

STRETCHING THE CORRIDOR:

The Effects of Extended Rate Stabilization on Defined Benefit Plan Funding Requirements

SEPTEMBER 2014

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SOA RESEARCH REPORT

At several points during the past year, Congress contemplated modifications to the “pension funding stabilization” provisions that were implemented with the Moving Ahead for Progress in the 21st Century Act (“MAP-21”). The funding stabilization provisions influence the calculation of certain statutory¹ requirements for sponsors of private sector single-employer defined benefit plans.² Affected statutory requirements include the amount that sponsors must contribute to their plans each year and whether plans may offer certain benefits, such as lump sum forms of payment.

The Society of Actuaries (“SOA”) analyzed the potential effects of the pension funding stabilization provisions in 2012, before MAP-21 became law.³ The report demonstrated that the law would allow plan sponsors to defer required contributions to their defined benefit plans, if desired, giving them more flexibility in how they deployed their cash. The report also revealed that statutory measures of plan funded status would increase significantly with implementation of the stabilization provisions. This had implications for plan reporting and the availability of certain benefits, such as lump sum forms of payment. These effects were expected to be temporary, because they were driven by modifications to the interest rates used in pension liability calculations and the MAP-21 modified interest rates were expected to eventually revert to the interest rates that would have otherwise existed without the stabilization provisions.

The changes recently contemplated by Congress would prolong the effects of the stabilization provisions by extending the “10 percent corridor” in the MAP-21 provisions. The corridor regulates the likelihood and scale of the stabilization effects, and extending the 10 percent corridor increases the expected period of time before rates revert to pre-MAP-21 levels.

In this report, we first analyze the effects that a five-year extension of the 10 percent corridor would have on minimum contribution requirements and funding-based benefit restrictions. We then provide a brief analysis of the effects of making the 10 percent corridor permanent.

¹ Throughout this report, the term “statutory” may connote any calculations prescribed by law. The pension funding stabilization provisions discussed in this report do not affect all statutory calculations.

² As of 2011, the private sector single-employer defined benefit system consisted of approximately 44,000 defined benefit plans covering 32 million participants and beneficiaries with more than \$2 trillion in assets. Source: U.S. Department of Labor Private Pension Plan Bulletin, June 2013.

³ See Society of Actuaries, [Proposed Pension Funding Stabilization, June 2012](#).

Our analysis shows that extending the 10 percent stabilization corridor for five more years (through 2017) would, in our base case:

- Add two to three years to the expected period of time before interest rates revert to pre-MAP-21 levels, from 2016 to 2018 or 2019;
- Defer funding of the system by an expected two years, providing plan sponsors with additional flexibility in how they use their cash;
- Increase PBGC premium revenue by up to \$10 billion, with the actual amount depending on the degree to which plan sponsors take advantage of the opportunity to defer plan contributions; and
- Marginally decrease the prevalence of funding-based benefit restrictions, easing limits on sponsors' ability to "de-risk" their defined benefit plans. The prevalence of benefit restrictions would increase significantly in the absence of the stabilization provisions.

Perhaps most importantly, our analysis shows that extending the 10 percent stabilization corridor indefinitely—directly or indirectly—would have major implications for defined benefit funding policy because it would fundamentally change the targeting of funding levels.

We note that interest rate movements since the beginning of 2014 indicate that the effects of the interest rate corridor may last longer than the expected durations we report.⁴ Nonetheless, the relative effects of extending the 10 percent corridor, such as more flexible contribution requirements, remain valid.

⁴ Our interest rate projections were calibrated to market conditions as of December 31, 2013, and interest rates are in the lower end of our projected range as of July 2014. To the extent that interest rates remain low for longer periods of time, the corridor will apply for a longer period of time.

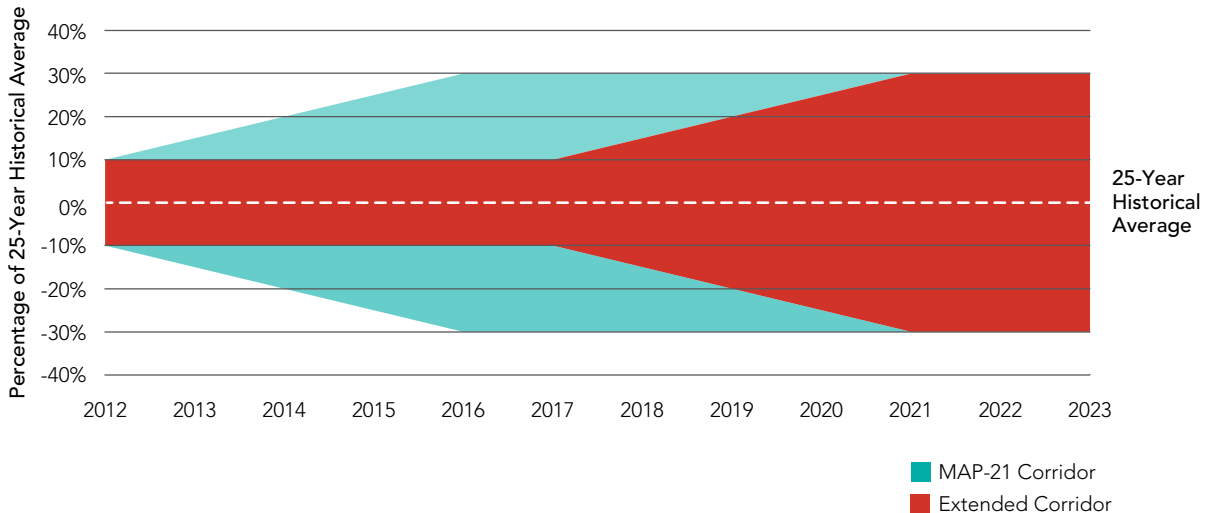
Extending the 10 Percent Corridor for Five Years

The pension funding stabilization provisions⁵ modify interest rates used in the calculation of several statutory requirements for private sector single-employer defined benefit plans, including the calculation of minimum funding requirements.⁶ Where they apply, the provisions limit interest rates to within a specified range of 25-year historical average interest rates, creating a “corridor” of potential interest rates centered on the historical average rates. Under MAP-21, the corridor expands from a 10 percent limit in 2012 (the “10 percent corridor”) to a 30 percent limit in 2016.⁷ Widening the corridor from 10 to 30 percent reduces the effectiveness of the provisions by reducing the likelihood that they will apply and reducing the interest rate adjustment when they do apply.

