



SOCIETY OF  
ACTUARIES®

2019 **ANNUAL  
MEETING**  
& EXHIBIT

October 27-30  
Toronto, Canada

## Session 137: Pension Plan Hibernation: Don't Poke the Sleeping Bear

[SOA Antitrust Compliance Guidelines](#)

[SOA Presentation Disclaimer](#)

# Session 137 – Pension Plan Hibernation (Don't Poke the Sleeping Bear)

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**Moderator:** Brett Dutton, FSA, CFA

October 29, 2019



# SOCIETY OF ACTUARIES

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# Plan administration and legislative compliance

Hilja Viidemann  
Senior Consultant, Buck



# Plan Administration and Legislative Compliance

- Funding and Investment Policy
- End Game Strategy
- PPA Compliance
- Accounting Considerations for Frozen Plans
- Nondiscrimination Testing
- Administration
- Outsourcing the Administration Function
- Outsourcing the Investment Function

# Administrative and Regulatory Compliance

## Re-Assess Funding Policy

### Time Horizon

When plan is frozen time horizon changes  
Shorter time horizon to termination when more cash goes into the plan through investment return or contributions

### Funding Policy

Cash constraints can dictate investment strategy to improve funded status  
Should funding gap be closed by contributions or investment returns

### Investment Strategy

Risk/Return characteristics of portfolio can lead to lower funding but higher volatility

# Pension Plan End Game Strategy

## Maintain Ongoing Plan: Retain Liabilities and Manage Risk More Closely

- A typical plan will continue for 50-100 years with administrative costs and reporting requirements
- Assets and liabilities still exposed to risk, a long term strategy needed to mitigate pension cost and funded level volatility
- Investment and longevity risks remain a focus for concern

## De-Risk Liabilities: Actively De-Risk Liabilities through a TV Lump Sum Window (or Partial Annuity Purchase)

- Participants currently employed cannot receive a distribution absent a plan termination
- Lump sum window settles liability directly with terminated participants for an amount closer to accounting liabilities – cheaper than purchasing annuities
- Reduces administrative maintenance and costs such as PBGC premiums
- AOCI recognition is accelerated into P&L through intermittent settlements
- Increased asset liquidity required for lump sum distribution or annuity premium payment

## Full Plan Termination: Purchase Group Annuities

- Plan sponsors can elect to transfer pension liability to high quality insurance carrier, offloading all future risk
- Premiums can exceed accounting liabilities by 10 - 25%, so important to reduce unnecessary annuity expense by offering lump sums to actives and terminated participants in conjunction with annuity purchase
- 18-24 month process, with funding and accounting considerations

# Administrative and Regulatory Compliance

## PPA Compliance

### Annual Valuations and AFTAPs

- Annual valuations required for frozen plans
- AFTAPs by September 30<sup>1</sup> required to continue accruals – no accruals in frozen plans
- If plan pays accelerated benefits, AFTAPs certifying 80% funded status required by September 30<sup>1</sup>
- Review process for PPA credit balance elections: do standing elections make sense now?

### Participant Statements

- Frozen plans keep the obligation to provide participant benefit statements under PPA<sup>2</sup>
- Statement once every 3 years or
- Annual notice to participants where they can obtain this statement

### Government Reporting

- Form 5500s required for frozen plans – should preparation of forms be outsourced?
- PBGC premiums required
- If plan falls below specified funding thresholds, PBGC reportable events triggered that require the company to disclose financial information to the PBGC

<sup>1</sup> For plans with calendar year plan years

<sup>2</sup> Section 105(a)(3)(B) of ERISA says that the Secretary of Labor may provide that years in which no employee benefits under 410(b) need not be taken into account in determining the 3-year period between participant statements (which would have allowed frozen plans to stop automatically issuing benefit statements to active DB participants, and would have converted those participants to being able to receive them upon request). However, the Secretary of Labor never issued any regulations to that effect.

# Administrative and Regulatory Compliance Accounting Considerations

## US GAAP Accounting Methods

- When plan participants are mostly inactive<sup>1</sup>, gain/loss may be amortized over Average Future Lifetime vs. Average Future Working Lifetime
- Does EROA assumption basis need to change?
- Consider mark to market accounting, for example, if plan is fully immunized

## Simplified Accounting

- Disclosures on combined basis with other frozen plans
- Simplified disclosures: Less information needed than the plans with ongoing accruals?
- Discuss with plan sponsor and auditors

## Forecasting

- All else equal, duration will shorten over time for a frozen plan
- PBGC premiums are often the main component of administrative expense for frozen plans

<sup>1</sup> “Mostly inactive” is often interpreted as 95% of participants

# Administrative and Regulatory Compliance Nondiscrimination Testing

## Amounts Testing

- For closed plans<sup>1</sup> compliance with amounts testing requirements will get more difficult as the closed group ages
- Amounts testing is not necessary for hard frozen plans
- If other plans test on combined basis, monitor the effect of freezing /closing DB plan on your other plans

## Coverage

- Compliance with coverage testing requirements will get more difficult as the closed group ages
- Coverage testing is not necessary for hard frozen plans

## Participation<sup>2</sup>

- Closed plans need to comply with minimum participation rules
- The lesser of 50 employees or 40% of employees (minimum 2) must participate
- Options to correct failures: (1) hard freeze (2) merge plans (3) test on QSLOB basis

<sup>1</sup> In closed plans, no new participants enter but a subset of participants continues to accrue benefits

<sup>2</sup> Temporary relief is available under IRS Notice 2017-45 and proposed legislation (SECURE Act of 2019) would modify these rules

# Administration

- When a plan is frozen, administration processes should be re-assessed
- Outsourcing administration may make sense depending on plan's time horizon

## Why Develop a Data Clean-Up Plan?

- Lengthy data clean-up projects can derail the outsourcing process
- Budget cost and resources for necessary projects during outsourcing
- Smooth plan outsourcing process with few surprises
- If Plan Termination, Lump Sum or merger are being considered, clean data improves Plan Administration and accuracy of participant benefits



# Administration

## Complicated Data Issues

- Benefit Amounts should be calculated for active participants
  - Not possible in all plans
- QDRO DV Benefits Split
- 415 Limits
- QDRO Shared or Separate Indicator
- Transfers and Small Plans
- Missing Participants
- Missing Addresses

### Complicated Data Issues

- QDRO Data issues often require a full review of the QDRO document and calculation
- Other complicated data issues may require information from outside sources

# Outsourcing of Administrative Functions

## Initial Data Quality Assessment

### Maintenance of Historical Data

- Missing legacy plan data
- Data stored in paper files or in more than one location
- Loss of staff with historical knowledge
- **Keep accrued benefit back-up for all participants, not just the accrued benefit**

### Calculation Sampling

- Have certified accrued benefits been calculated for everyone
- Does stored accrued benefit match calculated accrued benefit?
- Do prior calculations reflect the terms of the plan

### QDROs and 415 Limits

- Are participant/AP benefits split for participants not in pay status?
- Does the data clearly distinguish between the participant and the alternate payee
- Is there a diligent process in place to ensure that participants do not exceed the 415 limit

### Forms and Letters

- Do they reflect the terms of the plan?
- Are they compliant?

# Outsourcing the Administrative Function

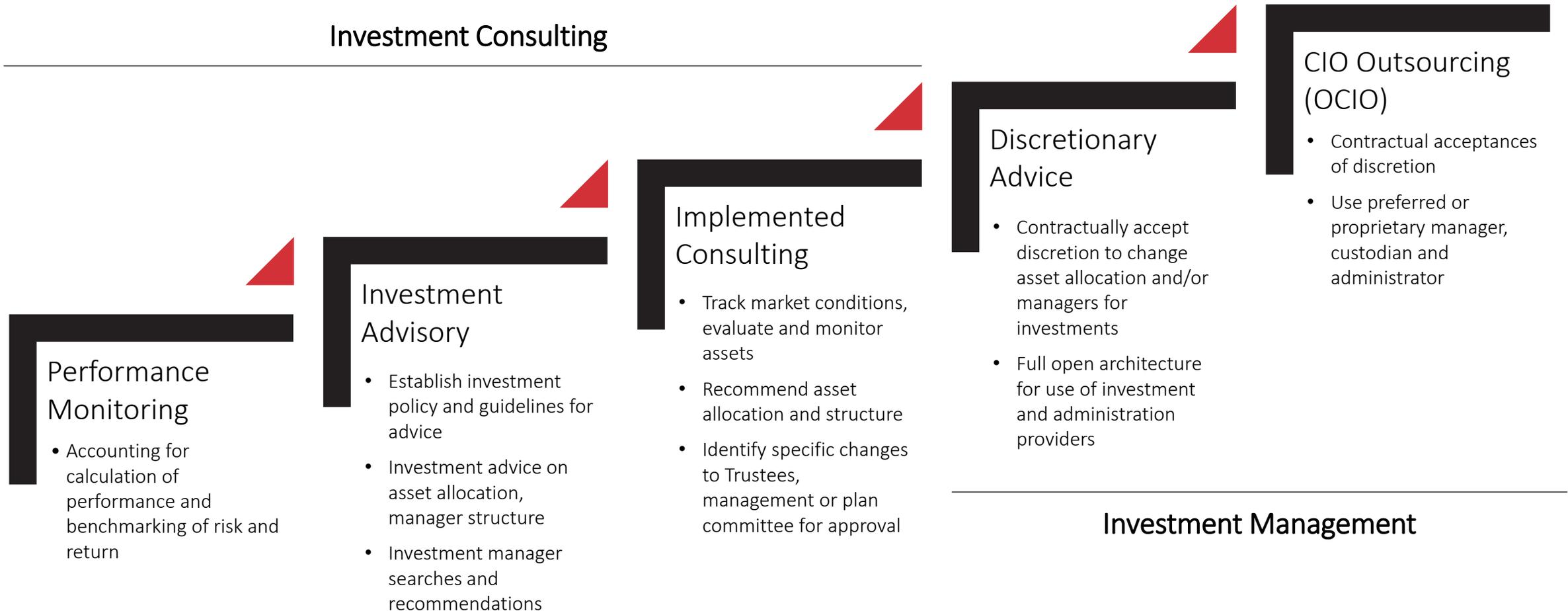
## Level of Outsourcing Needed

After plan freezes, level of outsourcing needed will evolve over time



# Outsourcing the Investment Function

## Level of Outsourcing Needed



# 2019 SOA Annual Meeting

## **Session 137** **Pension Plan Hibernation:** **Don't Poke the Sleeping Bear**

Rene Martel

October 29, 2019

# Agenda

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- 1/Pension Plan Hibernation: Investment Considerations and Portfolio Construction
- 2/Pension Plan Hibernation: Risk Transfer Considerations
- 3/Additional information

# 1.

## **Pension Plan Hibernation: Investment Considerations and Portfolio Construction**

# Pension plan hibernation

## Definition

### Hibernation

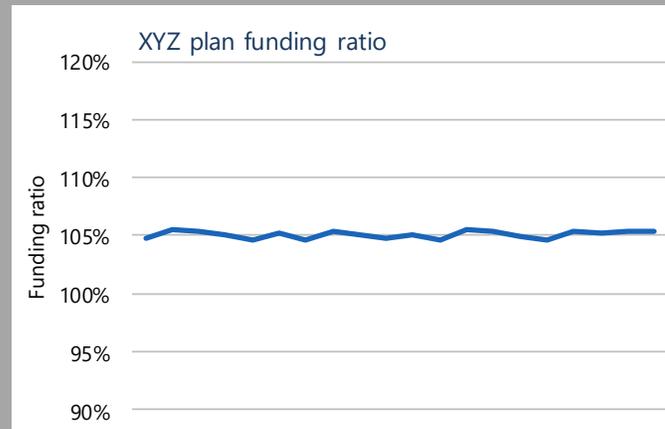
- The condition or period of an animal or plant spending the winter in a dormant state
- An extend period of remaining inactive or indoors

