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# PROPOSED PENSION FUNDING STABILIZATION:

HOW DOES IT AFFECT THE SINGLE-EMPLOYER DEFINED BENEFIT SYSTEM?

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## Proposed Pension Funding Stabilization: How Does It Affect the Single-Employer Defined Benefit System?

### MAJOR FINDINGS:

- The Pension Funding Stabilization provisions of the Senate transportation bill would effectively prescribe a pattern of valuation interest rates for the next several years, with a significant increase in 2012 rates followed by declines in subsequent years.
- Initially, aggregate contribution requirements would be significantly less than under current law (approximately 43 percent in 2012), but would then be expected to increase each year until ultimately exceeding the amounts that would have been required under current law.
- The predictability of contribution requirements would show some improvement in the short term but little improvement in the long term, because the funding stabilization provisions do not address non-interest-rate sources of volatility and are less likely to affect valuation rates in the future.
- The prescribed rates would mask market-related changes in funded status for several years. For example, funded statuses in 2013 and 2014 would likely not be materially affected by increases or decreases in interest rates from today's levels.
- The solvency of plans would decline in the short term due to lower contributions, and would eventually return to the levels expected under current law as contributions increase.

### EXECUTIVE SUMMARY

In recent months, the topic of “funding stabilization” has been a key concern of stakeholders in the private, single-employer defined benefit (DB) system. Funding stabilization refers to legislation pending in the U.S. Congress that would alter the calculation of the pension obligations that prompt funding of these pension plans. One proposal for doing so has been documented in the Senate-passed Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) bill (S. 1813), under the section heading “Pension Funding Stabilization.” The provisions of this section would constrain the interest rate used to measure pension obligations within a specified range,<sup>1</sup> theoretically limiting fluctuations in this critical assumption and associated calculations.

This report provides an analysis of the effects the funding stabilization provisions of the MAP-21 bill would have on the private, single-employer DB system as a whole, as well as how it would affect individual plan sponsors. The report approaches the analysis from the perspective of several key principles behind funding regulation: the transparency of plan funded status, the solvency of the system, and the stability and predictability of future contribution requirements. With respect to the stability and predictability of contribution requirements, the analysis reviews both the pattern and variability of future contribution requirements.

Because the funding stabilization provisions of the bill would modify the interest rates used to determine pension obligations, they challenge one of the fundamental aspects of the Pension Protection

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<sup>1</sup> The permissible range of interest rates would be based on the 25-year historical average of corporate bond yields. In 2012, the permissible range would be within 10 percent of the 25-year average. The range would expand by 5 percent (above and below) each year, until the permissible range would constrain rates to be within 30 percent of the 25-year average for valuations in 2016. It would then remain constant for all subsequent years.

Act of 2006 (PPA)—that calculated pension obligations closely track market conditions. This analysis shows that the provisions would effectively prescribe a pattern of interest rates over the next several years, reducing contribution requirements initially and subsequently increasing them each year until, ultimately, they would exceed the level of contribution requirements called for under current law. Because interest rates would be prescribed for several years, increases and decreases in the market level of interest rates would have little effect on reported funded statuses and contribution requirements during those years. Non-interest rate sources of volatility, such as asset returns and the triggers associated with key funding thresholds, would still affect contribution requirements during these years, since they are not addressed by the provisions. As a result, the provisions have only a limited effect on the predictability of contribution requirements during the short term, and, when combined with the increasing range of permissible interest rates allowed by the provisions, the provisions have little effect on predictability in the long term.

The findings of this analysis provide valuable insights for stakeholders in the single-employer DB plan system. While the provisions of the MAP-21 bill would have significant short term effects, such as reduced contribution requirements and solvency levels, they would not effectively address structural issues, such as the volatility of contribution requirements. Reduced contribution requirements would provide DB plan sponsors with greater short term flexibility to invest in their business. However, they would also need to plan for subsequent increases in their contribution requirements, which could entail a strategy of contributing in excess of required amounts. Thus, the short term effects of this legislation could lead to longer-term consequences if not addressed.

### EFFECT ON VALUATION INTEREST RATES

Understanding how the funding stabilization provisions would affect the calculation of pension obligations in the future requires some context. With a few exceptions,<sup>2</sup> the proposed legislation would alter the valuation interest rate—the rate used to determine pension obligations for funding purposes. To the extent it increases the valuation rate, it would decrease reported pension obligations, and funding requirements. Likewise, it could reduce the valuation interest rate, increasing reported obligations.

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<sup>2</sup> Sponsors currently have the option to value their DB obligations using either a smoothed, segmented yield curve or the current, full yield curve. The proposed legislation would only affect the smoothed, segmented yield curve. This is further described later in this section.

Table 1 summarizes the effect of the funding stabilization provisions on valuation interest rates,<sup>3</sup> assuming no future changes to the spot rate curve published by the IRS at the beginning of 2012. Because the current 25-year average historical interest rate is high relative to today's interest rates, the corridor limit proposed in the Senate bill would apply immediately upon implementation, increasing the valuation rate from 5.37 percent to an estimated 6.73 percent in 2012. Then, as the permissible range around the 25-year average widens and the relatively high interest rates at the beginning of the 25-year history are replaced by the lower interest rates of today, the corridor limit would decline until, ultimately, current law rates drive the effective valuation interest rates again.