Extending the 10 percent corridor for five years would narrow the stabilization corridor relative to the limits established in MAP-21, increasing the likelihood and scale of its effects. The five-year extension modeled in this analysis assumes that corridor limits remain at 10 percent from 2012 through 2017 and then expand to 30 percent over the following four years. (See Exhibit 1.) The analysis first examines the direct effects that a five-year extension of the 10 percent corridor would have on the interest rates used to calculate defined benefit liabilities. It then examines the consequent effects that a five-year extension would have on key statutory requirements for defined benefit plans: the amount of contributions required of sponsors and the prevalence of funding-based benefit restrictions.

EXHIBIT 1

FIVE-YEAR EXTENSION OF THE 10 PERCENT STABILIZATION CORRIDOR



⁵ See section 303(h)(2)(C)(iv) of the Employee Retirement Income Security Act. See also section 430(h)(2)(C)(iv) of the Internal Revenue Code. We note that the pension stabilization provisions do not apply for purposes of determining minimum contribution requirements if the plan sponsor elects to use the full corporate spot rate curve under section 430(h)(2)(D)(ii).

⁶ Appendix A presents a flowchart showing how interest rates, among other factors, flow into the calculation of several statutory requirements for defined benefit plans, including the requirements influenced by the pension funding stabilization provisions.

⁷ A 10 percent corridor restricts interest rates to be within 90 and 110 percent of 25-year historical average interest rates. If, for example, an interest rate would otherwise be less than 90 percent of the 25-year average, a rate equal to 90 percent of the 25-year average is used instead.

EFFECT ON STATUTORY INTEREST RATES

If the 10 percent corridor were to apply retroactively to 2012, as it does in our modeled extension, its effect on 2013 and 2014 statutory interest rates would already be known. Table 1 compares level-equivalent interest rates developed under a five-year extension of the 10 percent corridor to level-equivalent interest rates developed under other statutory bases.⁸ Under the five-year extension, stabilized rates decline at a much slower rate than they would if based on the MAP-21 stabilization provisions or 24-month average rates, providing a more gradual transition to current interest rate levels.

TABLE 1

Comparative Statutory Interest Rates (Level Equivalents)

	2012	2013	2014
MONTHLY AVERAGE RATES	4.72%	4.07%	4.89%
24-month average rates	5.40%	4.77%	4.44%
MAP-21 stabilized rates	7.03%	6.34%	5.82%
Stabilized rates with five-year extension	7.03%	6.69%	6.51%

The stabilized rates decline in a gradual manner by design. Absent the stabilization corridor, the interest rates that determine contribution requirements and benefit restrictions would be based on the 24-month average rates, which vary on a monthly basis as corporate rates change. The limits of the stabilization corridor are steady, predictable,⁹ and much higher than current 24-month average rates. As long as the 24-month average remains below the lower limits—or “floor” rates—stabilized interest rates will continue to decline in a steady, predictable fashion. Eventually 24-month average rates will exceed the floor rates, and stabilized interest rates will be equal to either 24-month average rates or the upper (“ceiling”) percentage limits. Exhibit 2 illustrates one possible scenario for the second segment rate.¹⁰ In our example, the stabilized rates decline with the floor until 2016, after which they correspond to the 24-month average rates. The actual year in which the floor will cease to apply depends on the path of future interest rates—longer periods of low rates will result in the floor rates applying for a longer period of time.

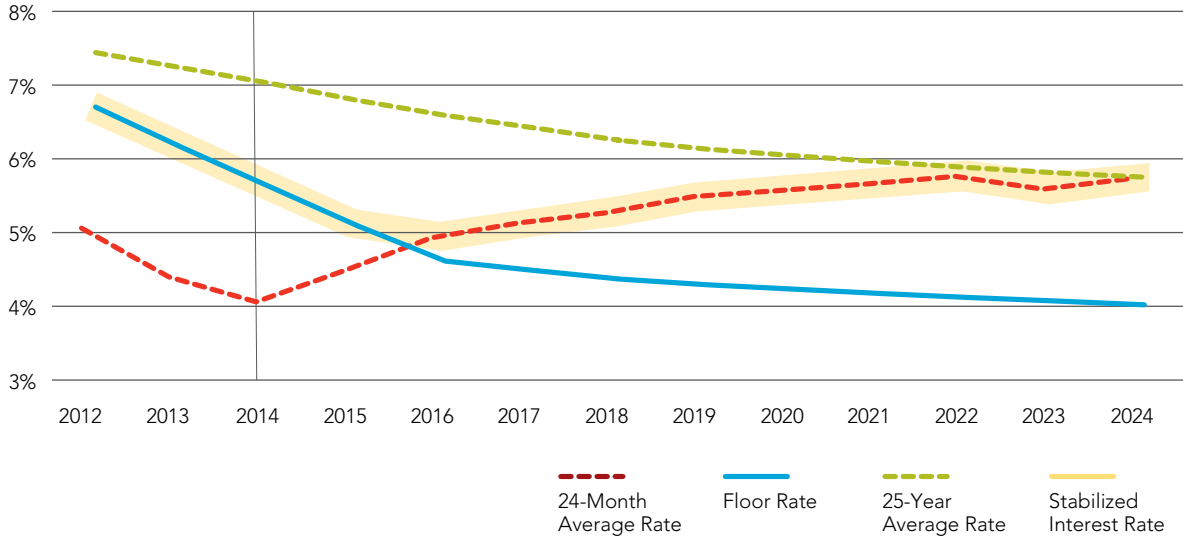
⁸ Level-equivalent rates—weighted averages of the underlying full and segmented spot rate curves—are used for ease of comparison. The level-equivalent monthly average rate is derived from the high-quality market (HQM) spot rate curve published by the IRS for the December preceding the year shown and projected benefit payments for the entire private sector single-employer defined benefit system. Twenty-four-month average segment rates and MAP-21 segment rates are based on the same projected benefit payments and the segment rates published in IRS Notices 2012-55 and 2013-11, using a look back to the December preceding the year shown. The values will vary for individual defined benefit plans due to differences in the timing of expected benefit payments and look-back periods.

⁹ Corporate interest rates would need to increase or decrease noticeably to generate an unexpected change in the corridor limits. For example, interest rates would need to increase or decrease more than 10 basis points per month from June 2014 through August 2015 (ending more than 150 basis points higher in September 2015) in order to generate a one-basis-point change in the 2016 limits before rounding. With rounding, rates would need to increase approximately three basis points per month or decrease approximately 15 basis points per month through August 2015 to generate a one-basis-point increase or decrease, respectively.

