward.

PLAN SPONSOR RISK SHARING

The Plan Sponsor's maturity risk, or in other words, the risk of plan liabilities dwarfing plan sponsor resources due to increasing numbers of retirees, is greatly reduced by this plan design. The Plan Sponsor continues to share in investment and mortality risk, but to a much lesser extent than in a traditional defined benefit plan. The Plan Sponsor's share of investment risk with this type of plan design relates primarily to nonretired assets, so it is *prima facie* smaller than in most plans. For many plans today, liabilities are six times payroll, and half of those liabilities are for retirees. Typical portfolio standard deviations today run around 13 percent of pay, so if the Plan Sponsor shared in all the investment risk in a fully funded plan, a one standard deviation investment loss (which, in theory, is expected to occur about once every six years) would correspond to 78 percent (6 x 13 percent) of payroll. Even though the effect on the contribution rate would be smoothed by the use of the actuarial value of assets, a lot of volatility would remain. But if that same Plan Sponsor shares only in the nonretired investment risk, perhaps by employing a variable benefit design of the general type discussed in this article, a one standard deviation asset loss might correspond to 39 percent of payroll instead of 78 percent (50 percent x 6 x 13 percent). So this type of variable benefit design

can significantly reduce contribution rate volatility. That is good for the Plan Sponsor and ultimately good for the plan itself. Investment gains will still lower the ADEC and losses will still raise it, but the MPM will act to dampen changes in the ADEC. How does that work? Well, investment gains lower ADECs because assets go up more than assumed when there is a gain. But once there are sufficient gains for the MPM to exceed the GMB, investment gains increase the MPM, and therefore the benefit that the actuarial valuation expects to be paid. Higher MPM benefits increase liabilities, ameliorating the decrease in employer contributions that would otherwise occur. On the flip side, investment losses tend to raise ADECs, but the increase may be dampened by a reduction in projected MPM benefits. Total volatility may not actually be reduced, though. Contribution volatility is exchanged for benefit volatility.

PLAN DESIGN CONSIDERATIONS

The balance between the GMB in the example and the MPM is central to this design. A high GMB compared to the MPM would transfer most preretirement risk to the plan sponsor. The benefit multiplier and employee contribution rates in the Example Plan (1.3 percent and 4 percent, respectively), as well as the factor of 2 in the definition of the MPM, make the design appear to work but are not the only possible choices. The preretirement and postretirement interest rate assumptions (6 percent and 4 percent in the example) are also important parts of the design. The difference between them affects the Post Retirement Adjustments that can be expected. The expectation should be realistic and related in some way to long-term expected inflation. Changes, if any, in these assumptions should be very rare. Obviously in designing an actual plan, demographics and stakeholder objectives would influence the specific plan design that is selected. Plan design would most likely also be influenced by structure and funded status of the legacy plan and issues related to the transition from the legacy plan to the replacement variable benefit plan.

WISCONSIN'S "VARIABLE PROGRAM"

There is one feature of the Wisconsin plan that was intentionally excluded from the Example Plan, because, by virtue of its name, people tend to think it is a main feature of the variable benefit plan when, in fact, it is only a minor piece. The Wisconsin

"Variable Program" offers participants the opportunity to invest half of their contributions (and a matching amount of employer contributions) in a separate "variable" fund that is invested 100 percent in common stock and is valued at market value (no smoothing). Participants who choose the variable program bear all of the risk and reap all of the reward of the common stock investment. The administration is a little complicated, but the variable program has no effect on the plan sponsor's risk. The MPM, for example, is calculated as though the variable program had not been chosen. If the common stock investment does better than the default investment portfolio, the person's benefit at retirement will be higher than the plan would otherwise provide. If the common stock investment does worse, the participant's benefit is reduced accordingly.

CONCLUSION

Variable benefit plans of this general type can provide a good blend of preretirement income replacement, inflation protection, market participation, and contribution rate stability. They do pose some administration and communication difficulties and are subject to political risks. For example, if the PRA stabilization fund were to become large, political pressure for a special retiree PRA might be difficult to resist. Also, a prolonged period of good investment experience could make the MPM dominant, and political pressure for an increase in the GMB (which would appear cheap or free with most valuation methods) would be difficult to resist. What should the poor actuary do? Relax, take a deep breath, exhale slowly, and think "ASOP 51."