VALUATION YEAR	2011	2012	2013	2014	2015	2016	2017
CURRENT LAW INTEREST RATE	5.88%	5.37%	4.94%	4.68%	4.68%	4.68%	4.68%
SENATE BILL INTEREST RATE	5.88%	6.73%	6.18%	5.66%	5.16%	4.81%	4.75%
INCREASE	NA	1.36%	1.24%	0.98%	0.48%	0.13%	0.07%

Table 1

Table 2 examines how the proposed law would affect future valuation interest rates, recognizing that the spot rate curve will not remain constant after 2012 (as assumed in Table 1). Table 2 illustrates the likelihood<sup>4</sup> that the interest rate corridor would affect valuation interest rates and the direction that interest rates would move. Relatively high interest rates at the beginning of the 25-year historical period provide a high degree of certainty that the provisions would increase the valuation rate in the early years of the projection. As the corridor widens and high historical interest rates phase out, the likelihood of the corridor having the opposite or no effect begins to increase.

YEAR	INCREASES RATE	NO CHANGE	LOWERS RATE
2012	100%	0%	0%
2013	100%	0%	0%
2014	100%	0%	0%
2015	90%	10%	0%
2016	44%	53%	3%
:	:	:	:
2021	29%	50%	21%
:	:	:	:
2026	27%	52%	21%

Table 2

<sup>3</sup> Throughout this report, a single, level-equivalent interest rate is used to summarize the spot rate curves that are used in actual valuations.

<sup>4</sup> Most of the analysis in this report is based on 500 real-world simulations of future economic and market variables provided by Barrie and Hibbert, a Moody's Analytics Company that specializes in the modeling of these variables. Tables 2 and 3 are based on the projected corporate spot curves included in these simulations and are therefore consistent with the other exhibits provided in this report. Percentages shown reflect the number of affected outcomes out of the 500 scenarios for each specified year.

Table 3 expands on Table 2 by showing the percentage of scenarios in which the proposed law would change the level-equivalent interest rate by more than 25 basis points, relative to current law. The corridor could change the valuation interest rate by a single basis point, which would have little effect on the calculation of obligations. Table 3 provides a sense of the likelihood that the funding stabilization provisions would have a meaningful effect on interest rates.<sup>5</sup> Comparing Tables 2 and 3, it becomes clear that though there is a fair chance the provisions will affect future valuation rates, the likelihood of a meaningful change decreases as time progresses. In addition, if there is a 25 basis point change in the future, it is much more likely that it will increase the valuation interest rate than decrease it. Most notable, however, is the very high likelihood of significant rate increases in the early years of the forecast. Indeed, based on the 500 scenarios used for this analysis, the funding stabilization provisions of the Senate bill would effectively prescribe the valuation interest rates for at least 2012 and 2013, and perhaps longer.

YEAR	INCREASES RATE MORE THAN 25BP	LESS THAN 25BP CHANGE	LOWERS RATE MORE THAN 25BP
2012	100%	0%	0%
2013	100%	0%	0%
2014	97%	3%	0%
2015	48%	52%	0%
2016	15%	85%	0%
:	:	:	:
2021	14%	81%	5%
:	:	:	:
2026	12%	83%	5%

Table 3

As a final observation, the provisions would not affect valuation interest rates if sponsors elect to measure their plan obligations with a full (non-smoothed) yield curve. DB plan sponsors may elect to measure plan obligations with a current, full yield curve, as opposed to the smoothed, segmented curve, which is often used for asset-liability matching purposes. Relatively few sponsors use the full yield curve today,<sup>6</sup> so some may consider this a trivial issue. It should be noted, however, that while the funding stabilization provisions would affect valuation interest rates, they would widen the gap between smoothed interest rates and the full yield curve, making the transition from one curve to the other more disruptive. Thus, the proposed law could deter movement toward such hedging strategies.

### EFFECT ON CONTRIBUTION REQUIREMENTS

As illustrated above, the provisions of S.1813 would increase the interest rates used to determine pension funding obligations for the next several years, after which valuation interest rates would likely revert toward the rates determined under current law. This pattern would flow through to the determination of contribution requirements by lowering calculated obligations initially and then subsequently moving them toward the levels they would be at under current law.

<sup>5</sup> The effect of a 25 basis point change will vary significantly from plan to plan, as numerous other variables come into the equation. However, a conventional rule estimates that a 25 basis point change would cause a 2 to 4 percent change in calculated pension obligations. It should be noted, too, that the existence of funded thresholds, such as those at 60 percent, 80 percent and 100 percent, could make very small changes in the valuation interest rate meaningful to affected sponsors and participants.

<sup>6</sup> Of the more than 8,500 2010 5500 filings in our database as of March 2012, a little more than 1 percent of the filings indicated use of the full yield curve.

Exhibit 1 illustrates the effect of the provisions on projected aggregate contribution requirements for the single-employer DB system.<sup>7</sup> As shown in our previous report, *The Rising Tide of Pension Contributions*, contribution requirements under current law are expected to increase in the near term and then level out as plans attain improved funded statuses.<sup>8</sup> The higher interest rates determined by the proposed law would lower contribution requirements initially, but as those interest rates converge toward market levels, contribution requirements would increase. Contribution requirements under the provisions would eventually exceed requirements under current law because, ultimately, the same obligation is being funded and sponsors would need to make up for lower contributions in the earlier years. In sum, the provisions would defer funding requirements by the amount of time it would take for the valuation interest rates (as affected by the corridor) to return to market levels.