¹⁰ Under PPA, the interest rate used to discount expected future benefits payments differs by the time between the valuation date and the payment of the expected benefit. The second segment is used to discount payments expected to occur more than five and less than or equal to 20 years after the valuation date.

EXHIBIT 2

ILLUSTRATIVE DETERMINATION OF THE SECOND SEGMENT RATE



Extending the 10 percent corridor would also lengthen the period of time before 24-month average rates exceed floor rates. Table 2 demonstrates this effect by examining the likelihood that stabilized interest rates would be at floor levels in each of the next seven years.^{11,12} Applying the MAP-21 corridor, stabilized interest rates would likely rise above floor levels in 2016. If the 10 percent corridor is extended five more years, stabilized interest rates have a high probability of remaining at floor levels through 2017 and rising above in 2018—two years later.

TABLE 2

Likelihood That Stabilized Interest Rates Are at Floor Levels

	2015	2016	2017	2018	2019	2020	2021
MAP-21 corridor	100%	10%	5%	3%	3%	3%	3%
Five-year extension of 10 percent corridor	100%	99%	79%	39%	18%	8%	3%

¹¹ For Table 2, we compared the level equivalent of floor segment rates to the level equivalent of stabilized interest rates for each of 5,000 interest rate simulations. To avoid potential rounding discrepancies, statutory interest rates were assumed to be at floor levels if they were within two basis points of the level-equivalent floor rates.

¹² Table 2 probabilities, as well as all other data in this report that rely upon stochastic capital market projections, are based upon 5,000 real-world simulations of projected corporate spot rates provided by Barrie and Hibbert, a Moody's Analytics Company. The simulations used Barrie and Hibbert's standard calibrations as of December 31, 2013. Summary information about the simulations is provided in the appendix on Methods and Assumptions.

Table 3 provides a sense of the scale by which floor rates could be expected to exceed 24-month average rates by averaging the margin between their level equivalencies in scenarios where stabilized rates are at floor levels. Where the likelihood of floor rates applying is greater, their average effect on stabilized interest rates also tends to be greater. Thus, a five-year extension of the 10 percent corridor would, on average, also increase the scale of the corridor's effect on statutory interest rates.

TABLE 3

Average Basis Point Margin between Level-Equivalent Floor and 24-Month Average Rates When Floor Rate Is Greater

	2015	2016	2017	2018	2019	2020	2021
MAP-21 corridor	49	14	15	17	20	23	25
Five-year extension of 10 percent corridor	150	90	64	43	34	27	25

EFFECT ON CONTRIBUTION REQUIREMENTS

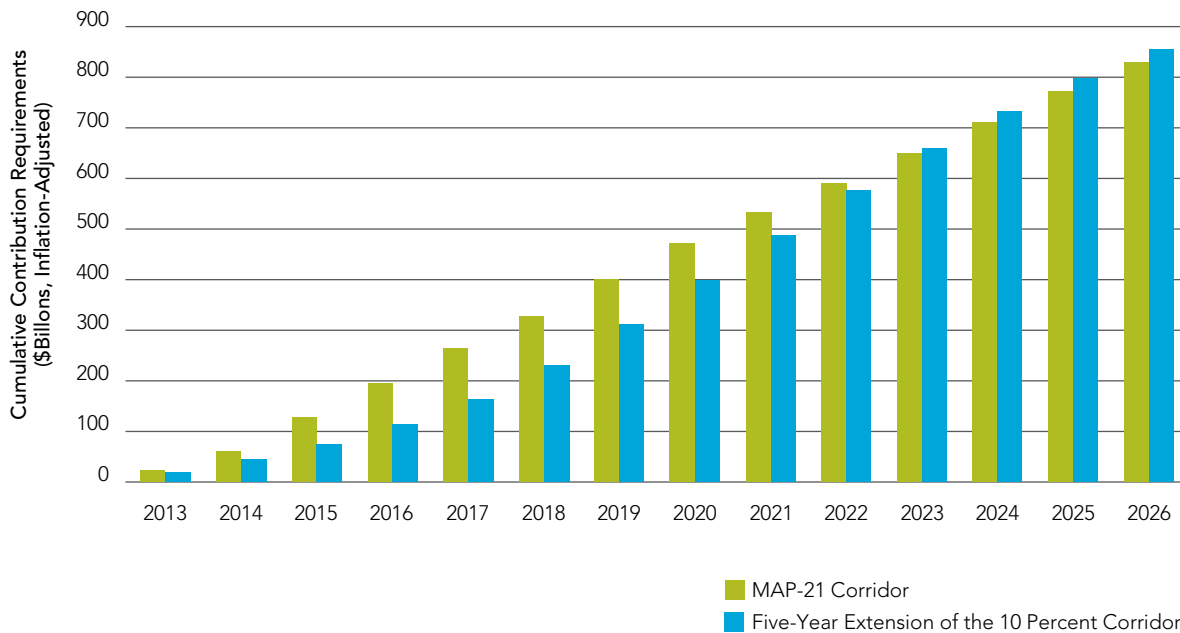
Consequent with its effects on interest rates, a five-year extension of the 10 percent corridor would prolong and amplify the effects that the funding stabilization provisions have on contribution requirements for defined benefit plan sponsors. As outlined in the SOA's 2012 analysis of the MAP-21 corridor, the stabilization provisions generally defer contribution requirements into later years, providing plan sponsors with greater flexibility in the timing of their contributions. A five-year extension of the 10 percent corridor would further increase the flexibility that plan sponsors have in timing their contributions.

Exhibit 3 demonstrates the lag in contribution requirements for the private single-employer defined benefit system that might result from a five-year extension of the 10 percent corridor. The graph compares the projected accumulation of contribution requirements based upon the extended corridor to the projected accumulation based upon the MAP-21 corridor. Both projections use the same set of deterministic assumptions about the future, including reasonable assumptions about future asset returns and interest rate movements.¹³ Based upon these assumptions, accumulated contribution requirements would lag by no more than two years during the projection period if the 10 percent corridor is extended by five years.

¹³ The projection assumptions are disclosed in the appendix on Methods and Assumptions.

EXHIBIT 3

EFFECT OF EXTENDING THE 10% CORRIDOR ON CUMULATIVE CONTRIBUTION REQUIREMENTS



Both alternatives in Exhibit 3 have approximately the same cumulative amount of contribution requirements over the projection period. Discounting for inflation, the sum of contribution requirements in Exhibit 3 is \$830 billion using the MAP-21 corridor and \$855 billion using the extended corridor. As noted in our 2012 analysis of the MAP-21 stabilization provisions, changes to contribution requirements generally adjust the timing of required funding, not the amount of required funding.