### Pension plan hibernation

- Relatively sophisticated investment strategy for defined benefit plans designed to achieve:
  - > **Limit pension risk exposure or volatility**  
*(As measured by volatility of funding ratio / contributions / financial statement metrics)*
  - > **Control or reduce future plan contributions / costs**  
*(Deficit reduction contributions, PBGC premiums, investment management, etc.)*
- In other words, the goal is to put the pension plan in a self-sustaining mode that will minimize (or eliminate) the potential of inconvenience or hindrance for its sponsor



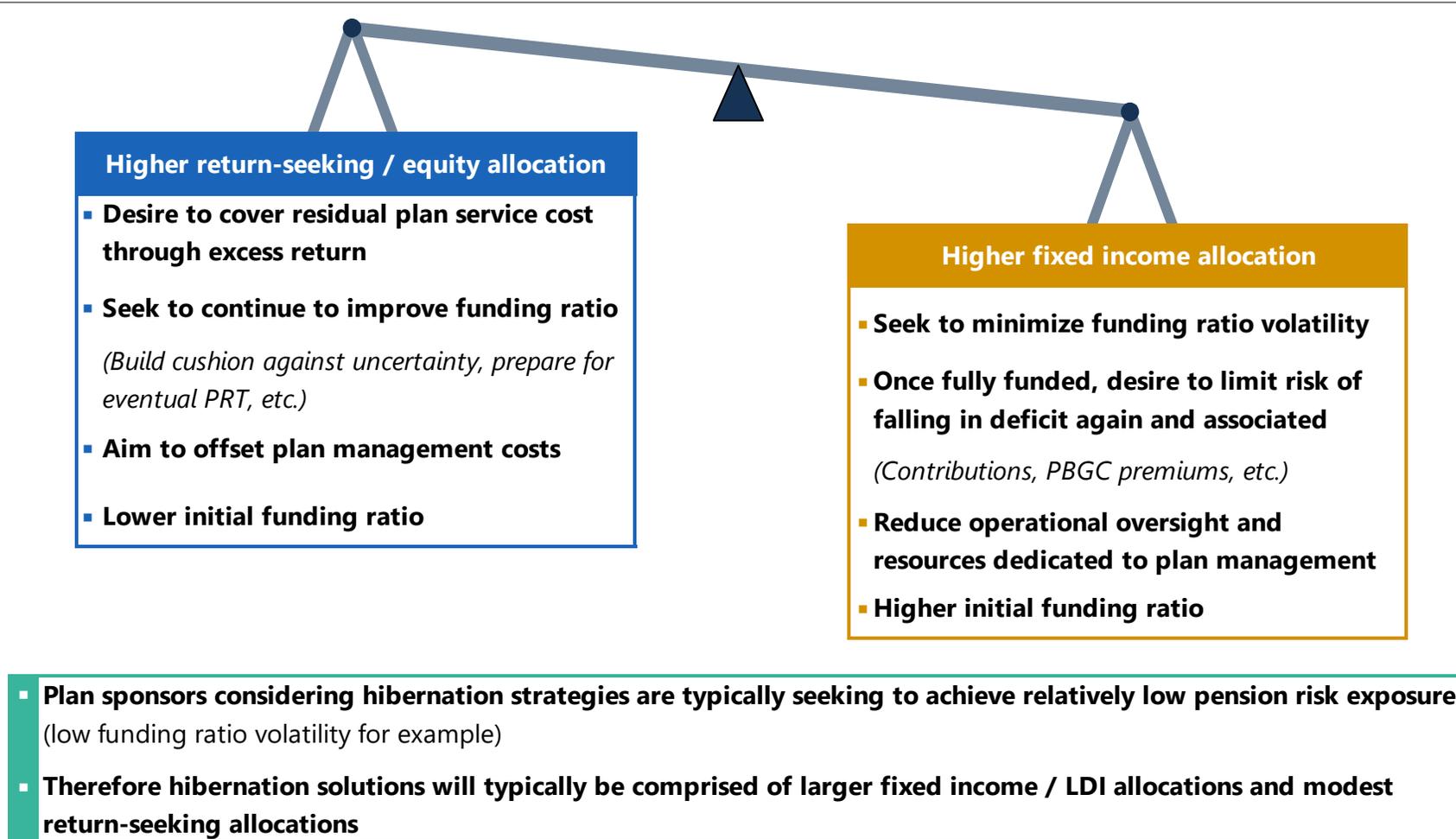
VS.



SOURCE: PIMCO. Hypothetical example for illustrative purposes only.  
Refer to Appendix for additional investment strategy and risk information.

# Pension plan hibernation

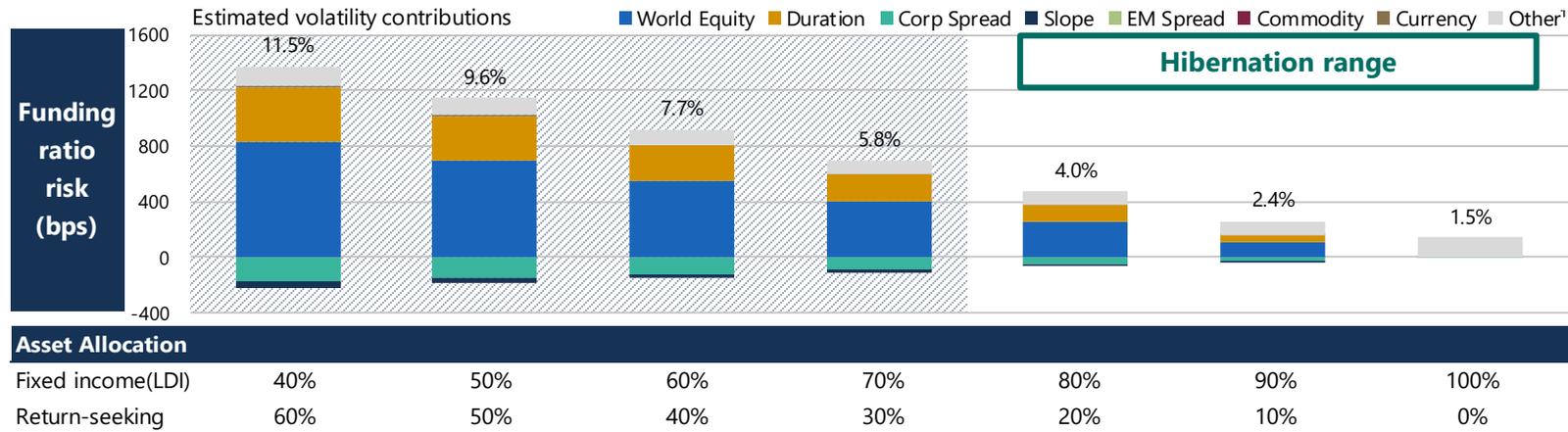
## Asset allocation considerations



SOURCE: PIMCO. Hypothetical example for illustrative purposes only.  
Refer to Appendix for additional investment strategy and risk information.

# Pension plan hibernation

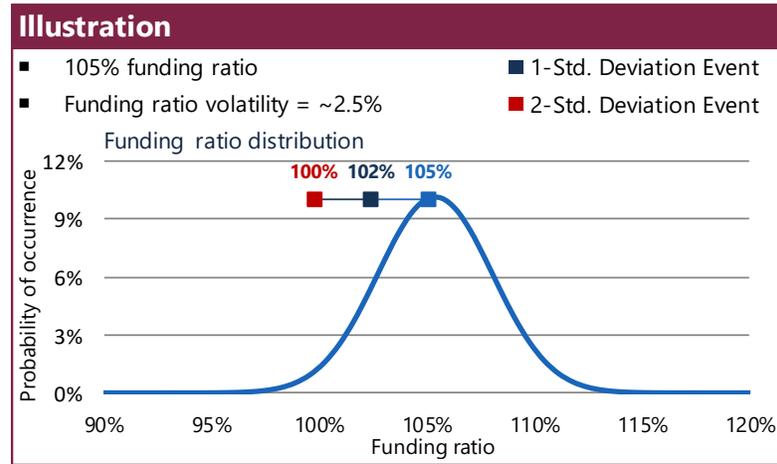
## Asset allocation vs. risk tolerance



**Hibernation magic formula**

- Choose asset allocation such that:  

$$\text{Funding ratio volatility} \sim \frac{1}{2} \text{ of ending funding surplus}$$



As of 30 June 2019. SOURCE: PIMCO, Sample Client. See additional information section for glide path analysis information. **Hypothetical example for illustrative purposes only**  
 Return-seeking allocation proxied by MSCI ACWI ex-US Index, Russell 2000 Index and S&P 500; Fixed-income allocation proxied by BBG BC Credit(3-5yr) Index, BBG BC Credit(5-7yr) Index, BBG BC Credit (7-15yr) Index, BBG BC Credit (15-25yr) Index, BBG BC Credit (25+yr) Index and BBG BC Long-term Gov't Index.  
<sup>1</sup> Other factors include: Idiosyncratic (specific), Convexity, and "Style" factors such as Industry and Value  
 Refer to Appendix for additional volatility estimates, glide path, hypothetical example, investment strategy, portfolio analysis and risk information