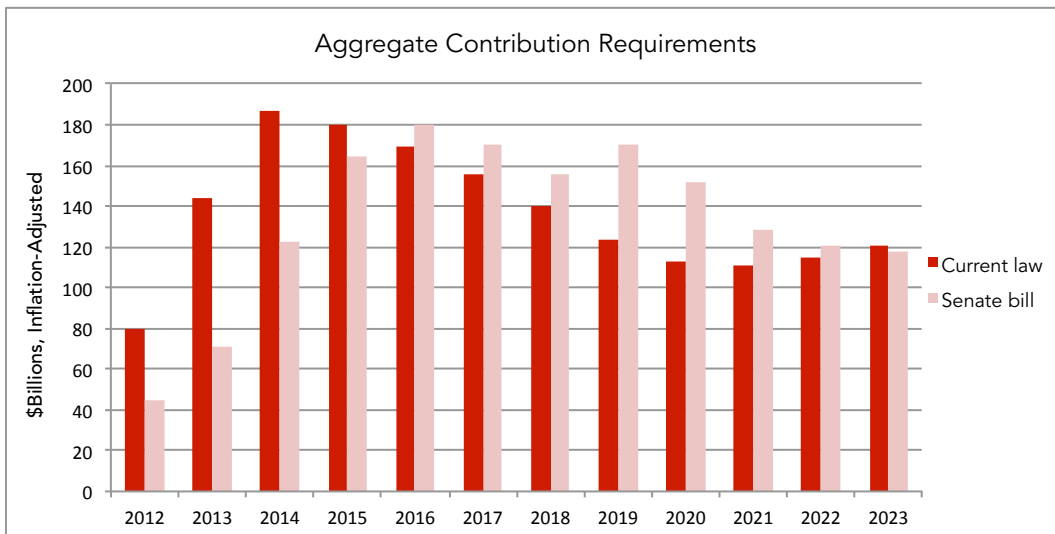


Exhibit 1

### EFFECT ON THE PREDICTABILITY OF FUNDING REQUIREMENTS

Stakeholders in the private DB system share concern about the stability and predictability of funding requirements. Stable, predictable contribution requirements allow the sponsors of DB plans to more efficiently budget cash outlays for their plans. The stability and predictability of plan funded status<sup>9</sup> help sponsors navigate the consequences of funded thresholds, which can have volatile effects on their contribution requirements and the benefits that participants can receive.<sup>10</sup>

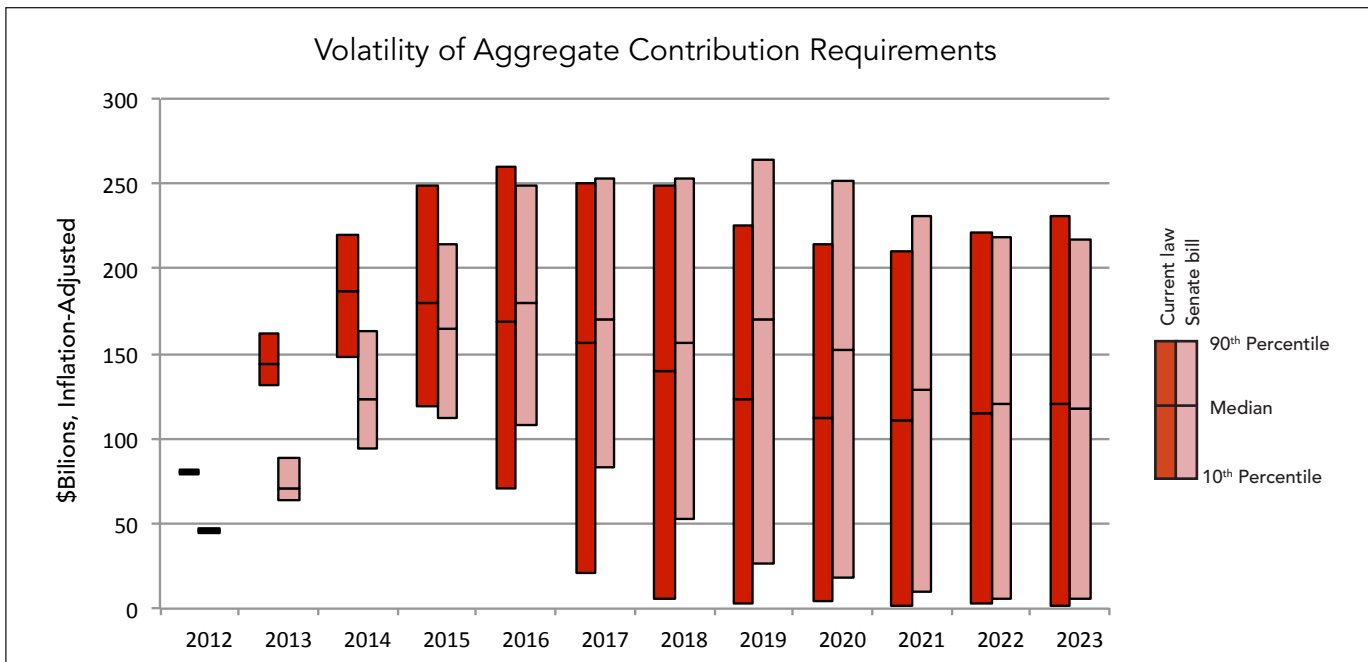
<sup>7</sup> For clarity, Exhibit 1 displays only median levels for each projection year. Among the 500 scenarios, aggregate contribution levels varied from \$0 to more than \$250 billion over the projection period. Exhibit 2 provides more information about the range of contribution requirements.

<sup>8</sup> However, funding requirements are expected to be greater than shown in the *Rising Tide* report, reflecting plan experience during 2011.

<sup>9</sup> Generally, plan assets divided by plan obligations.

<sup>10</sup> As an example, plans that fall below the 80 percent funded threshold are subject to additional contribution requirements and may suffer restrictions on the forms of distributions participants are eligible to receive.