It is important to note that Exhibit 3 demonstrates the effect of a five-year extension on contribution requirements and not its effect on actual contributions. Defined benefit plan sponsors may consider many factors when they determine their funding policies, and most contribute more than statutory minimums require. Regulatory filings for the 2012 plan year indicate that sponsors of approximately 77 percent of single-employer defined benefit plans contributed a total \$76 billion more than the statutory minimums required for that year.¹⁴ While many sponsors would take full advantage of contribution deferrals allowed by an extension of the 10 percent corridor, the excess contributions made by the majority of sponsors would reduce the total amount of funding actually deferred.

Recent rate increases have heightened the prominence of PBGC premium costs in decisions about the timing of contributions. Sponsors choosing to defer plan funding generally pay greater PBGC premiums than they would if they chose to contribute earlier. Based on the assumptions in Exhibit 3, including an assumption that all sponsors contribute the minimum required amounts, sponsors would pay an additional \$10 billion in PBGC variable premiums over the projection period if the 10 percent corridor is extended five years. The actual increase in premium collections would be less to the extent that sponsors contribute in excess of minimum required amounts. Of note to decisions about contribution timing, the two corridor alternatives are not cost neutral with respect to PBGC premiums. Sponsors may wish to carefully consider whether the benefits of deferring plan contributions outweigh the costs, such as increased PBGC premiums.

¹⁴ Based on Form 5500 Schedule SB data available from the U.S. Department of Labor website as of August 12, 2014. The 2012 plan year is significant as the first year that the pension stabilization provisions of MAP-21 applied.

EFFECT ON MEASURES OF FUNDED STATUS

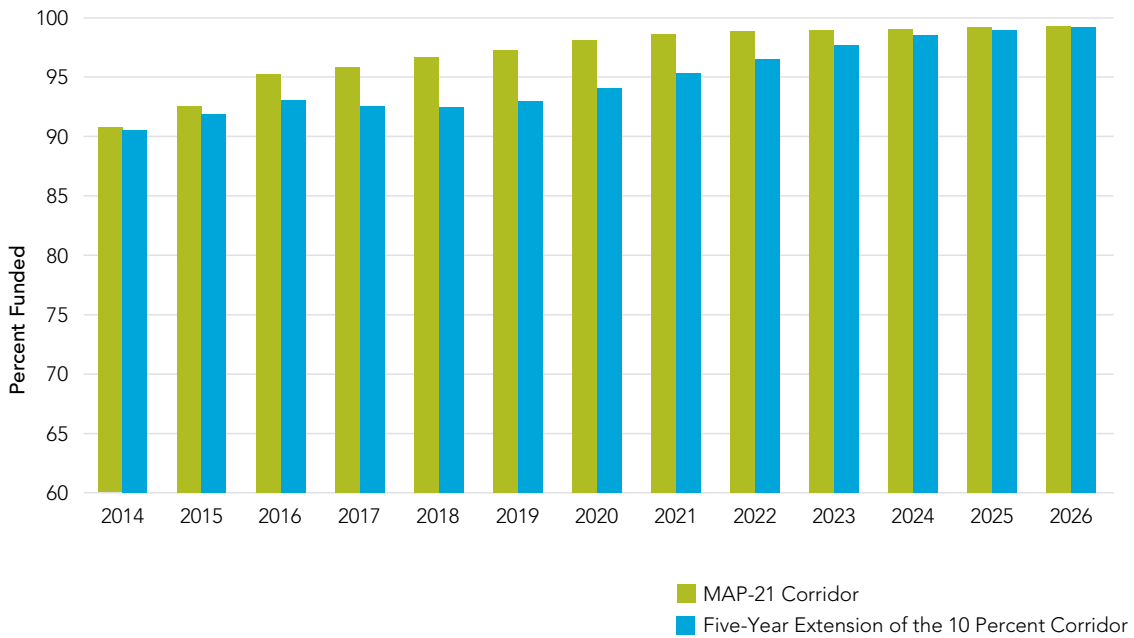
The pension funding stabilization provisions affect two important measures of funded status: the portion of benefit obligations secured by plan assets and a statutory ratio that may trigger restrictions on plan operations.

Insofar as an extension of the 10 percent corridor leads to later contributions by plan sponsors, it would affect the level of assets held by plans during the interim period. Thus, an extension could affect the security of plan benefits.

Exhibit 4 illustrates the effect that a five-year extension of the 10 percent corridor might have on the portion of private single-employer defined benefit obligations secured by plan assets.¹⁵ The illustration assumes plan sponsors contribute the minimum required amounts projected for Exhibit 3.¹⁶ In this scenario, funding would reach 99 percent in 2025 if the 10 percent corridor is extended five years, two years longer than it would take to reach that level using the MAP-21 corridor limits. If plan sponsors continue to contribute more than the minimum required amounts, funding levels would exceed those shown in Exhibit 4 and the margin between the two alternatives would shrink.

EXHIBIT 4

EFFECT OF 10% CORRIDOR EXTENSION ON PROJECTED MINIMUM FUNDING LEVELS



¹⁵ For purposes of Exhibit 4, funded ratios are based on the market value of assets and the present value of accrued benefit payments, which are discounted on the corporate spot curves underlying the stabilized interest rates. Exhibit 4 measures the portion of obligations covered by summing plan liabilities secured by plan assets; i.e., it is the ratio of assets to liabilities, excluding the value of surplus assets in plans where assets exceed liabilities.

¹⁶ The projections in Exhibit 4 use the same deterministic assumptions for demographic and economic experience used for the projections in Exhibit 3. The assumptions are summarized in the appendix on Methods and Assumptions.

A five-year extension of the 10 percent corridor would have a direct effect on a key statutory measure of plan funding—the Adjusted Funding Target Attainment Percentage (“AFTAP”).¹⁷ Additional statutory precautions begin to take effect when plan funding, as measured by the AFTAP, falls below thresholds specified in the law. These precautions include funding-based benefit restrictions, which may affect sponsors’ ability to employ certain “de-risking” strategies. Restrictions on the availability of lump sum payment and annuity placement options begin to take effect when a plan’s AFTAP falls below 80 percent. An extension of the 10 percent corridor would change a statutory interest rate used in the AFTAP calculation and increase the availability of lump sum payment and annuity placement options in the short term.