## Hibernation portfolio construction

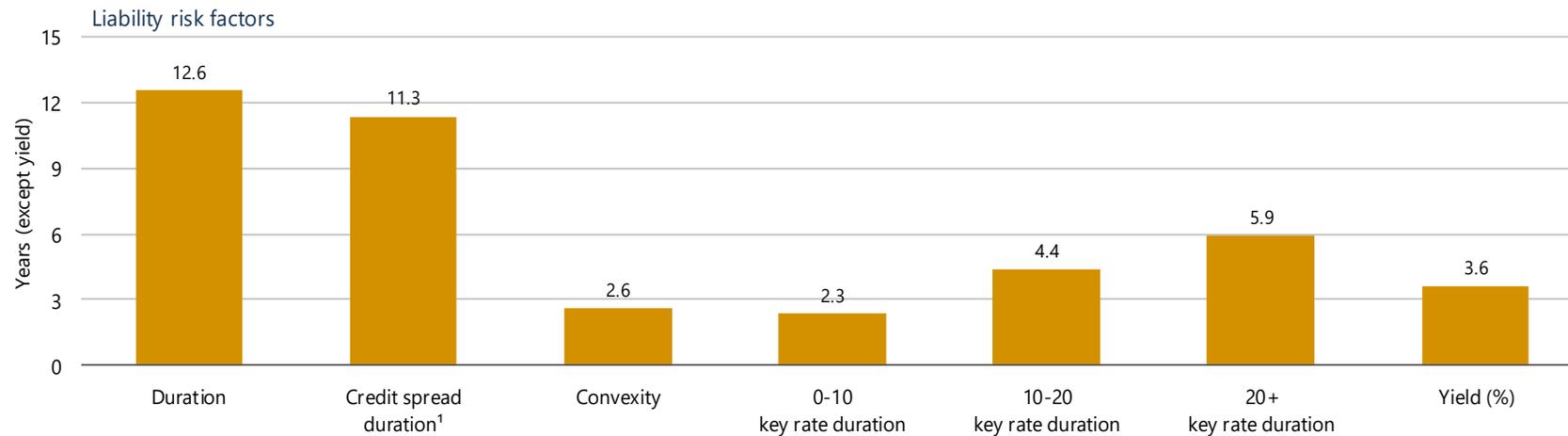
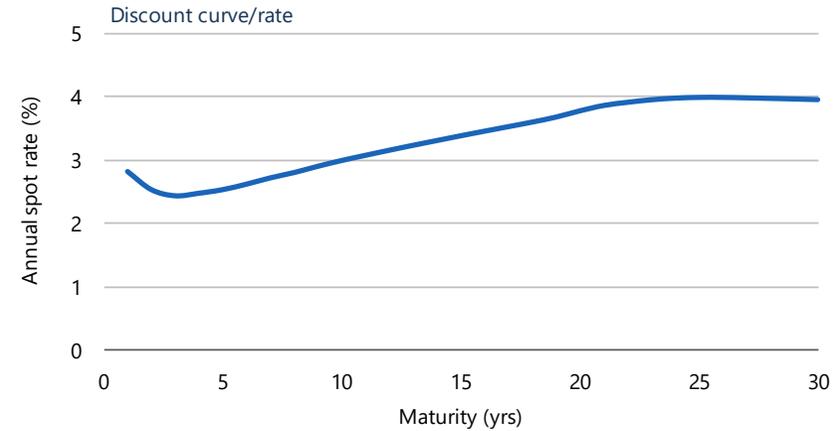
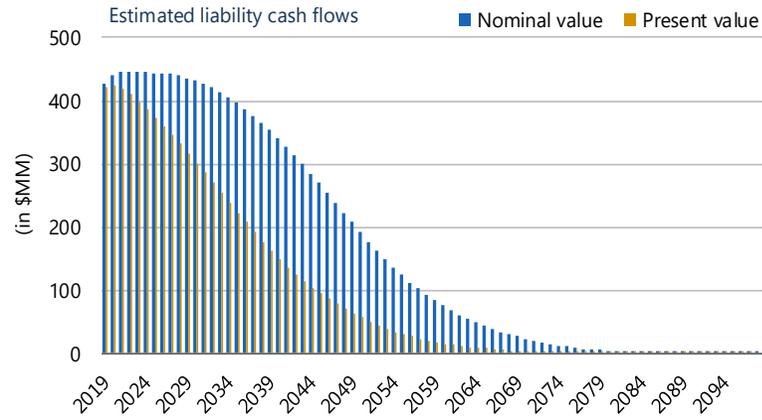
*Five key dimensions of liability risk should be managed*

<b>Duration</b>	<ul style="list-style-type: none"><li>• Measures the sensitivity of the present value of the liability and hedge portfolio to changes in interest rates (i.e., Treasury yields)</li><li>• Assumes a parallel shift in the yield curve</li></ul>
<b>Credit spread duration</b>	<ul style="list-style-type: none"><li>• Measures the sensitivity of the present value of the liability and the hedge portfolio to changes in investment grade corporate/credit spreads</li><li>• Assumes a parallel shift in the level of spreads across the yield curve</li><li>• For greater precision, credit sensitivity of the liability and the hedge portfolio should be “beta adjusted” to reflect the lower spread volatility associated with higher quality bonds</li></ul>
<b>Curve risk (aka key rate durations)</b>	<ul style="list-style-type: none"><li>• Measures the sensitivity of the liability and hedge portfolio to changes in the shape of the yield curve</li><li>• Breaks down duration risk into maturity buckets</li><li>• The use of key rate durations allows for a granular view of duration risk across the entire yield curve</li></ul>
<b>Convexity</b>	<ul style="list-style-type: none"><li>• Measures the sensitivity of the duration of the liability and hedge portfolio to changes in interest rates. Positive convexity means that duration will increase as interest rates fall and decrease as interest rates rise</li><li>• Pension liabilities, because of their very long “tail” are highly convex – even relative to a bond portfolio of the same duration</li></ul>
<b>Yield</b>	<ul style="list-style-type: none"><li>• The discount rate applied to a liability represents the effective rate at which the liability accrues</li><li>• A hedge portfolio should seek to deliver a yield that is as close as possible or higher than the accrual rate on the liability to ensure that the plan does not lose ground relative to the liability</li></ul>

Refer to Appendix for additional investment strategy and risk information.

# Hibernation portfolio construction

## Accurate liability risk measurement is critical



As of 30 June 2019. SOURCE: PIMCO Optimizer, Sample Client, Towers Watson. **Hypothetical example for illustrative purposes only.**

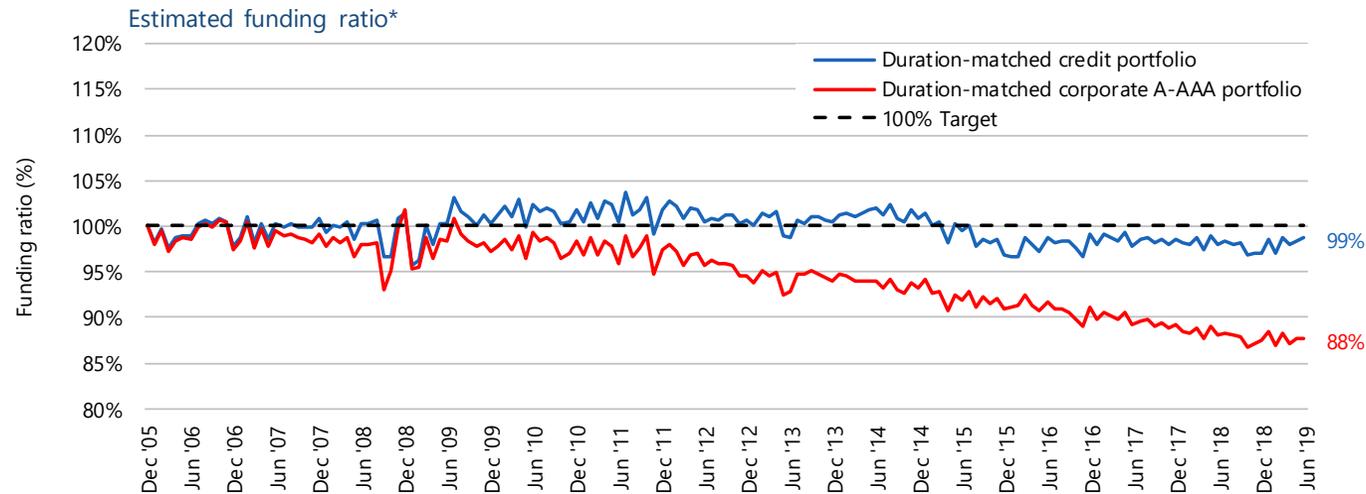
NOTE: We assumed the following credit spread Beta adjustment factors: Corporate/Credit AAA=0.6, Corporate/Credit AA=0.8, Corporate/Credit A=1.0, Corporate/Credit BBB=1.3, FAS Accounting (TW 60<sup>th</sup>-90<sup>th</sup> curve) =0.9, Treasuries=0.0

<sup>1</sup> Beta adjusted

Refer to Appendix for additional credit quality, hypothetical example and PIMCO Optimizer information

# Hibernation portfolio construction

## *Beware of your intuition*



- Plain vanilla liability-matching portfolios constructed with a high degree of focus on the liability discount rate universe are likely to significantly underperform liabilities over time
- In order to properly match and keep pace with liabilities, liability-matching portfolios must:
  - 1) Broaden their universe beyond that implied by the discount rate
  - 2) Incorporate a sufficient amount of active management and alpha potential

As of 30 June 2019. Source: Bloomberg Barclays, PIMCO.

**Hypothetical example for illustrative purposes only.**

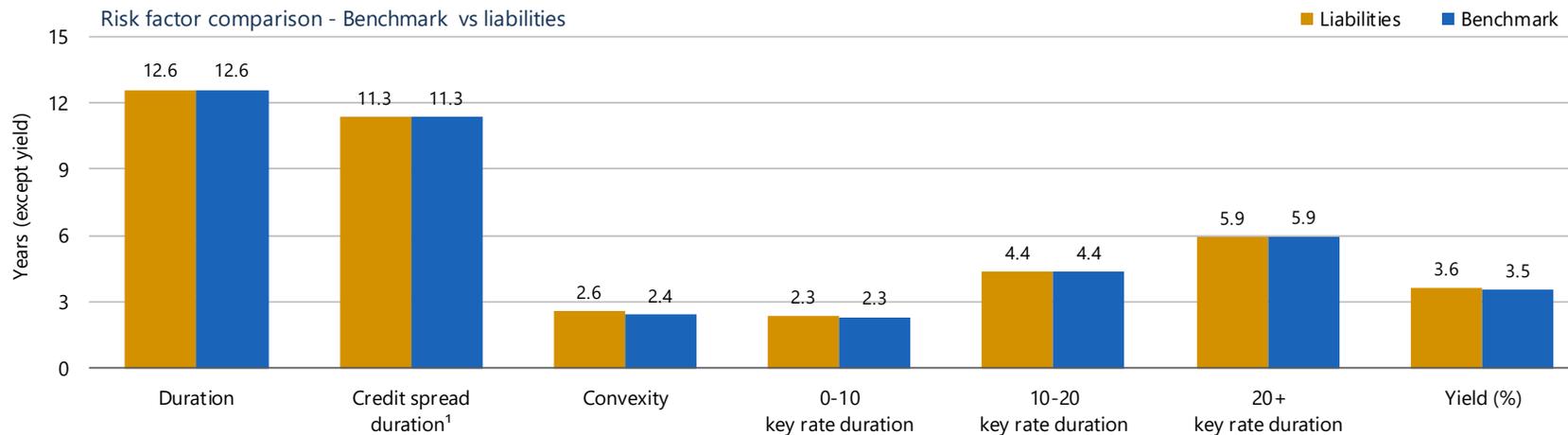
\* The allocation in the blended indexes are not static, and are re-balanced on a monthly basis to match the liability duration. The plan is assumed to be 100% funded on 12/31/05. Long credit (BBG Barclays Long Credit Index), intermediate credit (BBG Barclays Intermediate Credit Index), long corporate A-AAA (BBG Barclays Long Corporate A-AAA Index), intermediate corporate A-AAA (BBG Barclays Intermediate Corporate A-AAA Index).

Refer to Appendix for additional hypothetical example, index and risk information.