Exhibit 2 illustrates the effect of the funding stabilization provisions on the volatility of contribution requirements by adding the 10<sup>th</sup> through 90<sup>th</sup> percentile range of results to the median results shown in Exhibit 1. A narrower range of results (or “smaller” bar) indicates more predictable contribution requirements. The table at the bottom of the exhibit shows the 10<sup>th</sup> through 90<sup>th</sup> percentile range of contribution requirements for each year. The proposed provisions have some effect on the predictability of aggregate contribution requirements, particularly in 2016 to 2018, when many plans are more likely to pass the 100 percent funded threshold under current law.<sup>11</sup> Nonetheless, a significant amount of volatility remains under the proposed provisions. This can be explained by sources of volatility that the provisions do not address, such as asset returns and triggers associated with crossing key funded thresholds.<sup>12</sup>



Difference Between 10th and 90th percentile contribution requirements (\$Billions, Inflation-Adjusted)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CURRENT LAW	2	30	72	129	189	230	243	223	210	209	219	230
SENATE BILL	1	25	69	101	141	170	200	238	234	220	213	211

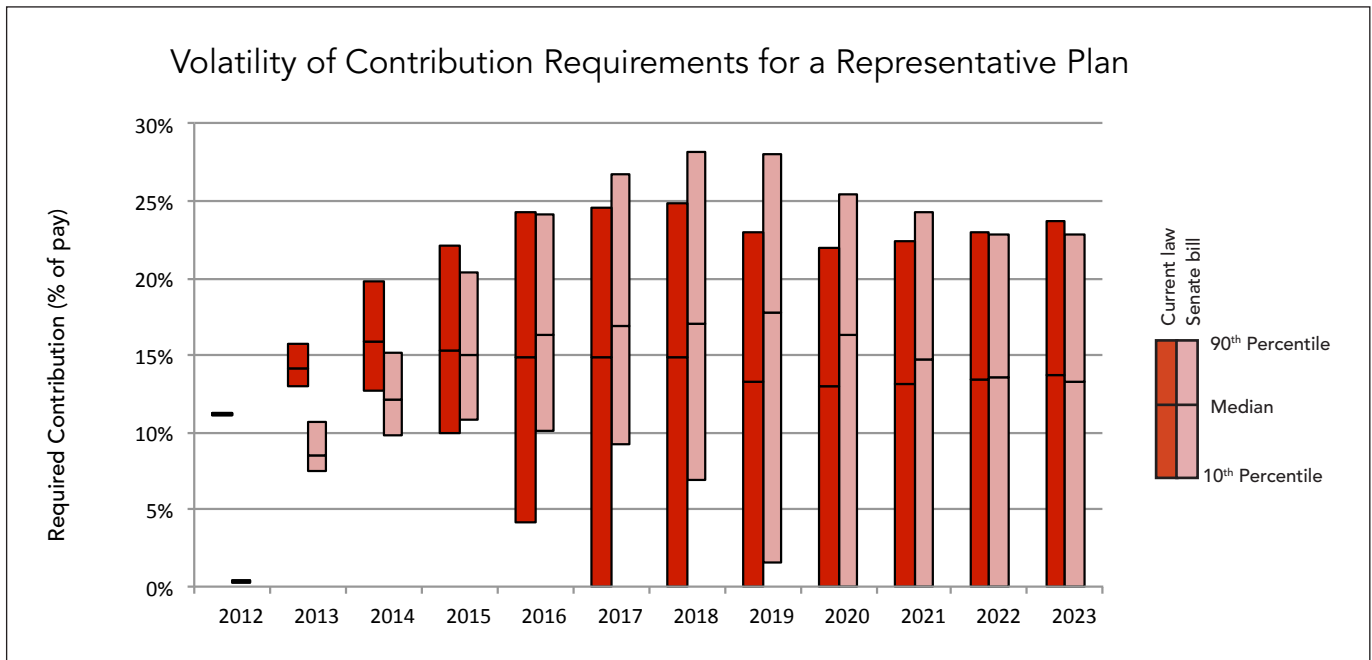
Exhibit 2

Exhibit 2 provides a good summary of how the proposed law would affect the predictability of contribution requirements, but it aggregates the results for all plans, obfuscating the effect on individual

<sup>11</sup> Passing this threshold adds to volatility by reducing the contribution requirement to zero, often a significant drop.

<sup>12</sup> In addition to the aforementioned thresholds at 80 percent and 100 percent, the 60 percent threshold may force the plan to cease additional benefit accruals, reducing contribution requirements and the benefits that participants receive.

plans. Exhibit 3 illustrates how the provisions would affect the contribution requirements for a single representative plan,<sup>13</sup> with results shown as a percentage of pay. The percent of pay metric is meaningful as a measure of stability and predictability, since variations can be observed relative to variations in overall payroll. The stability and predictability for this representative plan appear very similar to the results for the system as a whole. However, it is worthwhile to note that, over the projection period, median contribution requirements would be between 11 percent and 16 percent of payroll under current law versus between 0 percent and 18 percent under the proposed provisions. So while the Senate bill would improve predictability somewhat in the short term, sponsors would need to proactively manage their cash contributions if they desire more stable cash flows.