Table 4 compares the estimated portion of plan liabilities in the private single-employer defined benefit system considered over the 80 percent threshold as of the beginning of 2014, using several alternative bases for the AFTAP interest rate. A five-year extension of the 10 percent corridor would have little effect on the availability of lump sum payment and annuity placement options since most liabilities were already over the threshold on the basis of the MAP-21 corridor. Without stabilization, the portion of liabilities over the 80 percent threshold would shrink significantly because the difference between stabilized and 24-month average rates at the beginning of 2014 is great enough to cause a significant decline in the statutory measure of funded status. For example, a plan considered more than 90 percent funded as of the beginning of 2014 on a stabilized basis could fall below the 80 percent threshold on a 24-month average basis. As a point of reference, approximately 88 percent of liabilities are in plans with a funded ratio over 80 percent, if the funded ratio is calculated as the market value of plan assets divided by plan liabilities based on a corporate spot rate curve.¹⁸

TABLE 4

Estimated Portion of Plan Liabilities above the 80 Percent Threshold

	2014
MAP-21 stabilized basis	92%
Stabilized basis with a 5-year extension of 10 percent corridor	94%

SUMMARY

A five-year extension of the 10 percent corridor would increase the likelihood that the pension funding stabilization provisions would influence statutory funding requirements through 2025. In the short term, this would allow private-sector sponsors of single-employer defined benefit plans greater flexibility to manage the funding and settlement of plan obligations. At the system-wide level, a five-year extension of the 10 percent corridor would delay funding of the system by an expected two to three years. Ultimately, individual plans sponsors would determine the lag in plan funding as they assess the costs, benefits, and risks associated with deferring their plan contributions.

¹⁷ In general, the AFTAP is a ratio of plan assets to plan liabilities, with adjustments for advance funding credit and recent annuity purchases. The asset and liability values used to calculate the ratio are often modified by statutory provisions.

¹⁸ The December 2013 HQM corporate bond yield curve was used as a proxy for a corporate spot rate curve.

Indefinite Extension of the 10 Percent Corridor

In this section we expand our analysis to cover some of the effects of extending the 10 percent corridor limit indefinitely, such that the corridor would never expand to a 30 percent limit. This analysis also provides insight to the effects of continued extensions of the 10 percent corridor, since the effects of continued extensions may resemble those of a permanent 10 percent corridor.¹⁹

Relative to a five-year extension of the 10 percent corridor, an indefinite extension would narrow the corridor limits over a much longer period. As noted earlier, narrowing the corridor increases the likelihood of its effects. Over longer periods of time, the effects of the corridor may vary from today's experience as the funding environment changes. For example, the corridor has the effect of deferring contribution requirements in today's environment, and it could potentially accelerate contribution requirements in the long term. At a more fundamental level, the increased likelihood of the corridor's influence changes the basis for setting the system's targeted level of funding.

EFFECT ON STATUTORY INTEREST RATES²⁰

Tables 5 and 6 expand on Tables 2 and 3, demonstrating the longer-term effect that a 10 percent corridor might have on the relationship between 24-month average rates and floor rates. Table 5 shows that, if the 10 percent corridor is extended indefinitely, stabilized rates exceed floor rates in more than half of the simulations after 2018. After 2018, there is still a reasonable likelihood that floor rates would determine applicable statutory interest rates if the 10 percent corridor is extended indefinitely. This contrasts strongly with the low likelihood that floor rates apply if the corridor expands to 30 percent. Consistent with Table 3, Table 6 indicates that the floor of a 10 percent corridor would, on average, have a greater effect on stabilized interest rates than the floor of a 30 percent corridor when it applies.

TABLE 5

Likelihood That Stabilized Interest Rates Are at Floor Levels

	2018	2019	2020	2021	2022	2023	...	2026
MAP-21 corridor	3%	3%	3%	3%	4%	4%	...	4%
Five-year extension of 10 percent corridor	39%	18%	8%	3%	4%	4%	...	4%
Indefinite extension of 10 percent corridor	57%	46%	42%	42%	42%	41%	...	40%

TABLE 6

Average Basis Point Margin between Level-Equivalent Floor and 24-month Average Rates When Floor Rate Is Greater

	2018	2019	2020	2021	2022	2023	...	2026
MAP-21 corridor	17	20	23	25	24	23	...	22
Five-year extension of 10 percent corridor	43	34	27	25	24	23	...	22
Indefinite extension of 10 percent corridor	57	55	55	55	56	56	...	54

¹⁹ The stabilized interest rates would be the same as long as the extensions maintain the percentage limits at 10 percent. However, sponsor contribution strategies may differ if the corridor is effectively made permanent through a series of extensions rather than a one-time change.

²⁰ The results in Tables 5 through 8 are based upon 5,000 real-world simulations of projected corporate spot rates provided by Barrie and Hibbert. The simulations used Barrie and Hibbert's standard calibrations as of December 31, 2013. Summary information about the simulations is provided in the appendix on Methods and Assumptions.

An indefinite extension of the 10 percent corridor would noticeably increase the likelihood that corridor ceiling rates would apply within the timeframe of our projections. (See Table 7.) The ceiling applies when 24-month average rates exceed the percentage limit above 25-year average rates. Twenty-five-year average rates currently exceed 24-month average rates by a large margin, making the near-term likelihood of this circumstance low. Over longer periods, 24-month average rates have a greater likelihood of overtaking 25-year average rates, and lowering the ceiling limit from 30 percent to 10 percent would further increase the likelihood that ceiling rates would apply.

TABLE 7

Likelihood That Stabilized Interest Rates Are at Ceiling Levels

	2018	2019	2020	2021	2022	2023	...	2026
MAP-21 corridor	0%	2%	3%	4%	4%	5%	...	5%
Five-year extension of 10 percent corridor	3%	5%	5%	4%	4%	5%	...	5%
Indefinite extension of 10 percent corridor	6%	12%	16%	17%	17%	18%	...	21%

Examined together, Tables 5 and 7 expose a key consideration in setting parameters for the stabilization corridor: A narrower corridor increases the likelihood that the statutory interest rates used to target plan funding will be based on a percentage of 25-year average rates rather than 24-month average rates. Table 8 demonstrates this effect by comparing projections of how often the corridor limits would apply under each of the alternatives examined in this report. Maintaining an indefinite 10 percent corridor significantly increases the likelihood of corridor application, relative to a 30 percent corridor, and makes it more likely that stabilized rates will be based on the 25-year average than the 24-month average over the long term. Because 25-year average rates are very stable, the increased likelihood of corridor application shown in Table 8 demonstrates that an indefinite extension of the 10 percent corridor would represent a significant shift away from the use of market interest rates in the determination of funding targets.