Thank you to James Anderson, FSA, EA, MAAA, of Gabriel, Roeder, Smith and Company and to Bob Conlin and the Staff at the Wisconsin Retirement System for reviewing this paper and providing many helpful suggestions. ■



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The Society of Actuaries Living to 100 Symposia: What Does Long Life Mean to Us?

By Anna M. Rappaport

In January of 2020 the Society of Actuaries (SOA) will present its seventh triennial international Living to 100 (LT100) Symposium in Orlando, Florida, on January 13–15, 2020. I have participated in all six prior symposia as a paper writer, committee member and speaker. With the support of more than 20 organizations from around the world, past symposia brought together thought leaders from diverse disciplines and as many as 10 countries to share ideas and knowledge on aging, changes in survival rates, and their impact on society, institutions and individuals.

I have greatly enjoyed the symposia and networking with the people there. At the past few Living to 100 symposia, a diverse range of professionals, scientists, academics, and practitioners participated and there was discussion of the latest scientific information on how and why we age, methodologies for estimating current and future rates of survival, potential benefits and risks associated with the increasing numbers of retirees and potential answers to other difficult related issues.

This meeting is different from most professional meetings that I attend because the content covers a wide span of different issues and helps me think about the bigger picture, and how the specific things I am interested in tie to the bigger picture.

The symposium will combine keynotes from thought leaders with major scientific backgrounds, papers, and panel discussions and for the first time in 2020, some shorter essays. Past papers are available on the SOA Living to 100 website. There is a monograph for each symposium. The 2017 monograph includes the full content of that symposium. For papers through 2014, there is a large summary paper focusing on the themes, areas of agreement and disagreement, and a list of all the abstracts. That paper is highly recommended.



I believe that actuaries who are concerned with social insurance and public finance will be very interested in Living to 100 because societal aging impacts public policy and budgets in many different ways including:

- Impact on the tax base
- Impact on the services needed by the population
- Cost of Social Security, Medicare, Medicaid and other public services
- Need for programs to help facilitate work at older ages
- Structure of communities to make them more adaptable: the world health organization has a program for age-friendly communities

These are current topics that are very important because there are questions about how programs such as Social Security, Medicare and Medicaid may change in the future. There is a long-term big question about how retirement ages for Social Security may change. Longevity has increased more than Social Security retirement ages, and there is a long-term imbalance in the Social Security system that must be corrected. Adjusting retirement ages is certainly one of the ways that the imbalance can be corrected. One of the highlights of these meetings are regularly assembled panels where Social Security actuaries have compared mortality and experience between different countries.

The program for 2020 Living to 100 is not totally set as of this writing, but the general topics and program will be like prior meetings. Keynote speakers offer insight into major areas of scientific and societal development. Here are bios for the two 2020 keynote speakers:

Dr. Steve Horvath will offer insights into the scientific side. He is a professor in the Departments of Human Genetics and Biostatistics at the University of California, Los Angeles. His research lies at the intersection of computational biology, genetics, epidemiology, and systems biology. He works on all aspects of biomarker development with a particular focus on genomic biomarkers of aging. He recently published an article that describes a highly accurate biomarker of aging known as the epigenetic clock. Salient features of the epigenetic clock include its high accuracy and its applicability to a broad spectrum of tissues and cell types. Dr. Horvath's most recent work demonstrates that the epigenetic clock captures aspects of biological age.

Ronald Klein will offer insights into the societal side of aging. He is an Actuary and is the Director of Global Aging for The Geneva Association—the leading international insurance think tank for strategically important insurance and risk management issues. As the leader of the Geneva Association's work on global aging issues his responsibilities include the development and publication of papers and articles on the topic of global aging; leadership of the annual Geneva Association Health & Ageing Conference; managing the industry working group on global aging; liaison with other (re)insurance and aging-related associations as well as representation of the Geneva Association at conferences and meetings. Ronnie will bring a practical approach to research by providing workable suggestions to mitigate global risks related to ageing. He is a Fellow of the Society of Actuaries and is currently on the Board of Directors of the Society of Actuaries.