Difference Between 10th and 90th percentile contribution rates (% of pay)

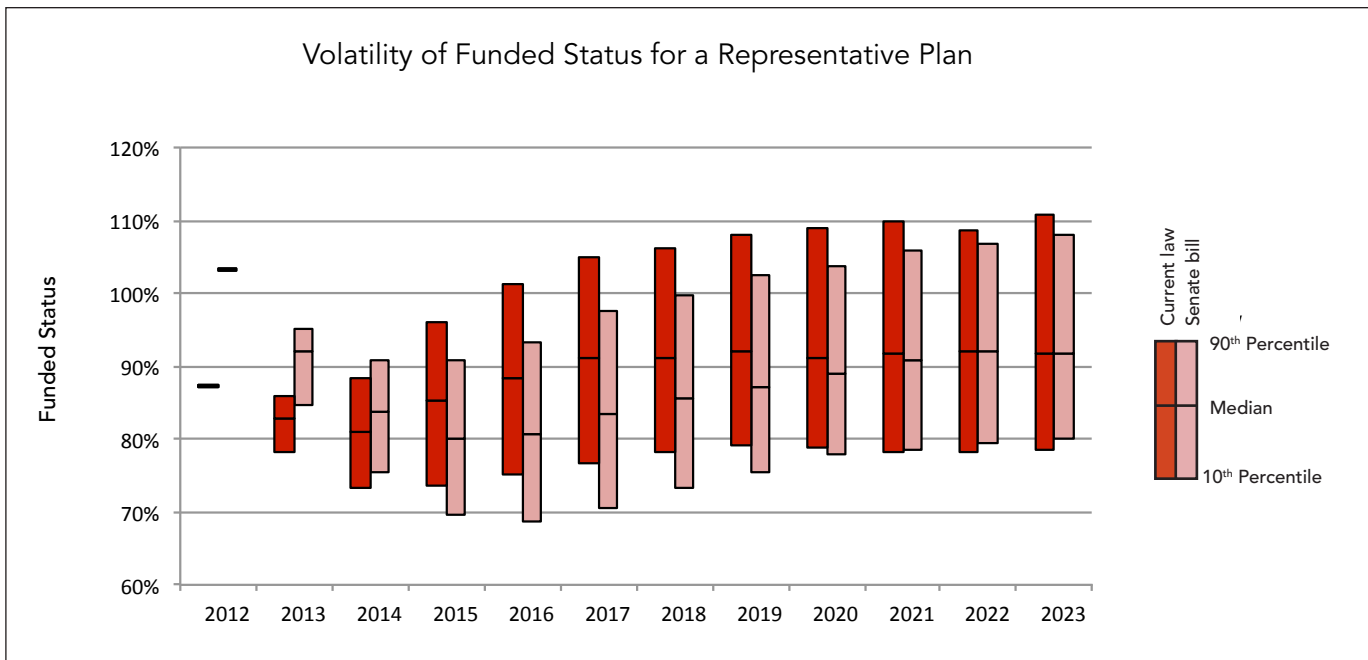
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CURRENT LAW	0%	3%	7%	12%	20%	25%	25%	23%	22%	22%	23%	24%
SENATE BILL	0%	3%	5%	10%	14%	18%	21%	27%	25%	24%	23%	23%

Exhibit 3

<sup>13</sup>Our hypothetical plan was 92 percent funded at the beginning of 2011, and would have had a minimum required contribution equal to 6.1 percent of pay for 2011. At the beginning of 2012, the funded status would be 87 percent under current law and 103 percent under the proposed funding stabilization provisions.



Exhibit 4 shows corresponding results for the funded status of the representative plan, which are important because of their relationship to the key PPA funded thresholds of 60 percent, 80 percent and 100 percent. The inverse relationship between Exhibits 3 and 4 is natural—to the extent funded status declines, contribution requirements increase. Under the Senate proposal, we expect the funded ratio of our typical plan to drop rapidly, as the decline in valuation interest rates<sup>14</sup> creates a series of valuation losses<sup>15</sup> over the next several years, which would only gradually make their way into the funding requirement over the seven years following each loss. Unless the sponsor of this plan funds in excess of the minimum amount required, there is an increased risk that this plan would fall below the 80 percent funded threshold, triggering additional contribution requirements and potential benefit restrictions. Finally, there is little evidence that the funding stabilization provisions would have much effect on the predictability of the funded status for this plan.



Difference Between 10th and 90th percentile funded statuses:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CURRENT LAW	0%	8%	15%	22%	26%	28%	28%	29%	30%	32%	31%	32%
SENATE BILL	0%	11%	15%	21%	25%	27%	26%	27%	26%	27%	28%	28%

Exhibit 4

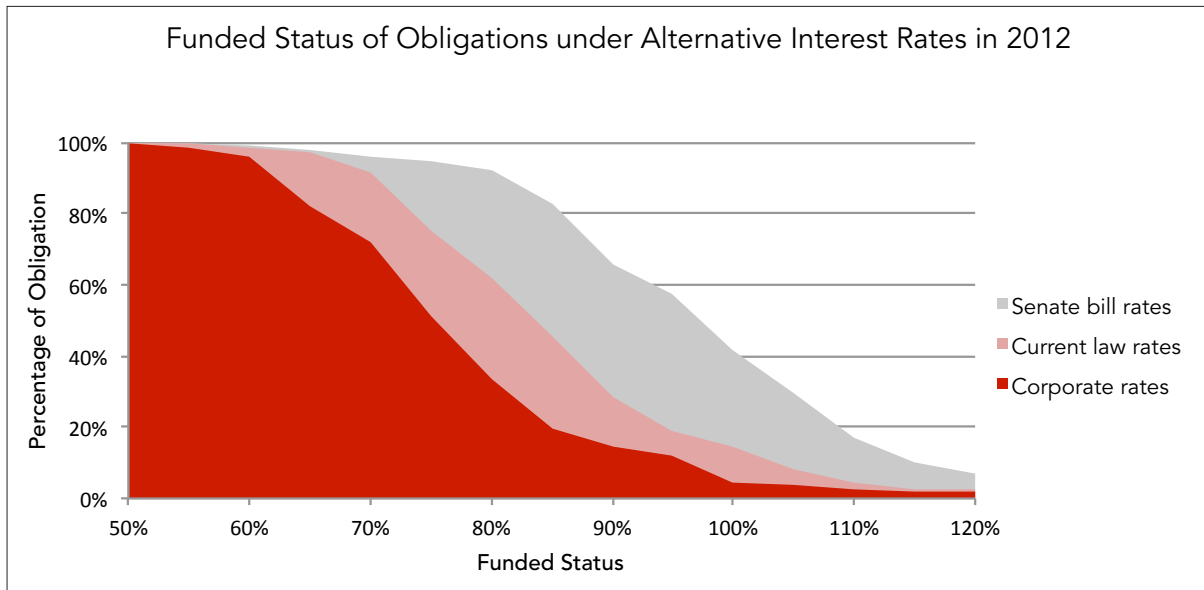
<sup>14</sup>See discussion of Table 1.