TABLE 8

Likelihood That Stabilized Rates Are Based on Corridor Rates²¹

	2018	2019	2020	2021	2022	2023	...	2026
MAP-21 corridor	3%	5%	6%	7%	8%	9%	...	9%
Five-year extension of 10 percent corridor	42%	23%	13%	7%	8%	9%	...	9%
Indefinite extension of 10 percent corridor	63%	58%	58%	59%	59%	59%	...	61%

An indefinite extension of the 10 percent corridor would initially have a similar effect on statutory funding requirements as a five-year extension, and it would have a reasonable chance of deferring funding requirements over several more years than a five-year extension. Differences between a five-year extension and an indefinite extension would not begin to show up until 2018, when the corridor would begin to expand under the five-year extension.

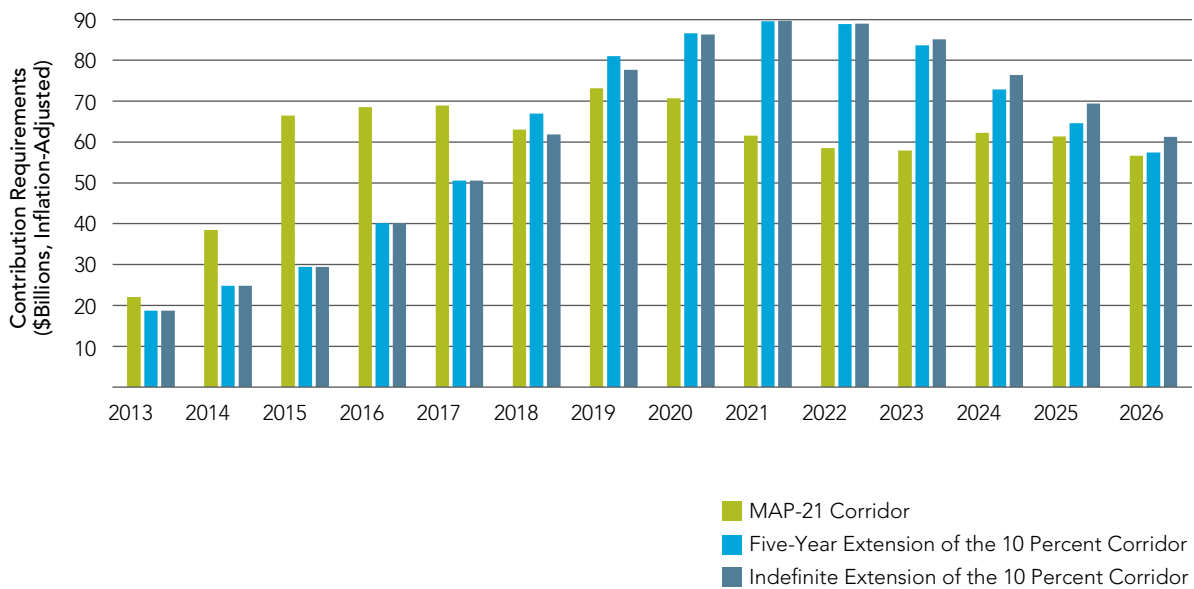
²¹ The results in Table 8 are based on the relative positions of corporate spot rates, 24-month average segment rates, and 25-year average segment rates at the beginning of 2014. In the general case, the likelihood of stabilized rates being at a corridor limit will vary with the relative starting position of these variables and the length of the projection period. For example, the likelihood of stabilized rates exceeding the 2015 floor rates is very low because the one-year change in interest rates is unlikely to be of sufficient magnitude to move the 24-month average above the floor. However, if the 24-month average was within a few basis points of the floor or we examined 10 years of accumulated changes, the likelihood would be higher.

Exhibit 5 depicts projected contribution requirements using “average” assumptions about future interest rates, in which neither the floor nor the ceiling apply under any corridor alternative after 2019.²² The differences between a five-year extension and an indefinite extension can be much greater if corridor rates apply for longer periods of time and, per Table 8, an indefinite extension of the 10 percent corridor would result in a high likelihood of corridor application for the remainder of the projection period. The differences would depend on the relationship between 24-month and 25-year average rates after 2018. If 24-month average rates remain well below 25-year average rates, as projected by the Table 5 scenarios, an indefinite 10 percent corridor would defer contribution requirements and funding of the system for longer periods of time. If 24-month average rates rise more than 10 percent above 25-year average rates, as projected by the Table 7 scenarios, contribution requirements and funding of the system would be accelerated relative to a five-year extension.

Table 7 identifies an increased potential for application of the corridor ceiling if the 10 percent corridor extends beyond 2017. In addition to accelerating contribution requirements, application of the ceiling would increase the prevalence of funding-based benefit restrictions relative to the 24-month average basis. This circumstance occurs in 20 percent of the simulations if the corridor is kept at a 10 percent limit and 5 percent if the corridor is allowed to expand to a 30 percent limit. While current circumstances make it improbable that the corridor ceiling would apply in the near future, an indefinite extension of the 10 percent corridor makes it a reasonable possibility in the more distant future.

EXHIBIT 5

EFFECT OF EXTENDING THE 10 PERCENT CORRIDOR ON CONTRIBUTION REQUIREMENTS



²² Exhibit 5 uses the same assumptions about future interest rates and asset returns as used in Exhibits 3 and 4. These assumptions are summarized in the appendix on Methods and Assumptions.

Over long periods, a 10 percent corridor would have major implications for defined benefit funding policy. As noted previously, the 10 percent corridor greatly increases the likelihood that statutory funding requirements will be based on a relatively static interest rate (the 25-year historical average). This increases the probability that contribution requirements will target a liability based on the 25-year historical average and decreases the probability that they will target a liability that is consistent with prevailing market conditions.

Although a full comparison of these approaches to setting funding targets is beyond the scope of this analysis, the approaches have key fundamental differences—such as the balance between the stability of the funding target and the level of plan funding. Stable funding targets may help sponsors budget for statutory requirements, such as contribution requirements and funding-based benefit restrictions. The level of plan funding affects the security of participant benefits. These priorities may conflict, especially in volatile financial markets. Making the 10 percent corridor permanent would cause a shift in the balance between these two important priorities.

Table 9 helps to demonstrate the balance between maintaining stable funding targets and ensuring adequate funding on a market-consistent basis.²³ Table 9 compares the effects of 10 percent and 30 percent corridors on the stability of the interest rates used to calculate funding targets and on the level of funding in the private single-employer defined benefit system. At the end of the simulation period,²⁴ the 10 percent corridor reduces the average year-to-year change in interest rates, increasing the stability of the funding target. It also increases the likelihood of underfunding on a market-consistent basis and the average shortfall when underfunding does exist.