# Hibernation portfolio construction

## Creating a tight-fitting liability benchmark

	Weight	Duration	Credit spread duration <sup>1</sup>	Convexity	Key rate duration			Yield (YTM)
					0-10	10-20	20+	
<b>Sample Client liabilities</b>		<b>12.6</b>	<b>11.3</b>	<b>2.6</b>	<b>2.3</b>	<b>4.4</b>	<b>5.9</b>	<b>3.62%</b>
<b>Potential hibernation benchmark</b>								
BBG Barclays Credit (3-5yr) Index	2%	3.6	3.8	0.2	3.6	0.0	0.0	2.54%
BBG Barclays Credit (5-7yr) Index	2%	5.3	5.9	0.3	5.3	0.0	0.0	2.86%
BBG Barclays Credit (7-15yr) Index	27%	7.3	8.3	0.6	5.0	2.3	0.0	3.26%
BBG Barclays Credit (15-25yr) Index	29%	12.9	14.3	2.3	1.3	7.1	4.4	3.98%
BBG Barclays Credit (25+yr) Index	26%	16.4	18.3	3.9	1.2	4.1	11.2	4.04%
BBG Barclays Long Gov Index	14%	17.8	0.3	4.1	0.4	4.6	12.8	2.47%
<b>Blended benchmark</b>	<b>100%</b>	<b>12.6</b>	<b>11.3</b>	<b>2.4</b>	<b>2.3</b>	<b>4.4</b>	<b>5.9</b>	<b>3.53%</b>



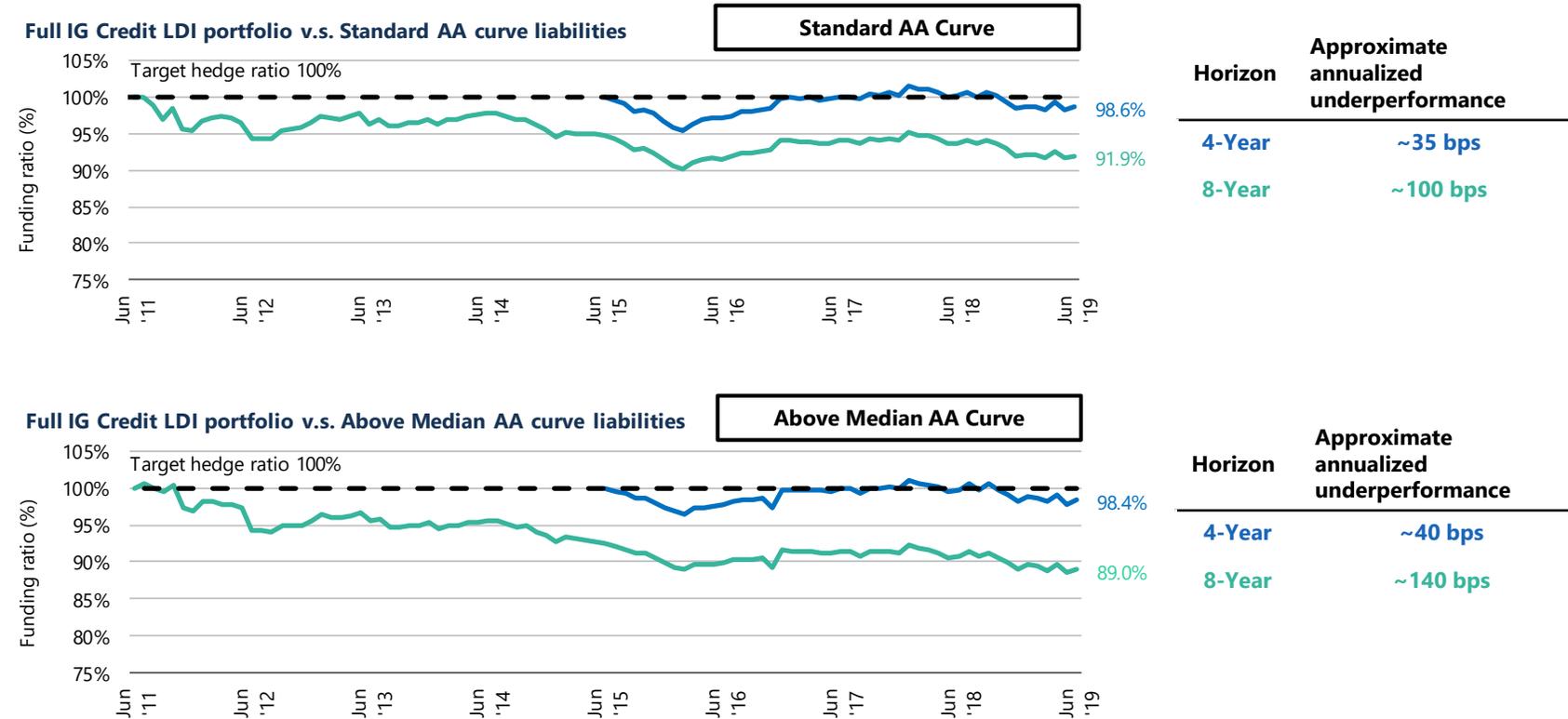
As of 30 June 2019. SOURCE: PIMCO, Sample Client. **Hypothetical example for illustrative purposes only.** Allocations may not sum to totals due to rounding

NOTE: Credit spread duration is beta adjusted. We assumed the following credit spread duration Beta adjustment factors: Corporate/Credit AAA=0.6, Corporate/Credit AA=0.8, Corporate/Credit A=1.0, Corporate/Credit BBB=1.3, FAS Accounting (AA)=0.8, Treasuries=0.0, Towers Watson 60-90=0.9.

Refer to Appendix for additional hypothetical example, index, investment strategy, portfolio analysis and risk information.

# Hibernation portfolio construction

*Passive hibernation approaches are likely to underperform liabilities*

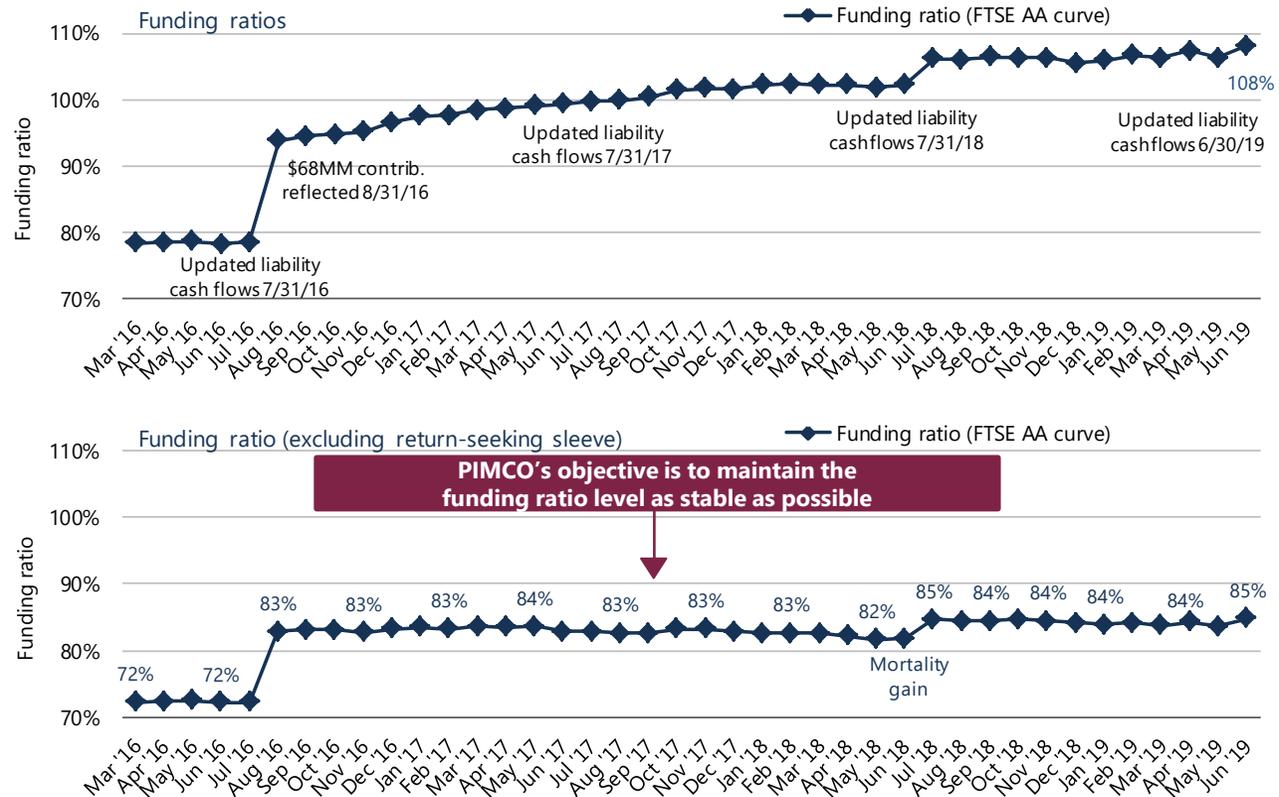


**Plan sponsors can seek to offset underperformance of indices vs liability discount rate methodologies  
By incorporating a meaningful degree of active management**

As of 30 June 2019. **Hypothetical example for illustrative purposes only.** The allocation in the blended index is not static, and is re-balanced on a monthly basis to match the liability duration. Refer to Appendix for additional hypothetical example and risk information

# Hibernation portfolio construction

## Measuring the outcome – Case study



As of 6/30/2019

Since Inception

Active management alpha (before fee)

0.81%

As of 30 June 2019. SOURCE: PIMCO, Sample Client. **Hypothetical example for illustrative purposes only**

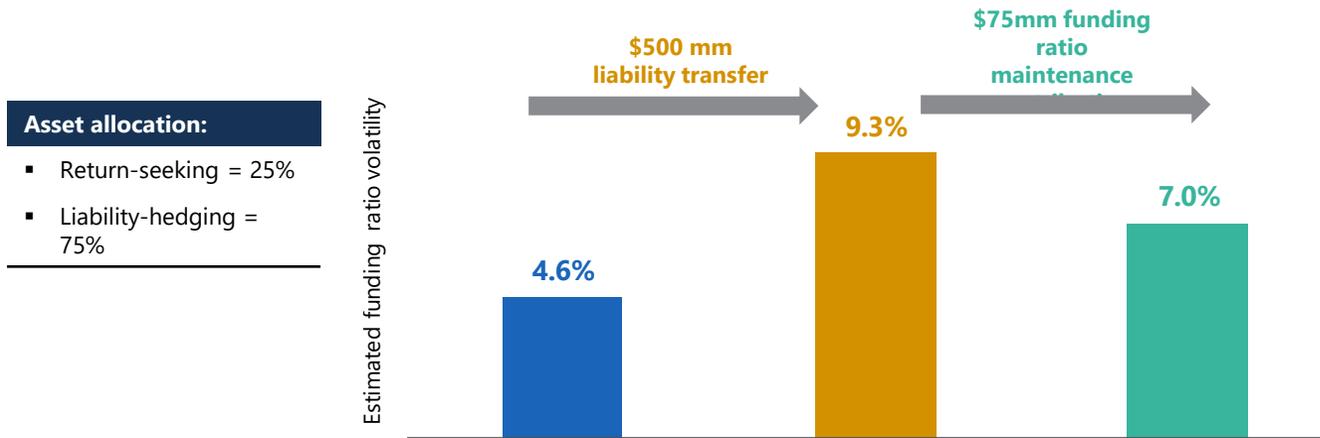
The above is presented for illustrative purposes only to demonstrate PIMCO's approach to hibernation. **It should not be assumed and no representation is made, that past performance is reflective of future results.** Nothing herein should be deemed to be a prediction or projection of future results. There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved.