<sup>15</sup>A loss occurs when obligations increase more than the valuation assumptions assume. Thus, a pattern of declining interest rates, which increase calculated obligations, causes losses.

**EFFECT ON THE TRANSPARENCY OF FUNDED STATUSES**

Under current law, funded status has a key role in the single-employer DB plan funding regulations. PPA established precautions based on funded status, intended to avoid risks that occur when funded levels become too low. These precautions include additional contribution requirements and benefit restrictions previously referenced in this report. More broadly, though, the funded status provides a barometer of plan status, by tracking the portion of DB promises backed by assets in the plan.

Exhibit 5 compares how well-funded the system would appear at the beginning of 2012 if obligations are measured with the corporate spot curve published by the IRS, the smoothed rates allowed under current law, and the corridor-limited rates that would apply if the proposed law comes into effect. The graph shows the percentage of single-employer DB obligations considered to have obtained the specified funded status when measured under the alternative valuation interest rates.



PERCENTAGE OF OBLIGATION FUNDED TO:	60%	80%	100%
Corporate rates (4.7% equivalent)	96%	34%	4%
Current law rates (5.4% equivalent)	98%	62%	14%
Senate bill rates (6.7% equivalent)	99%	92%	41%

**Exhibit 5**

As shown in Exhibit 5, the funding stabilization provisions would have a significant effect on the funded status of plans in 2012. Under any measurement, most of the promised obligations would be at least 60 percent funded in 2012. However, more significant disparities appear at other key ratios. In particular, 62 percent of outstanding obligations would be considered 80 percent funded using current law valuation interest rates, but 92 percent of obligations would be considered to be funded at this level under the proposed rules. And while current law valuation rates would put less than 15 percent of 2012 obligations above 100 percent funded, the proposed rules would indicate that more than 40 percent of outstanding obligations are fully backed by plan assets. Measurement under the current law would suggest that plans are in much better shape than a market measurement would suggest, while the proposed law would suggest that, contrary to market measurements, plans are generally in good health.

The disparities between funded ratios measured under current law and the Senate bill would be expected to dissipate as time progresses and the probability that the valuation interest rates would be the same increases. However, in the interim, funded ratios measured under current law would more closely track market conditions, because market changes in corporate bond yields are adopted by valuation interest rates more quickly under current law than under the proposed rules. This is most evident in 2013, when the valuation interest rate under the proposed rules is effectively prescribed, and highly likely in 2014, when the scenarios in our analysis show only a small chance that interest rates would move inside the corridor. Therefore, under the proposed law, changes in plan funded status from 2012 through 2015 would generally be independent of changes in market interest rates during these years.

#### EFFECT ON THE SOLVENCY OF PLANS

Ensuring the solvency of pension plans, their ability to settle benefit obligations when due, is a critical function of funding regulation. As described previously, the funding stabilization provisions would have the net effect of deferring contribution requirements into the future. It follows that, in general, solvency would decline initially, and then eventually return to the levels it would have attained under current law.