The program is under development and will depend on the papers and essays submitted and the panels planned. Some of the likely topics include:

1. Understanding the issues:
 - a. Mortality/longevity
 - b. Morbidity
 - c. Quality of Life
 - d. Relations between mortality/longevity, morbidity and the quality of life
 - e. Effects of developments in genetics, medicine and disease management

- f. Effects of changes in behavior and the environment
 - g. Effects of demographic characteristics
 - h. Effects of individual- and contextual-(community) level socioeconomic characteristics
 - i. Ongoing research, including medical, biological and aging research
2. Data sources for mortality, morbidity, quality of life measurement and projection:
Availability and new efforts/projects to collect data
 3. Modeling and projection techniques:
Emerging models and projection techniques
 4. Implications for society, institutions and individuals, as well as changes needed to support a growing aging population and related public policy issues and potential solutions
 5. Management of longevity risk:
Application of existing or new longevity techniques, data, theories, models or methods to actuarial practice. ■

I hope to see many of you at the 2020 Living to 100.

IMPORTANT LINKS FOR YOU:

A link to the current Living to 100 summary paper, which summarizes the content from the initial Living to 100 Symposium through the 2014 Symposium:

<https://www.soa.org/research-reports/2016/Living-to-100-Insight-on-the-Challenges-and-Opportunities-of-Longevity/>

A link to the 2017 Living to 100 online monograph that contains the papers and other content presented at the 2017 Symposium:

<https://www.soa.org/essays-monographs/2017-living-to-100/>



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Voluntary Social Security Coverage of State and Local Government Employees

By Bruce D. Schobel

In 2019 nearly all employees of private-sector corporations in the United States, as well as U.S. nationals working for U.S. employers or certain foreign subsidiaries of U.S. employers, are mandatorily covered by the U.S. Social Security program. Almost none of these employees (or their employers) has any choice in the matter. The law requires that they participate in Social Security and pay the mandatory payroll taxes. (Eligible retirees are not required to apply for benefits, but nearly all do eventually!) Mandatory Social Security coverage is also imposed on nearly all self-employed individuals who file U.S. income-tax returns and have net earnings from self-employment exceeding a de minimis amount. Federal Government employees hired since Jan. 1, 1984, and a small number of very high-level employees (for example, members of Congress and Federal judges) hired before that date are mandatorily covered as well.

Employees of state and local governments are different and follow their own special rules. Because of constitutional concerns regarding the federal government's ability to tax states (as employers, in the case of Social Security coverage), employees of state and local governments can be covered by Social Security in only two ways under present law:

1. Mandatorily for employees working in positions that are not covered by an employer-sponsored retirement plan deemed to be "comparable" to Social Security, or
2. Voluntarily, for employees working in positions that are covered by a "comparable" employer-sponsored retirement plan.

The first situation, involving mandatory coverage of state and local government employees not covered by a retirement plan comparable to Social Security, was explained in the previous issue of *In the Public Interest* (January 2019). This article describes the second situation, voluntary coverage.



Governmental employees who are not covered by any employer-sponsored retirement plan, or who are covered by a plan that does not meet one of the Social Security comparability tests described in the previous issue, are mandatorily covered by Social Security. However, if such employees become covered by an employer-sponsored retirement plan that is comparable to Social Security, then mandatory coverage ceases. Depending on the governmental employer involved, they may then become covered under a voluntary-coverage agreement or remain non-covered by Social Security.

Voluntary coverage of any state or local governmental employee group must be effectuated, if at all, by the group's employer. Individual employees generally have no say in the matter, especially if they enter governmental service after a voluntary-coverage agreement has been put into effect. The employer, working through the employer's state Social Security Administrator (and every state has one), must enter into an agreement with the Social Security Administration (SSA) to cover certain

positions—positions, not individuals—under Social Security. The employer agrees to withhold Social Security taxes from the affected individuals' wages and salaries, match those taxes with employer contributions (not technically taxes in this situation because they are voluntary), and remit those amounts to the Internal Revenue Service.

Voluntary Social Security coverage agreements for state and local government employees are allowed under the provisions of Social Security Act section 218, which was first enacted into law in 1950. Before then, state and local government employees simply could not be covered by Social Security under any circumstances.