Refer to Appendix for additional hypothetical example, investment strategy, portfolio analysis and risk information

# 2.

## **Pension Plan Hibernation: Risk Transfer Considerations**

# Partial pension risk transfers: Risk reduction...or not?



**Asset allocation:**

- Return-seeking = 25%
- Liability-hedging = 75%

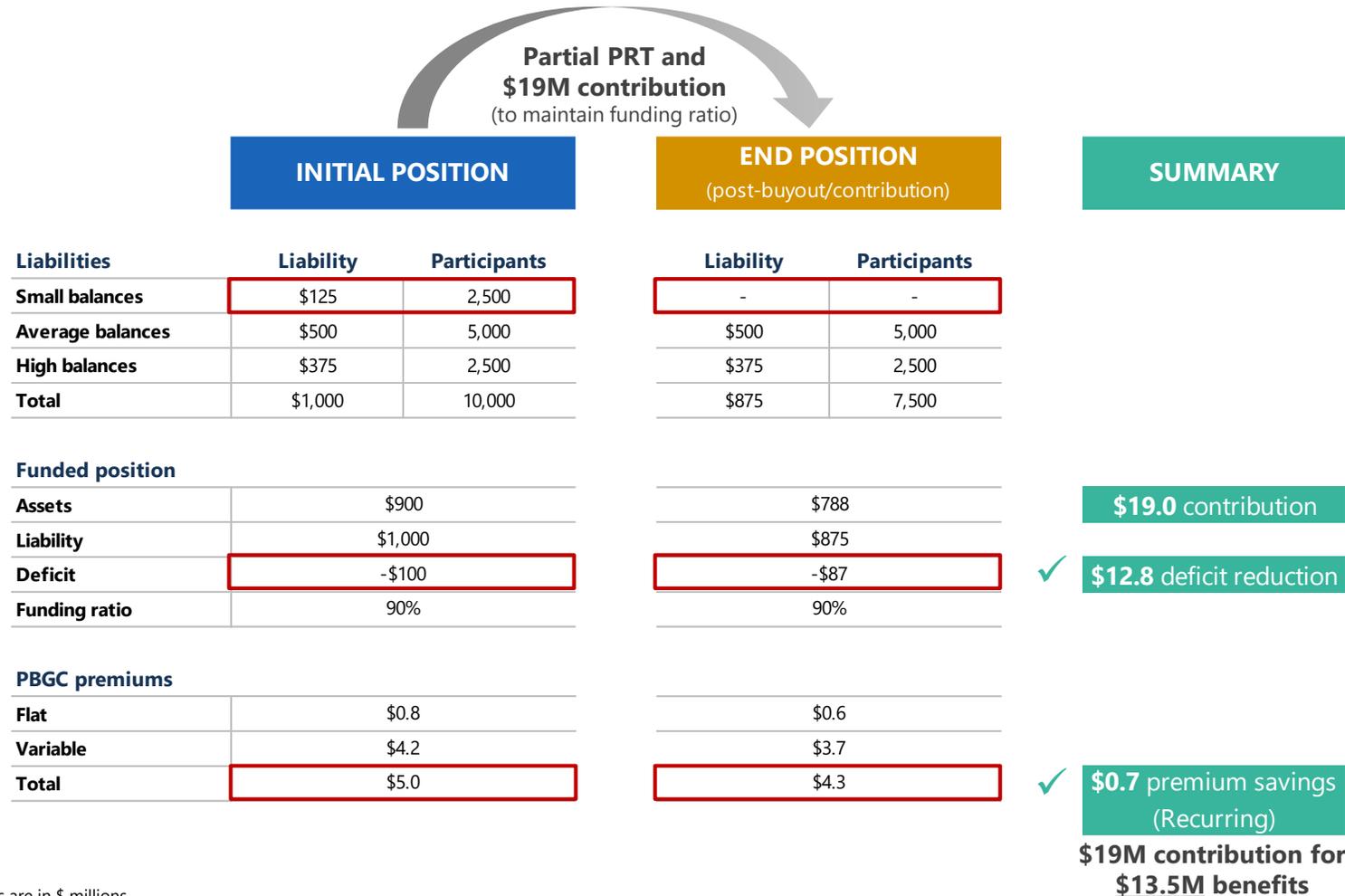
	INITIAL POSITION (pre-buyout)	END POSITION (post-buyout)	END POSITION (post-buyout/contribution)
<b>Additional contribution</b>	n/a	n/a	\$75
<b>Assets</b>	\$900	\$376	\$450
<b>Liabilities</b>	\$1,000	\$501	\$501
<b>Funded status</b>	-\$100	-\$125	-\$51
<b>Funding ratio</b>	90%	75%	90%
<b>Estimated funding ratio volatility (%)</b>	4.6%	9.3%	7.0%
<b>Estimated funding ratio volatility (\$)</b>	\$41	\$35	\$31

- On a % basis: Buyout significantly increases risk
- On a \$ basis: Buyout reduces risk by only \$10M despite \$75M contribution

All amounts are in \$ millions. Assume 5% buyout premium to PBO  
 Return-seeking proxy: 50% S&P500 Index, 25% MSCI ACWI ex-US Index, 8% NCREIF Property, 8% Private Equity, 8% HFRI Weighted Composite  
 Liability-hedging proxy: 57% BBG BC Long Credit, 23% BBG BC Intermediate Credit, 20% BBG BC Long Gov't  
 SOURCE: PIMCO. **Hypothetical example for illustrative purposes only.** There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved.  
 Please see Appendix for additional hypothetical example, investment strategy, and risk information.

# Partial pension risk transfers: Two scenarios

## Scenario 1: With partial PRT, contributions exceed benefits

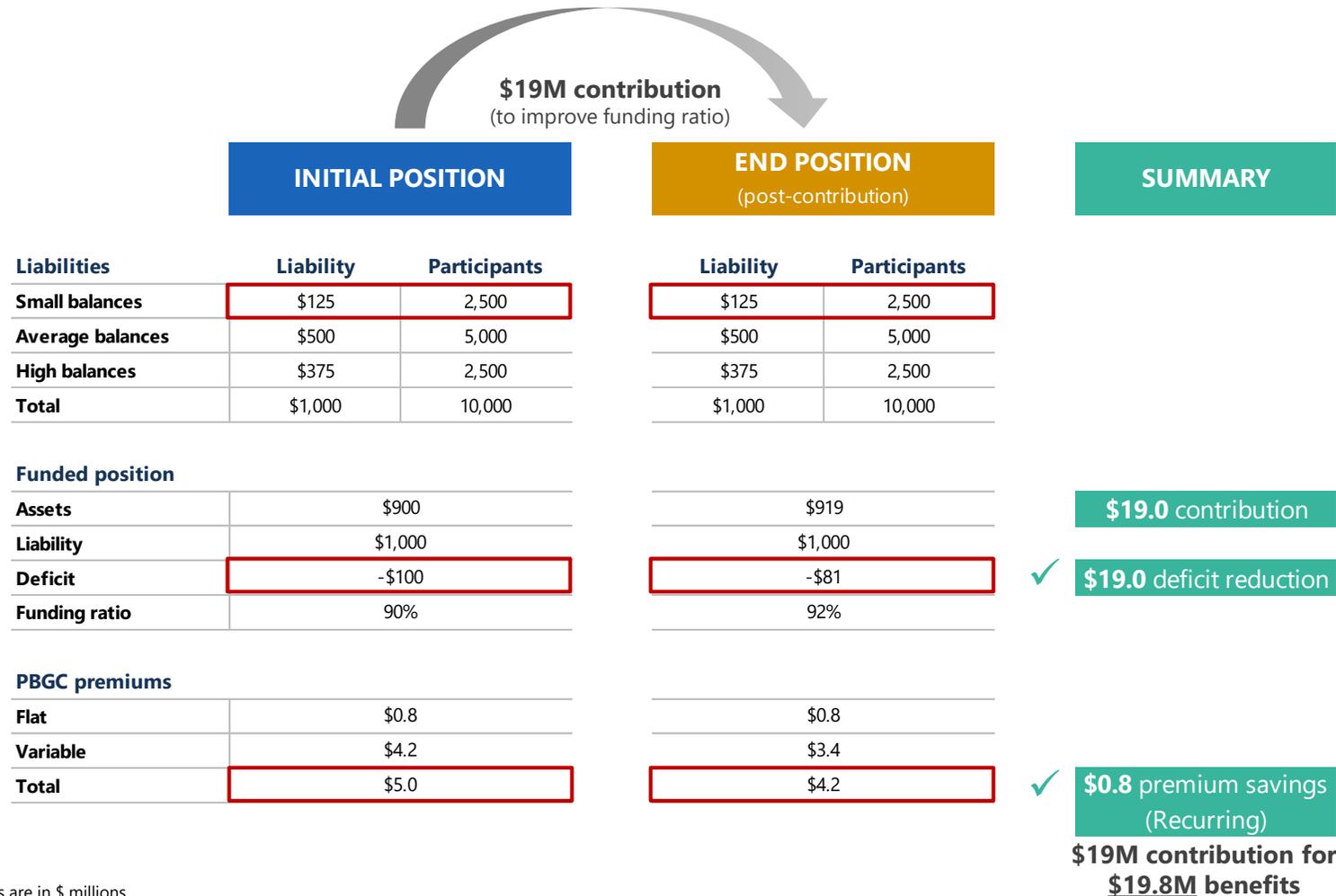


All amounts are in \$ millions

SOURCE: PIMCO. **Hypothetical example for illustrative purposes only.** There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved. Please see Appendix for additional hypothetical example, investment strategy, and risk information.

# Partial pension risk transfers: Two scenarios

## Scenario 2: Without partial PRT, benefits exceed contributions

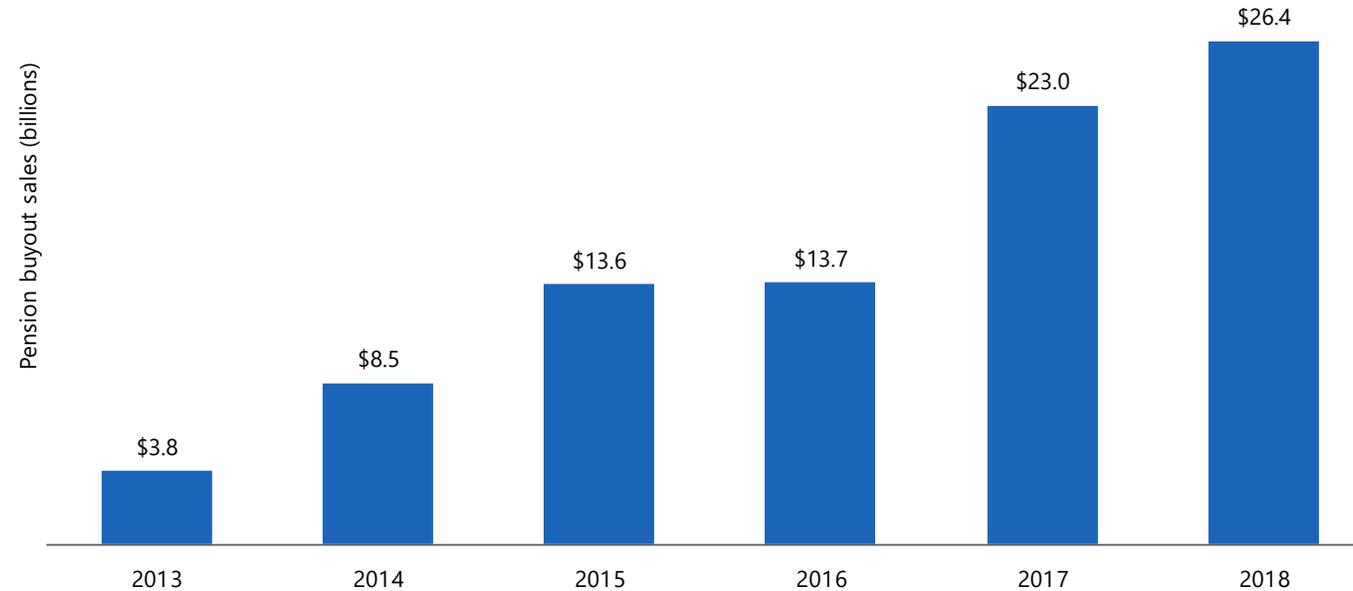


All amounts are in \$ millions  
 SOURCE: PIMCO. **Hypothetical example for illustrative purposes only.** There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved.  
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## Pension risk transfers