TABLE 9

Corridor Effect on Interest Rate Stability and Funding Level

	Average Change in Stabilized Interest Rates from 2025 to 2026	Likelihood System Is Less than 99% Funded ¹ in 2026 ²⁵	Average Funding Gap in 2026 When System Is Less than 99% Funded ²⁵ (Adjusted for Inflation to 2014)
30 percent corridor limit	0.21%	46.8%	\$284 billion
10 percent corridor limit	0.12%	52.4%	\$330 billion

The current difference between market interest rates and their 25-year historical averages causes some bias toward lower funding in Table 9, and this bias has a greater effect on the results for the 10 percent limit.²⁶ Nonetheless, the results do show a long-term effect based on real-world circumstances, and they provide some sense of the aforementioned trade-off. In principle, a more stable funding target increases the potential range of market-consistent funding levels (higher and lower) over time.

²³ Interest in the adequacy of funding on a market-consistent basis derives from the likelihood that defined benefit obligations will pass to another party, for example, in the event of planned or distressed plan terminations. The likelihood that this will happen varies across plan sponsors, creating a tension in this trade-off.

²⁴ A snapshot at the end of the simulation period was chosen to minimize the effects of current differences between the 25-year historical average and market-consistent rates. A more robust, principles-based analysis would consider different relative starting points and the potential duration of corridor effects to gauge how the corridor would operate in a variety of potential circumstances.

²⁵ Funded ratios are based on the market value of assets and the present value of accrued benefit payments, which are discounted on the corporate spot curves underlying the stabilized interest rates.

²⁶ A narrower corridor results in a greater bias because it increases the likelihood that the ceiling or floor rates will determine the funding target. Given the current difference between the 25-year and 24-month averages, the narrower corridor increases the likelihood that floor rates will determine targets, resulting in lower targets relative to market measures.

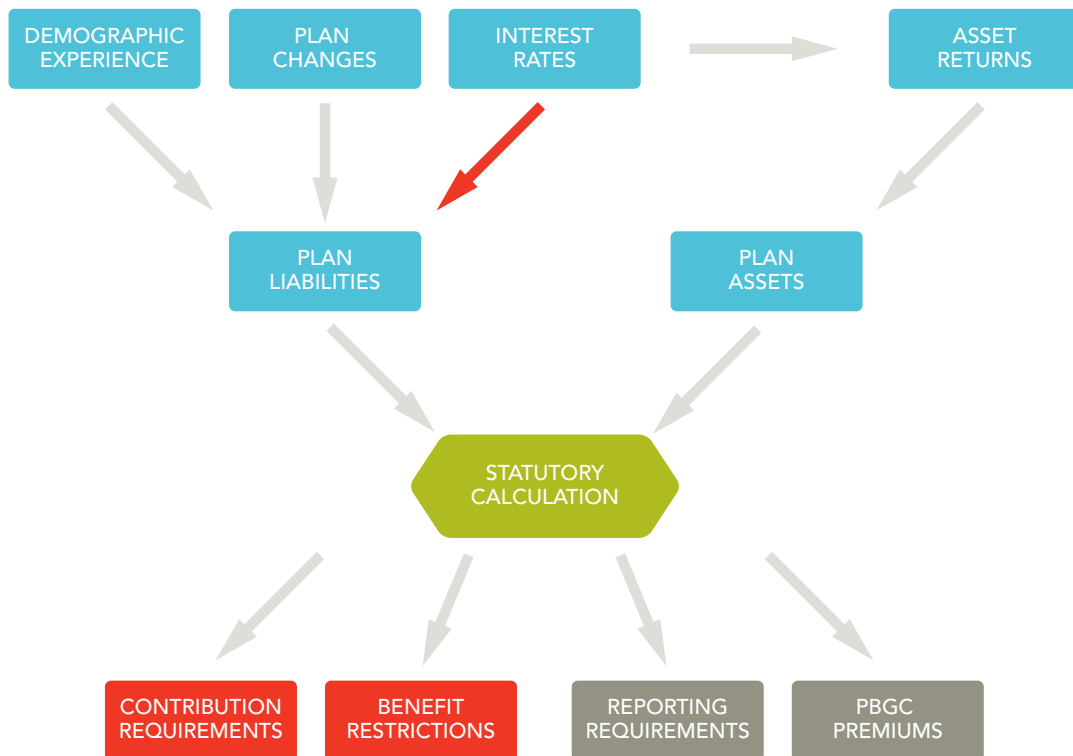
CONCLUSION

Extending the 10 percent corridor would extend the effects of the pension funding stabilization provisions that were initially implemented with the passage of MAP-21. The interest rates used to determine contribution requirements and funding-based benefit restrictions for the private single-employer defined benefit system would be based on a 25-year average of historical interest rates for a longer period of time than previously expected, and differences from the alternative (24-month average) basis would be greater. This would have the short-term effect of deferring required funding for several years. Over a longer term, funding of the system would eventually reach the level it would have attained without an extension.

Continued extension of the stabilization provisions' influence could have longer term implications for defined benefit funding policy. It would increase the stability of funding targets and decrease the sensitivity of funding targets to changes in interest rate markets. As a result, a plan's targeted level of funding would be less likely to approximate the cost of settling its obligations at any given point in time. Thus, maintaining the 10 percent "stabilization corridor" would be one way to shift the balance between the objectives of stable funding targets and market-consistent funding. Discussion of the balance sought by policymakers could enable further analysis to identify ways of achieving their goals.

Appendix A: Influence of Interest Rates on Statutory Requirements

The diagram below illustrates how interest rates, among other factors, influence the determination of statutory requirements for private, single-employer defined benefit plans. The diagram is representative for purposes of this report and does not include all inputs to statutory calculations, nor does it include all statutory requirements.



The pension funding stabilization provisions modify the interest rates that go into the plan liability calculation (at the red arrow)—but only for purposes of determining sponsor contribution requirements and potential restrictions on the benefits that plans may offer.

Appendix B: Methods and Assumptions

The data in this report are based upon deterministic and stochastic projections of the funded status and statutory contribution requirements of plans in the U.S. private sector single-employer defined benefit system, with the intent of examining the effects of extending the 10 percent interest rate corridor described in the MAP-21 pension funding stabilization provisions (Section 40211).