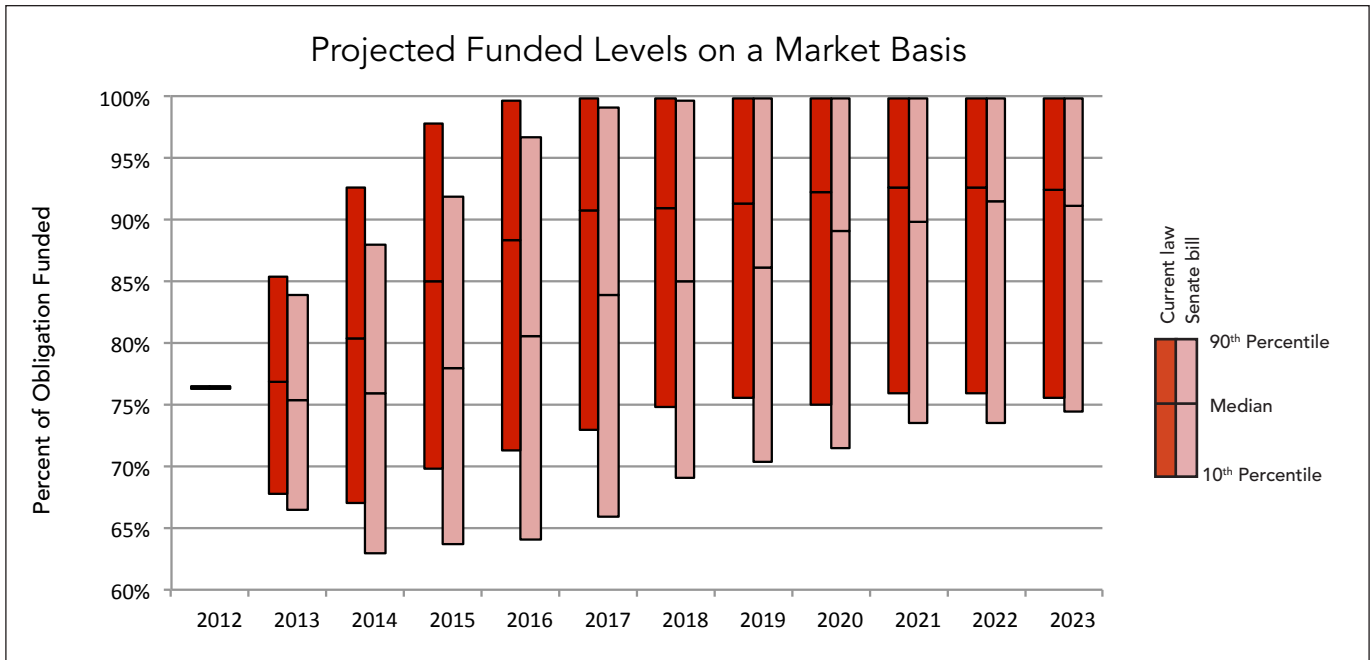


Exhibit 6

Exhibit 6 compares the projected level of funding in the single-employer DB system under current law and the funding stabilization provisions. For purposes of this illustration, the pension obligations were measured using spot rates for A-rated corporate bonds, so that there would be a consistent basis for comparing the level of plan funding.<sup>16</sup> As expected, the graph shows that funded levels would decline initially under the funding stabilization provisions and then return to levels comparable to those under current law.

The lag in funding would increase the risk of adverse outcomes during the short term. Specifically, to the extent plans default during this period, there would be greater claims on the Pension Benefit Guaranty Corporation (which, theoretically, would result in higher premium costs for sponsors) and lost participant benefits. Table 4 shows the median level of funding under current law and the Senate bill for each year of the projection. The differences provide a sense of the additional amounts that would be at risk under the proposal. The differences exceed \$100 billion for six years (2014 to 2019), so even a small percentage of defaults could result in losses measured in the billions. Nonetheless, it is noteworthy that funded levels would not necessarily be permanently depressed by the proposed legislation.

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CURRENT LAW	1.90	1.92	1.98	2.07	2.17	2.25	2.30	2.39	2.43	2.46	2.52	2.60
SENATE BILL	1.90	1.89	1.87	1.92	2.00	2.09	2.18	2.26	2.34	2.41	2.48	2.54
DIFFERENCE	0.00	0.03	0.11	0.15	0.17	0.16	0.12	0.13	0.09	0.05	0.04	0.06

Table 4

<sup>16</sup>Solvency obligations are more commonly based on U.S. Treasury yields or the cost of buying annuity contracts, which would have the effect of lowering funded levels under both the funding stabilization provisions and current law. These assumptions reflect the certainty of payments at the time obligations are settled. For simplicity, this analysis did not consider the effects of plan default and, therefore, uses corporate yields as a proxy to illustrate the effect of the funding stabilization provisions on solvency.

## IMPLICATIONS FOR PLAN SPONSORS AND REGULATORS

Policymakers deliberating over this legislation may want to consider how the proposed rules could be modified to better suit their goals. First, analysis shows that, while there is a significant chance that the provisions will have permanent effects on funding, the significant effects are only temporary. Therefore, these changes do not address structural concerns that may exist about the current law. During the period where the provisions are expected to have a significant effect, they would reduce contribution requirements relative to current law, freeing sponsors to fund other aspects of their operations. However, they would have a mixed effect on the volatility of contribution requirements, potentially creating another rising tide of contribution requirements while only slightly improving the predictability of those requirements. If plan sponsors seek to level the pattern of contribution requirements by funding in excess of minimum requirements, they may negate the effects of reduced contribution requirements. However, addressing non-interest rate sources of volatility in the contribution requirement could improve predictability without affecting the level of contributions. As a final point, it should be recognized that the provisions have broader implications than the level of contribution requirements, as they also affect the meaningfulness of disclosures about the funded status and the costs of potential plan defaults.

Should the funding stabilization provisions become law, plan sponsors will want to exercise greater caution in planning future contributions to their plans, taking into account the decline in valuation interest rates that will certainly follow the 2012 increase. The provisions would allow greater freedom in short term cash flow planning; however, to the extent contributions are deferred, the risk of falling below key funded thresholds and sharp hikes in future contribution requirements increases. Finally, most sponsors should continue to expect a degree of volatility in their funding requirements, to the extent they are exposed to non-interest rate risks.

## CONCLUSION

Some effects of the funding stabilization provisions in the Senate-passed MAP-21 bill can be determined with a high degree of certainty. The provisions would create an effectively certain pattern of valuation interest rates over the next several years, increasing sharply in 2012, and rapidly declining over the next two. This pattern would ripple through funding regulations to create similar fluctuations in required contributions and, depending on sponsor reactions, in funded ratios. Though contribution requirements would fluctuate, they would be lower during the initial years, providing plan sponsors with a brief period of increased flexibility in their cash management. However, this benefit would come at the cost of transparency of plan funded status and potential increased consequences of plan default.

Less certain are the effects the funding stabilization provisions would have on long term matters, such as recurring difficulties with the effects of market fluctuations. Ironically, given the reference to stabilization, the provisions do little to improve the volatility of contribution requirements. Other, non-valuation-interest-rate sources of volatility limit the effect of the provisions on predictability in the short term, and the reduced likelihood that the provisions will affect future valuation interest rates further diminishes the effectiveness. It also remains axiomatic that promised benefits will eventually need to be funded, so, to the extent today's funding requirements are lowered, they will most likely return as additional requirements in the future.