*Is everybody doing it?*

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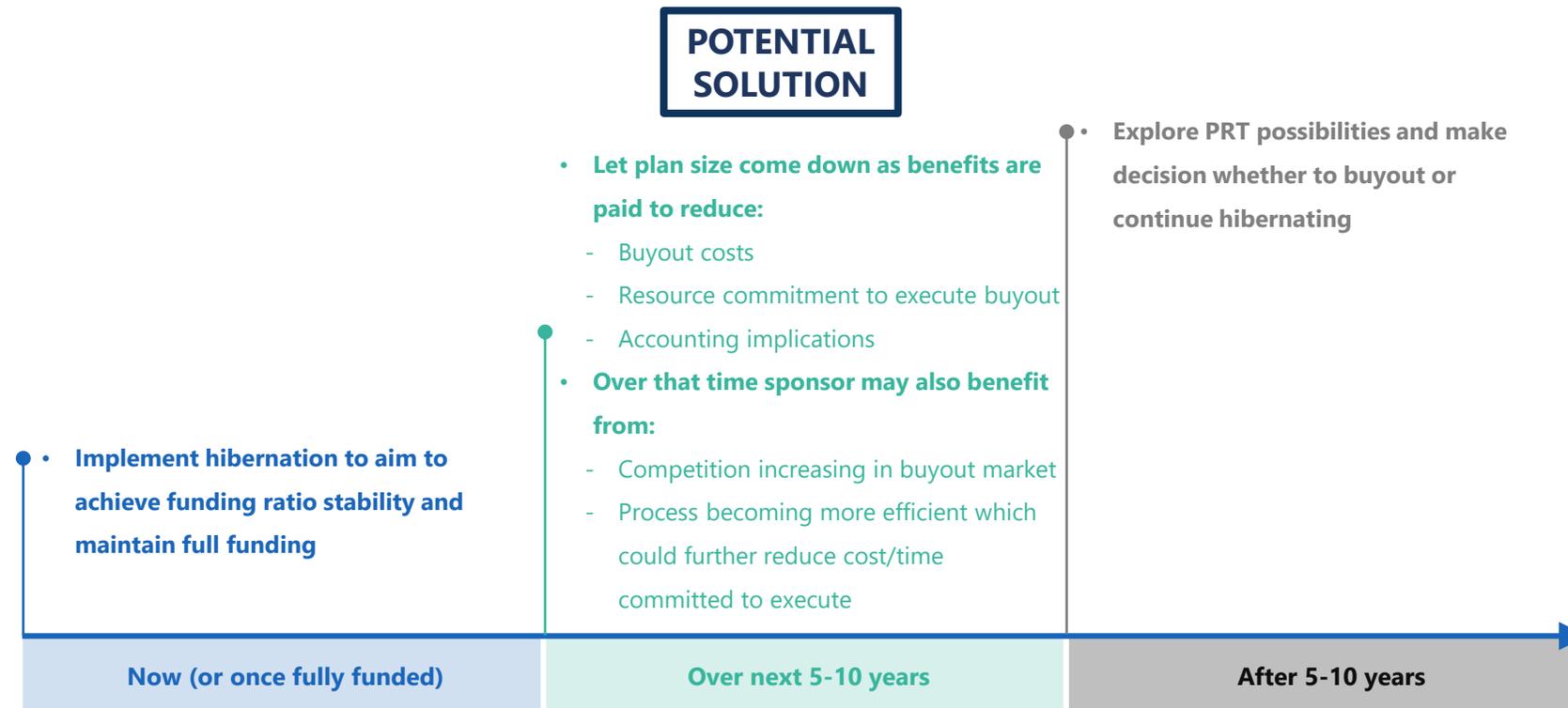


- U.S. volumes of pension risk transfer executed through annuity purchase corresponds to:
  - 1) less than 1% annually of outstanding stock of private defined benefit plan liabilities over the last 2 years
  - 2) ~ 0.5% annually of outstanding stock of private defined benefit plan liabilities over the last 5 years

SOURCE: Group Annuity Risk Transfer survey, LIMRA Secure Retirement Institute  
\* Based on the last 5 year annual average

# Hibernation now...PRT maybe later

1. Main drawbacks of PRT (cost, accounting implications, resource commitment, management of non-transferred liability) will shrink over time as plan size decreases
2. Hibernation provides a cheaper and similarly efficient solution until the PRT drawbacks become less significant



SOURCE: PIMCO. **Hypothetical example for illustrative purposes only.** Refer to Appendix for additional investment strategy and risk information

**3.**

**Additional information**

## Long duration benchmarks risk characteristics

RISK STATISTICS	BBG BARCLAYS LONG GOV'T/ CREDIT	BBG BARCLAYS LONG CREDIT	BBG BARCLAYS LONG CORPORATE	BBG BARCLAYS LONG CORPORATE A-AAA	BBG BARCLAYS LONG CORPORATE AA
Duration	15.64	14.02	14.21	14.86	15.53
Average credit quality	AA3/A1	A3/BAA1	A3/BAA1	A1/A2	AA2/AA3
Market value (\$M)	3,830,791	2,174,909	1,901,260	914,420	123,141
Convexity to maturity	3.26	2.77	2.82	3.02	3.29
Yield to worst	3.31%	3.96%	3.96%	3.56%	3.40%
OAS (Bps)	92	161	160	119	100
Number of issuers	709	703	591	270	49
Number of issues	2,317	2,240	1,994	1,003	124

SECTOR ALLOCATION	BBG BARCLAYS LONG GOV'T/ CREDIT	BBG BARCLAYS LONG CREDIT	BBG BARCLAYS LONG CORPORATE	BBG BARCLAYS LONG CORPORATE A-AAA	BBG BARCLAYS LONG CORPORATE AA
CORPORATE	49.6%	87.4%	100.0%	100.0%	100.0%
Financials	8.3%	14.6%	16.7%	22.3%	9.9%
Utilities	5.9%	10.4%	11.9%	19.0%	10.2%
Industrials	35.4%	62.4%	71.4%	58.7%	79.9%
Sovereign/supranational	2.9%	5.0%	0.0%	0.0%	0.0%
Local authority/agency	5.6%	7.6%	0.0%	0.0%	0.0%
Treasury	41.9%	-	-	-	-
Securitized	-	-	-	-	-
Total	100.0%	100.0%	100.0%	100.0%	100.0%

CREDIT QUALITY BREAKDOWN	BBG BARCLAYS LONG GOV'T/ CREDIT	BBG BARCLAYS LONG CREDIT	BBG BARCLAYS LONG CORPORATE	BBG BARCLAYS LONG CORPORATE A-AAA	BBG BARCLAYS LONG CORPORATE AA
AAA	45.1%	3.4%	3.1%	6.5%	-
AA	5.4%	9.4%	6.5%	13.5%	100.0%
A	20.2%	35.6%	38.5%	80.1%	-
Baa	29.3%	51.6%	51.9%	-	-
Total	100.0%	100.0%	100.0%	100.0%	100.0%

As of 30 June 2019. SOURCE: Barclays.

The option adjusted spread is generated by Barclays and is a single day snapshot of the individual securities within the index that are predominantly measured against like-duration U.S. Treasuries. The performance figures are as reported by Barclays for the Barclays U.S. Long Credit Index and Barclays Long Corporate Index and their respective sub-sectors. Refer to Appendix for additional credit quality, index and OAS information.

# LDI benchmark selection

## Concentration risk

### Top 5 parent company (%)

BBG BARCLAYS LONG GOV'T/ CREDIT		BBG BARCLAYS LONG CREDIT		BBG BARCLAYS LONG CORPORATE		BBG BARCLAYS LONG CORPORATE A-AAA		BBG BARCLAYS LONG CORPORATE AA	
AT&T	1.5	AT&T	2.6	AT&T	3.0	Comcast	4.9	Apple	16.8
Verizon	1.3	Verizon	2.2	Verizon	2.5	Microsoft	4.0	Wal-Mart	15.4
Anheuser-Busch	1.2	Anheuser-Busch	2.1	Anheuser-Busch	2.4	JPMorgan Chase	2.9	Royal Dutch Shell	13.1
Anheuser-Busch	1.2	Comcast	2.1	Comcast	2.4	Oracle	2.6	NextEra Energy	7.7
Microsoft	1.0	Microsoft	1.7	Microsoft	1.9	Wells Fargo	2.5	Berkshire Hathaway	7.3
<b>Total</b>	<b>6.0</b>		<b>10.6</b>		<b>12.2</b>		<b>16.9</b>		<b>60.2</b>

### Top 5 issuer (%)

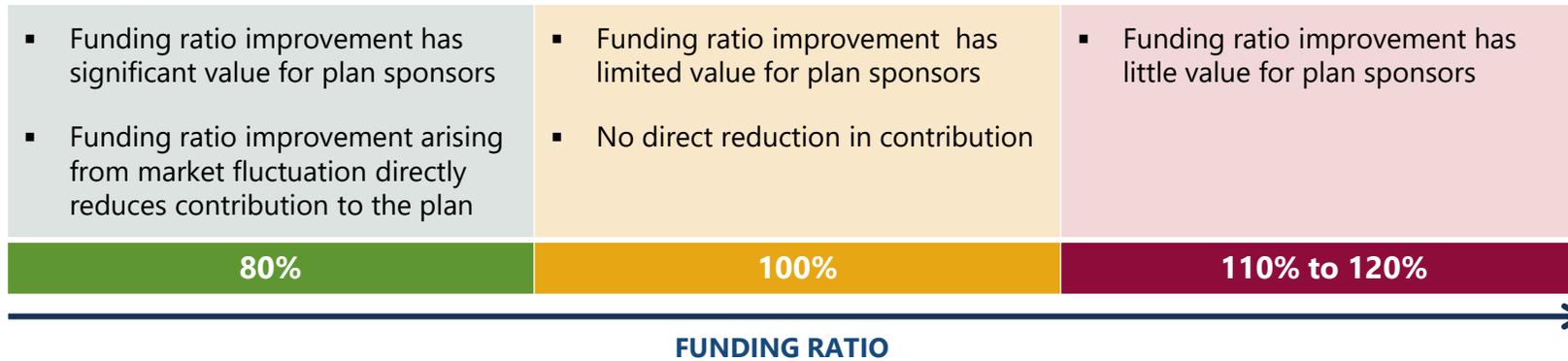
BBG BARCLAYS LONG GOV'T/ CREDIT		BBG BARCLAYS LONG CREDIT		BBG BARCLAYS LONG CORPORATE		BBG BARCLAYS LONG CORPORATE A-AAA		BBG BARCLAYS LONG CORPORATE AA	
AT&T	1.5	AT&T	2.6	AT&T	3.0	Comcast	4.5	Apple	16.8
Verizon	1.3	Verizon	2.2	Verizon	2.5	Microsoft	4.0	Wal-Mart	15.4
Comcast	1.1	Comcast	1.9	Comcast	2.2	JPMorgan Chase	2.9	Royal Dutch Shell	13.1
Microsoft	1.0	Microsoft	1.7	Microsoft	1.9	Oracle	2.6	Florida Power & Light	7.7
Mexico	0.7	Mexico	1.3	JPMorgan Chase	1.4	Apple	2.3	Berkshire Hathaway	6.0
<b>Total</b>	<b>5.5</b>		<b>9.7</b>		<b>11.0</b>		<b>16.3</b>		<b>58.9</b>

As of 30 June 2019. SOURCE: Barclays.  
 Note: Excludes Treasuries and Agencies  
 Refer to Appendix for additional index and issuer information.