Today, somewhat more than 20 million people are employed by state and local governments across the U.S. Almost three-quarters of those employees are covered by Social Security, mostly under section 218 voluntary-coverage agreements. A much smaller number, 2.4 million individuals, are covered mandatorily by Social Security under a provision enacted into law as section 11332 of the Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508), effective on July 2, 1991. The relevant subsection of the Internal Revenue Code is 3121(b)(7)(F). Social Security Act section 218 requires any governmental employer desiring Social Security coverage for some or all of its employees to conduct a referendum among employees working in positions that would become covered by the proposed voluntary-coverage agreement. If a majority of such employees votes in favor of being covered by Social Security, then the voluntary-coverage agreement goes into effect on a date specified by the agreement. In such cases, state and local governmental employees working in covered positions—and their employers—begin paying Social Security contributions at exactly the same rates as private-sector employees and their employers pay in Social Security taxes. Likewise, the governmental employees may become eligible to receive the same Social Security benefits under the same eligibility conditions (for example, age and coverage requirements) as apply to private-sector employees.

In most states, the required referenda to effectuate voluntary coverage for governmental groups are all-or-nothing. In other words, if a majority of the affected employees votes yes, then all of the employees are covered, including those who voted no, as well as all newly hired employees. But in 23 states listed in Social Security Act section 218(d)(6)(C),¹ governmental employers can create so-called divided retirement systems. In those cases, coverage occurs only if a majority of affected employees votes yes, but the positions of employees who voted no can continue to be excluded from Social Security coverage. If a majority of existing employees votes yes in such a referendum, thereby approving it, then all newly hired employees are also covered by

Social Security going forward. Noncovered employees become a closed group that eventually disappears.

Before 1983, any governmental unit that had entered into a voluntary-coverage agreement under Social Security Act section 218 had an option under the law of terminating such agreement and becoming noncovered. Such terminations were fairly rare until the 1970s, when significant numbers of governmental employers began the process of withdrawing from coverage, for at least two reasons. First, they saw that Social Security was having serious financial problems at the time and began to question whether promised benefits would really be paid. Second, they believed that they could provide larger benefits to their employees by investing the amounts of Social Security contributions in the equity markets, instead. By 1980 or so, withdrawals of governmental employers from voluntary coverage began to have a noticeable financial effect on the Social Security program, exacerbating already severe financial problems that were caused by general economic conditions at the time. The sweeping Social Security Amendments of 1983 (Public Law 98-21, enacted into law on April 20, 1983) eliminated, going forward, the option of terminating voluntary Social Security coverage agreements. Effective upon enactment, governments that had entered into voluntary-coverage agreements could never terminate them, even though they had that right at the time the agreements went into effect. The constitutionality of the provision that terminated opting-out, as it was called, was upheld by the U.S. Supreme Court in *Bowen v. Public Agencies Opposed to Social Security Entrapment*, 477 U.S. 41 (1986). Of course, any governmental unit entering into a voluntary-coverage agreement after the effective date of the Social Security Amendments of 1983 knew that such agreement would be irrevocable.

About six million state and local governmental employees do not have Social Security coverage in their current government jobs, either mandatorily or voluntarily. Such noncovered workers may, however, receive Social Security benefits when they reach Social Security's eligibility age, based on other employment. Many (even most) of these noncovered employees may have been or will be covered by Social Security in their previous, subsequent or even simultaneous other jobs, whether in the private sector or the public sector. Relatively few people work their entire careers in noncovered employment. And workers with 40 coverage credits—about 10 years of work in Social

About six million state and local governmental employees do not have Social Security coverage in their current government jobs.

Security-covered employment or self-employment—qualify for Social Security retired-worker benefits at age 62. That much covered employment is fairly easy to obtain, even for workers whose primary employment was noncovered. In 2019, workers with just \$5,440 in Social Security-covered earnings receive four coverage credits for the year, without regard to how many days they actually worked during the year.

Workers with careers split between covered and noncovered employment (not necessarily at the same time) may not receive the same benefits that workers with only covered employment receive. The Social Security Act provides two special benefit formulas for people receiving pensions based in whole or in part on employment that was not covered by Social Security. Those special benefit-computation formulas will be described in the next article in this series. ■



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ENDNOTE

- 1 Alaska, California, Connecticut, Florida, Georgia, Illinois, Kentucky, Louisiana, Massachusetts, Minnesota, Nevada, New Jersey, New Mexico, New York, North Dakota, Pennsylvania, Rhode Island, Tennessee, Texas, Vermont, Washington, Wisconsin, or Hawaii, or any political subdivision of any such state. Interestingly, Hawaii appears last (violating alphabetical order) because it was originally included in this list as a territory and subsequently became a state. This list of states allowing divided-retirement systems has changed over the years, but not recently.



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