**APPENDIX: METHODS AND ASSUMPTIONS**

The results in this report were derived from a 500-scenario stochastic projection of the private sector U.S. single-employer DB system, with the intent of understanding how the funding stabilization provisions contained in the Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) bill (S.1813) would affect key principles in funding regulation. The projections were developed using the Pension Insurance Modeling System (PIMS), which was originally created for the Pension Benefit Guaranty Corporation (PBGC). Starting with data from publicly available regulatory filings, PIMS simulated the demographic and economic experience of 425 single-employer DB plans, representing more than half of the reported benefit obligations of plans insured by the PBGC, using parameters determined by the Society of Actuaries (SOA). It then performed actuarial valuations of each plan for each year of the projection period and calculated the obligations, asset values and required contributions for each plan in the sample. The results from the sample of 425 plans were then extrapolated to the single-employer universe of plans, where such results are mentioned in this report.

In conducting the projections, the model relied on data supplied by the PBGC as of October 2011, which consisted of selected data from publicly available Form 5500 filings made by DB plan sponsors. The selected data included information about plan demographics, benefit structures, asset values, liabilities and actuarial assumptions for 425 large pension plans. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonability. The SOA modified a few data elements to update them for major events (such as large plan freezes) since October 2011.

PIMS used assumptions to simulate future actuarial valuations and actual future experience. All demographic and certain economic assumptions were deterministic, meaning they were held constant through all 500 scenarios. Key deterministic assumptions made for this analysis were:

	VALUATION	EXPERIENCE
DEMOGRAPHIC		
ACTIVE HEADCOUNT	Closed group	Constant for ongoing plans
TERMINATION RATES	As disclosed on Schedule SB	As disclosed on Schedule SB
DISABILITY RATES	As disclosed on Schedule SB	As disclosed on Schedule SB
RETIREMENT RATES	As disclosed on Schedule SB	As disclosed on Schedule SB
MORTALITY RATES (PRE- AND POST-RETIREMENT)	RP2000 projected 10 years beyond the valuation date, assuming 60/40 male/female population	RP2000 projected to the valuation date, assuming 60/40 male/female population
ECONOMIC		
EFFECTIVE INTEREST RATE		
	2010	5.74%
	2011	5.51%
	2012	4.71%
ASSET RETURN		
	2009	16.84%
	2010	12.86%
	2011	0.70%
ASSET ALLOCATION		
	Domestic equity	35%
	International equity	17%
	Investment grade debt	36%
	High yield debt	5%
	Real estate	4%
	Cash	3%
WAGE INCREASES (PAY-RELATED PLANS)	1.00% plus a merit increase derived from participant data	
BENEFIT INCREASES (NON-PAY-RELATED PLANS)	NONE	

Key stochastic assumptions included the corporate spot rate curve, asset returns, actual wage and benefit increases, and inflation. Barrie and Hibbert, a Moody's Analytics Company that specializes in modeling potential future economic scenarios, provided the SOA with 500 real-world simulations of future corporate spot curves, asset returns and inflation. (The SOA thanks Barrie and Hibbert for their assistance.) Actual wage and benefit increases were based on inflation, productivity growth, and a merit scale in the case of pay-related plans.

No bankruptcies or plan changes were assumed during the projection period. The valuation of plans with a fiscal year beginning after June 30 used assumptions for the next calendar year. All participants were assumed to elect a single life annuity form of payment.

Where the report references results under PPA or current law, minimum funding requirements were modeled on the provisions in the PPA of 2006, as amended through the Pension Relief Act of 2010 (PRA). Plans within the sample that elected alternative amortization schedules under PRA were mod-

eled using their actual elections. The model assumed that all sponsors elected to use 24-month smoothing of interest rates. The model assumed the actuarial value of assets (AVA) equaled the market value of assets (MVA) if those values were equal in their Schedule SB filing; otherwise, it assumed 24-month smoothing of the MVA for the AVA.

Where the report references results under the Senate bill (or the funding stabilization provisions of the MAP-21 bill), the calculation of minimum funding requirements was modified to take into account the Pension Funding Stabilization provisions of Section 40312 of the Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) bill (S.1813). Specifically, to the extent the 24-month average of interest rates determined under PPA would have otherwise been above or below the range of interest rates permitted by the provisions, they were set to maximum or minimum (respectively) rates of the range. The range was determined by applying the applicable percentage specified by the law to the average of segment rates for the 25 years ending Sept. 30 of the year prior to the valuation year. Historical interest rates were based on the High Quality Market-Weighted (HQM) corporate bond yield curves published by the Department of the Treasury for October 2003 through December 2011, the Citigroup Pension Discount Curve for September 1995 through September 2003, and Treasury rates adjusted for corporate default spreads prior to September 1995.

Unless otherwise stated in the report, sponsors were assumed to contribute the minimum amount of cash required after application of their available credit balance. Actual contributions were used to the extent data was available and the actual contributions exceeded the modeled minimum requirement. All cash flows (contributions attributable to the plan year and benefit payments during the plan year) were assumed to occur at the end of the plan year.

To model the universe of single-employer DB plans in the United States, the results generated for each plan in the sample were multiplied by a factor based on reported 2009 benefit obligations (funding targets) for the universe and the sample. Prior to calculating the multipliers, the plans in the sample were categorized by the funded status of the largest plan at its sponsoring firm (326 firms sponsored the 425 plans in the sample). The plans within each category were generally assigned a multiplier that would gross the total liability in that funded status category to the total liability for the corresponding funded status category in the universe.



This report is not intended to advocate a position for or against the pending legislation. Rather, the purpose of this research is simply to provide an objective, actuarial analysis of the potential impact of the legislation on the funding requirements for corporate defined benefit plans. While we hope that this actuarial analysis will help inform policy makers on some implications of the proposed legislation, we recognize there are many other issues they must also consider when evaluating the merits of the bill, including the state of the economy, the current low level of interest rates, the impact on plan sponsors, and other factors. Consequently, the Society of Actuaries does not take any position on the merits of the legislation and whether it should or should not be passed.

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