# The rationale for glide path strategies

## Why should plan sponsors consider implementing a glide path?

The value of funding ratio improvement to the plan sponsor decreases as the funding ratio increases

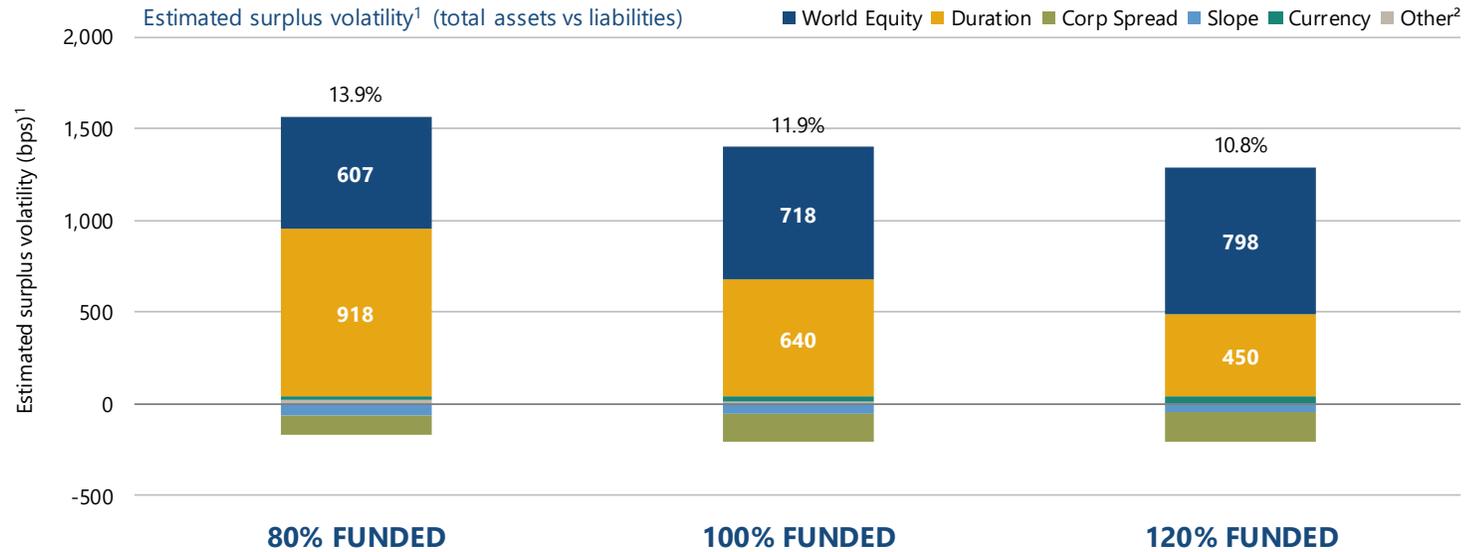


- Asset-liability risk should be gradually reduced as funding ratio improves
  - Plan sponsors should not continue to expose the plan to significant levels of risk when the improvement has limited or no value to them
- Glide path strategies provide a framework to systematically implement a gradual de-risking of the plan as funding ratio improves

Sample for illustrative purposes only  
Refer to Appendix for additional glide path and investment strategy information.

# The rationale for glide path strategies

## Change in interest rate risk vs. equity risk breakdown as funding ratio improves



- Equity risk contribution to surplus volatility increases as funding ratio improves with a static asset allocation
- Is the plan sponsor comfortable with a higher equity risk exposure as a result of funding ratio improvement?
  - Glide path enables plan sponsor to limit or offset the equity risk increase

As of 30 June 2019.

SOURCE: PIMCO, Sample Client

**Hypothetical example for illustrative purposes only.**

<sup>1</sup> See Appendix for additional information regarding volatility estimates.

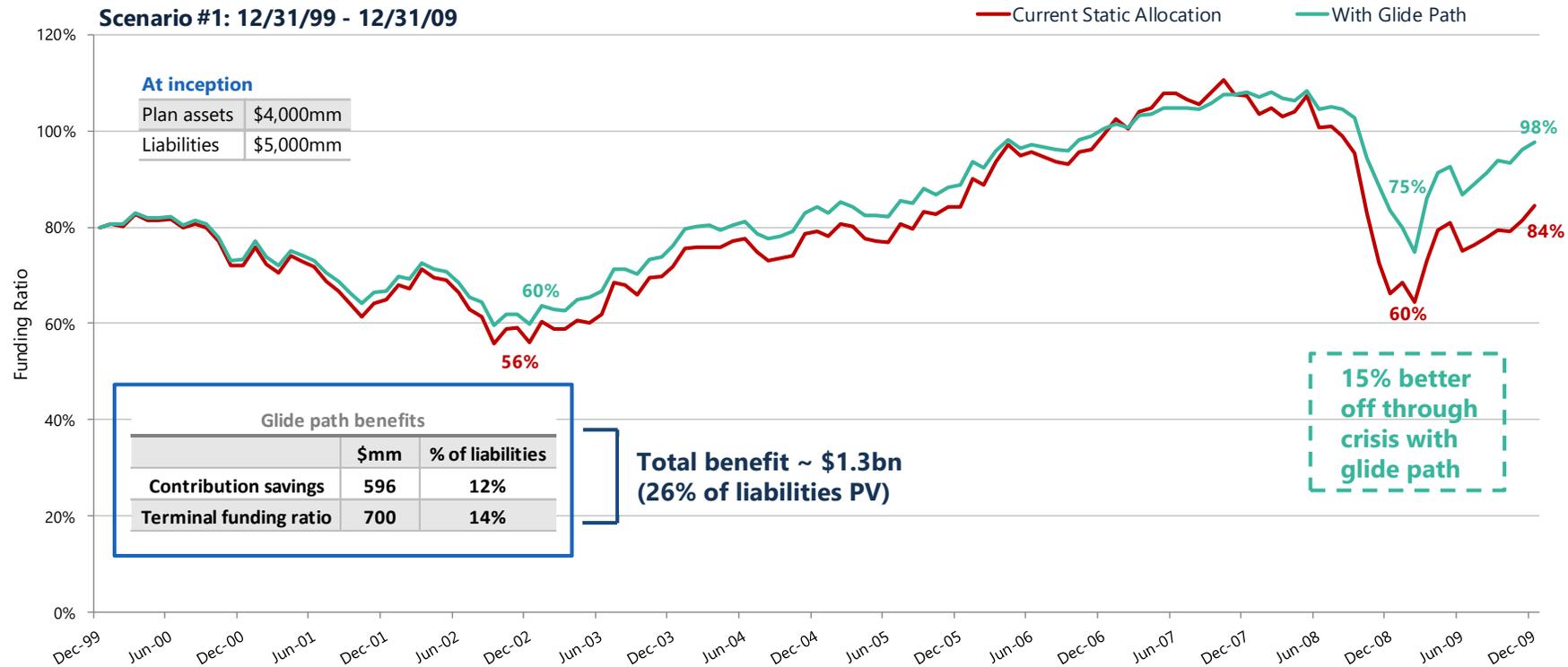
<sup>2</sup> Other factors include: Idiosyncratic (specific), Commodities, Volatility, and "Style" factors such as Size and Momentum.

This analysis is based on a sample pension plan's liabilities (14 yrs duration) and asset allocation: 55% MSCI World, 5% HFRI Fund Weighted Composite, 10% Barclays Aggregate, 30% Barclays Long Gov/Credit Index.

Refer to Appendix for additional hypothetical example, index, investment strategy, portfolio analysis and risk information.

# Quantifying the benefits of a de-risking glide path

## Historical scenario analysis – Scenario #1: 12/31/99 – 12/31/09 (illustrative)

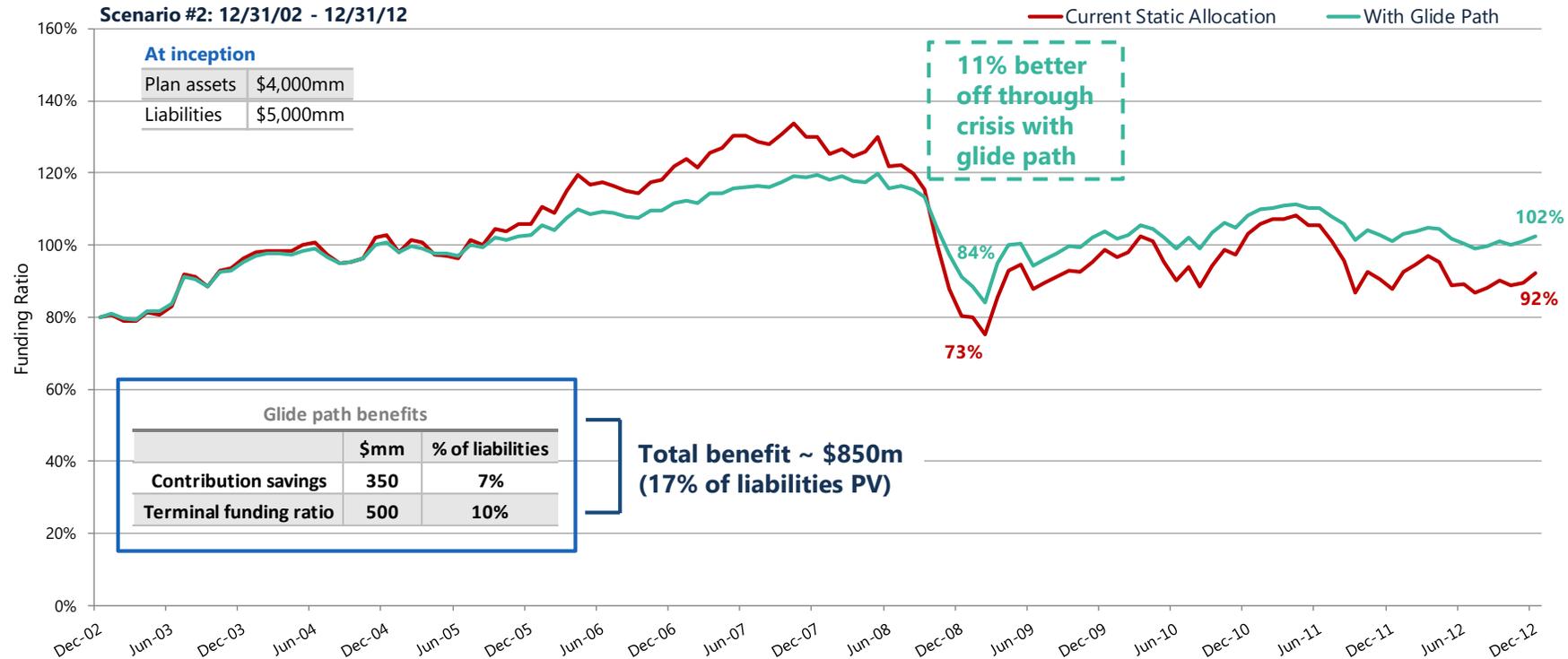


As of 30 June 2019. SOURCE: Sample Client, PIMCO, Bloomberg. **Hypothetical example for illustrative purposes only.** Current static allocation has been modified in each approach using equity overlays to achieve target hedge ratios. Current static allocation: 18% S&P500 + 12% MSCI EAFE + 5% MSCI ACWI + 5% MSCI EM + 8% S&P Private Equity + 9% Dow Jones Real Estate + 4% Macquarie Global Infrastructure + 12% HFRI Fund Wtd Composite + 2% BBG Commodities + 25% BBG BC Long Gov/Credit. Approach A: Same as current static allocation except S&P500 / MSCI EAFE / MSCI ACWI are in the form of equity overlay backed by BBG BC Long Gov/Credit to help achieve glide path hedge ratio targets. Approach A also allows re-risking (re-risk when fall back by more than one funding ratio trigger) and includes asset allocation shifts in the glide path [75% return seeking (at 80% funding ratio) decreases linearly to 40% (at 90% funding ratio) decreases linearly to 37.5% return seeking (at 105% fund ratio)]

Refer to Appendix for additional hedge ratio, hypothetical example, index, investment strategy, portfolio analysis, and risk information.