The Pension Insurance Modeling System (PIMS), developed by the PBGC, was used to project changes in funded status and contribution requirements. The model uses data from Form 5500 filings²⁷ to establish the initial state of each plan in a sample of more than 400 single-employer (SE) plans. The sample represents about half of the SE benefit obligations insured by the PBGC. Plan-specific weights are applied such that the sample can be used to draw conclusions for the full universe of SE plans.²⁸ While we cannot verify the accuracy of all the model's detailed plan-specific inputs, they were reviewed for general consistency and reasonability.

Minimum contribution requirements were modeled on the provisions in the Pension Protection Act of 2006, as amended through 2013. The analysis examines two alternative modifications to the minimum contribution requirements. Where the report refers to a five-year extension of the 10 percent corridor, the minimum (maximum) percentages that apply for purposes of segment rate stabilization (Internal Revenue Code section 430(h)(2)(C)(iv) (II)) remain 90 (110) percent through calendar year 2017 and then decrease (increase) 5 percent per year until 2021, after which they remain at 70 (130) percent. Where the report refers to an indefinite extension of the 10 percent corridor or making the 10 percent corridor permanent, the applicable percentages are 90 percent and 110 percent in all years.

Estimates of PBGC variable premium revenue included premium rate increases scheduled in the Bipartisan Budget Act of 2013. We assume 95 percent of accrued benefits are vested for purposes of determining the premium funding target. Plan sponsors were assumed to elect the alternative method for determining premium funding targets, which entails use of 24-month average interest rates to measure the funding targets.

Unless otherwise stated in the report, sponsors were assumed to contribute the minimum amount required after application of their available funding balances. Actual contributions were used if they were included on a Form 5500 Schedule SB filed by October 2013 and exceeded the modeled minimum requirement. The model assumes that sponsors increase their prefunding balances for contributions in excess of the minimum requirements only to the extent their AFTAPs would be above 80 percent after the increase. Contributions attributable to a plan year were assumed to occur at the end of the plan year, and benefit payments were assumed to be disbursed in the middle of each plan year.

We assume that all sponsors elect to use segment rates (as opposed to the full yield curve described in Internal Revenue Code section 430(h)(2)(D)(ii)) to measure plan liabilities used in the determination of statutory requirements. The Actuarial Value of Assets (AVA) equaled the Market Value of Assets (MVA) if those values were equal in a plan's Schedule SB filing; otherwise, we assumed 24-month smoothing of the MVA for the AVA.

No bankruptcies or plan changes (including plan freezes) 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.

²⁷ Our analysis uses a sample drawn primarily from plan year 2011 filings.

²⁸ Plan weights are based on 2011 benefit liabilities (funding targets) for the sample and for the universe as a whole. To develop the weights, the plans in the sample were categorized by the funded status of the largest plan at its sponsoring firm (322 firms sponsored 413 plans in the sample). Weights were then developed to equalize the weighted liability of the sample with that of the universe, separately for each funded status category.

Exhibits 3–5 and Table 4 used deterministic assumptions to illustrate the projected effects of changes to the pension funding stabilization provisions. Key deterministic assumptions used in these illustrations include:

TABLE A1

Economic Assumptions: Interest Rates and Plan Asset Returns

	Level Equivalencies of the Corporate Spot Rate Curve	Plan Asset Portfolio Returns
2011	5.57%	4.22%
2012	4.72%	13.26%
2013	4.07%	9.74%
2014	4.89%	5.50%
2015	5.30%	5.75%
2016	5.60%	6.00%
2017	5.60%	6.25%
2018	5.60%	6.50%
2019 and later	5.60%	6.75%

Projected plan asset returns were based on a weighted-average of six asset classes:

TABLE A2

Asset Allocation

Equity: United States	32.5%
Equity: International	17.5%
Bonds: Investment grade	40.0%
Bonds: High yield	3.5%
Real estate	3.5%
Cash	3.0%
Total	100.0%

TABLE A3

Economic Assumptions: Inflation, Wage Growth, and Benefit Increases

	Valuation	Experience
Inflation (CPI)	2%	2%
Wage growth	1.0% plus a merit increase derived from participant data	3.7%
Unit benefit increases for non-pay-related plans	None	3.7%

TABLE A4

Demographic Assumptions

	Valuation	Experience
Active head count	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 postretirement)	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

The analysis in this report also utilized stochastic projections of capital market variables to illustrate the likelihood that alternative pension funding stabilization provisions would influence certain statutory interest rates and funding of the system (Table 9). The stochastic projections relied on spot yield curves, asset class returns, and inflation experience assumptions provided by Barrie and Hibbert (a Moody's Analytics Company). Barrie and Hibbert provided 5,000 real-world simulations based on their standard calibrations as of December 31, 2013. (The SOA is grateful for their assistance.)

Tables A5 and A6 summarize key variables based on the Barrie and Hibbert simulations.

TABLE A5

Level Equivalencies of IRS High-Quality Market (HQM) Corporate Bond Yield Curves

	2015	2016	2017	2018	2019	2020	2025	2026
Average	5.33%	5.68%	5.93%	6.06%	6.08%	6.02%	5.83%	5.82%
Std Dev	0.44%	0.70%	0.91%	1.09%	1.19%	1.27%	1.50%	1.53%
10th	4.79%	4.85%	4.86%	4.81%	4.71%	4.60%	4.24%	4.21%
50th	5.30%	5.62%	5.84%	5.93%	5.91%	5.84%	5.57%	5.56%
90th	5.91%	6.60%	7.12%	7.50%	7.60%	7.66%	7.69%	7.70%

TABLE A6

Geometric Averages of Projected Plan Asset Portfolio Returns

	2014	2015	2016	2017	2018	2019	2020	2025
Average	3.34%	3.54%	3.96%	4.47%	4.96%	5.34%	5.65%	6.42%
Std Dev	8.62%	6.52%	5.41%	4.64%	4.19%	3.83%	3.53%	2.77%
10th	-7.95%	-4.94%	-3.01%	-1.55%	-0.55%	0.30%	1.09%	2.80%
50th	3.71%	3.76%	4.16%	4.64%	5.06%	5.42%	5.71%	6.44%
90th	14.04%	11.67%	10.70%	10.28%	10.22%	10.11%	10.11%	9.93%

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DISCLAIMER

This report is not intended to advocate a position for or against the pension funding stabilization provisions, nor is it intended to advocate for or against changes to the pension funding stabilization provisions. Rather, the purpose of this brief is to provide objective, actuarial analysis of the provisions and potential changes to the provisions. While we hope that this actuarial analysis will inform policymakers on some of the implications of the provisions, we recognize there are many other issues they must also consider when evaluating the merits of the provisions. Consequently, the Society of Actuaries does not take any position on the merits of the provisions or potential changes to the provisions.

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