# Quantifying the benefits of a de-risking glide path

Historical scenario analysis – Scenario #2: 12/31/02 – 12/31/12 (illustrative)

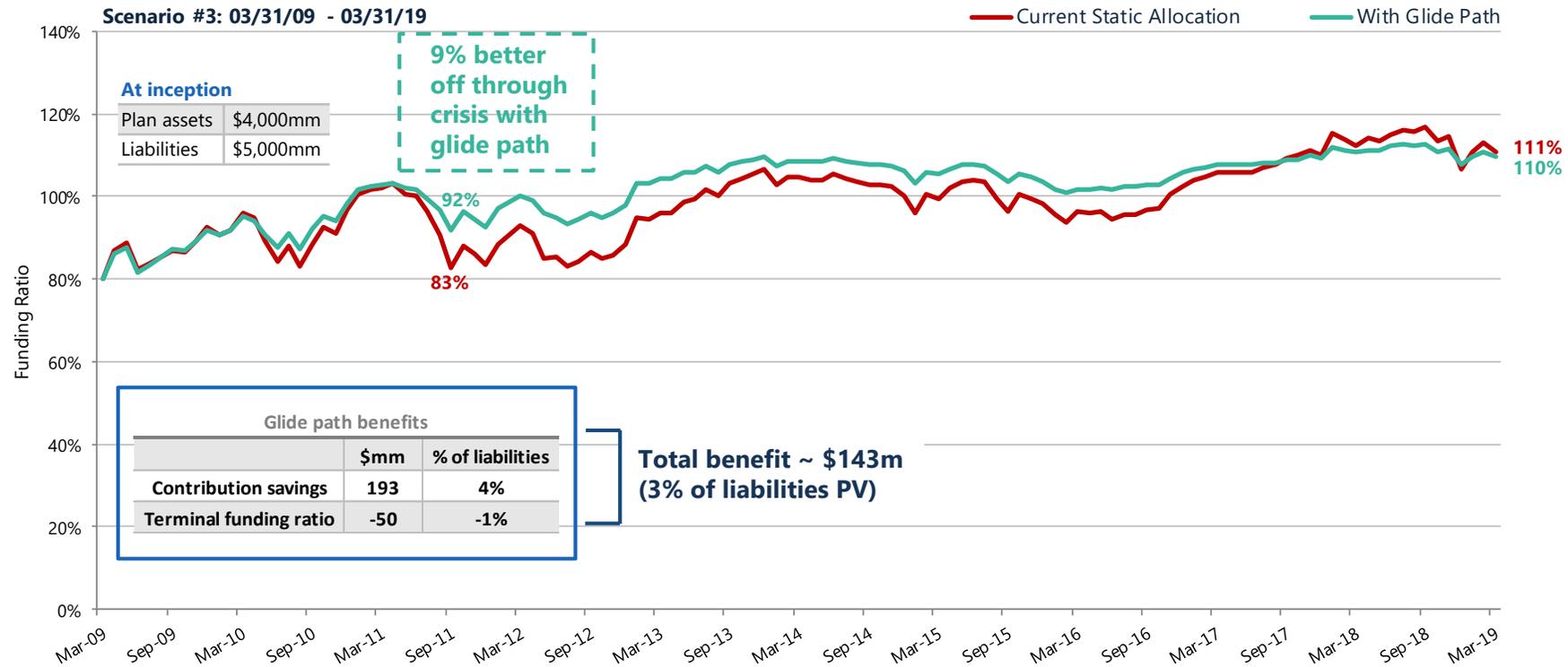


As of 30 June 2019. SOURCE: Sample Client, PIMCO, Bloomberg. **Hypothetical example for illustrative purposes only.** Current static allocation has been modified in each approach using equity overlays to achieve target hedge ratios. Current static allocation: 18% S&P500 + 12% MSCI EAFE + 5% MSCI ACWI + 5% MSCI EM + 8% S&P Private Equity + 9% Dow Jones Real Estate + 4% Macquarie Global Infrastructure + 12% HFRI Fund Wtd Composite + 2% BBG Commodities + 25% BBG BC Long Gov/Credit. Approach A: Same as current static allocation except S&P500 / MSCI EAFE / MSCI ACWI are in the form of equity overlay backed by BBG BC Long Gov/Credit to help achieve glide path hedge ratio targets. Approach A also allows re-risking (re-risk when fall back by more than one funding ratio trigger) and includes asset allocation shifts in the glide path [75% return seeking (at 80% funding ratio) decreases linearly to 40% (at 90% funding ratio) decreases linearly to 37.5% return seeking (at 105% fund ratio)]

Refer to Appendix for additional hedge ratio, hypothetical example, index, investment strategy, portfolio analysis, and risk information.

# Quantifying the benefits of a de-risking glide path

Historical scenario analysis – Scenario #3: 03/31/09 – 03/31/19 (illustrative)



As of 30 June 2019. SOURCE: Sample Client, PIMCO, Bloomberg. **Hypothetical example for illustrative purposes only.** Current static allocation has been modified in each approach using equity overlays to achieve target hedge ratios. Current static allocation: 18% S&P500 + 12% MSCI EAFE + 5% MSCI ACWI + 5% MSCI EM + 8% S&P Private Equity + 9% Dow Jones Real Estate + 4% Macquarie Global Infrastructure + 12% HFRI Fund Wtd Composite + 2% BBG Commodities + 25% BBG BC Long Gov/Credit. Approach A: Same as current static allocation except S&P500 / MSCI EAFE / MSCI ACWI are in the form of equity overlay backed by BBG BC Long Gov/Credit to help achieve glide path hedge ratio targets. Approach A also allows re-risking (re-risk when fall back by more than one funding ratio trigger) and includes asset allocation shifts in the glide path [75% return seeking (at 80% funding ratio) decreases linearly to 40% (at 90% funding ratio) decreases linearly to 37.5% return seeking (at 105% fund ratio)]

Refer to Appendix for additional hedge ratio, hypothetical example, index, investment strategy, portfolio analysis, and risk information.

# Liability-matching portfolio construction

*Building a resilient hedge portfolio vs absolute minimization of surplus volatility*

**Approach #1**  
**ABSOLUTE MINIMIZATION OF SURPLUS VOLATILITY**

Let spread hedge ratio deviate from stated hedge ratio target to minimize surplus volatility



Typically, the risk-minimizing position is **credit spread hedge ratio < duration hedge ratio**

**Significant reliance on historical correlations being repeated**

**Approach #2**  
**BUILD MOST RESILIENT HEDGE PORTFOLIO**  
(return-seeking assets are dedicated solely to potentially improving funding ratio)

Target same hedge ratios across all liability risk factors (e.g., duration, credit spread, key rate durations)

This avoids potentially diverting equity returns from their intended purpose (improving funding ratio) to subsidize the hedge



**credit spread hedge ratio = duration hedge ratio**

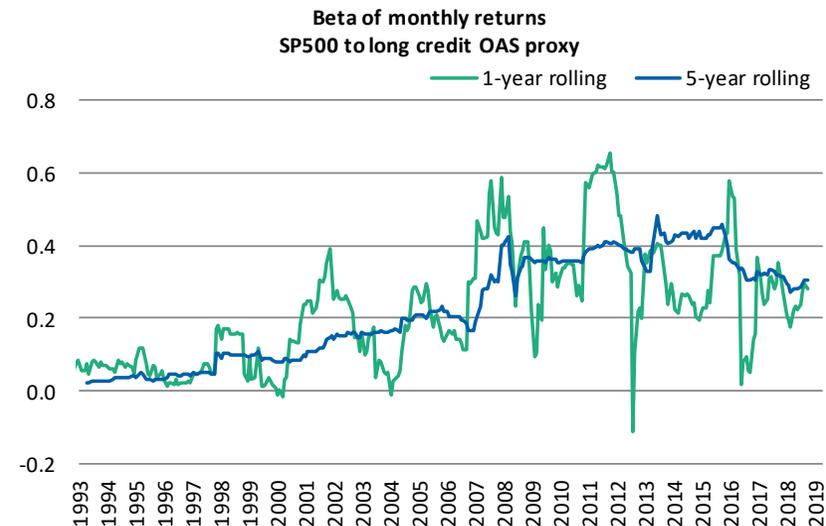
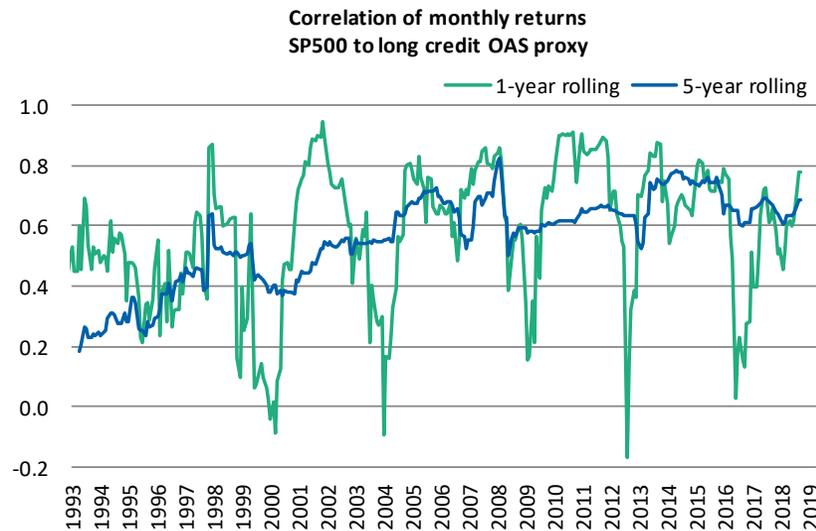
**Little to no reliance on historical correlations being repeated**

SOURCE: PIMCO. **Hypothetical example for illustrative purposes only.** There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved

## Liability-matching portfolio construction

### *Resilient hedge portfolio vs surplus volatility minimization – Which to choose?*

- The decision to emphasize hedge portfolio resilience vs surplus volatility minimization depends on a number of plan-specific criteria and circumstances.
- However, while a larger proportion of plan sponsors have historically focused on surplus volatility minimization, we would suggest revisiting and thoroughly analyzing this decision.
- It may be appropriate for many plan sponsors to make hedge portfolio resiliency the primary focus given that:
  - Surplus volatility minimization relies on historical correlations that may not be realized going forward.
  - Surplus volatility minimization effectively implies diverting returns from the return-seeking portfolio to “complete” weaknesses of the hedge portfolio (effectively borrowing returns that were earmarked for funding ratio improvement).



As of 30 June 2019. SOURCE: PIMCO, Bloomberg.

**Hypothetical example for illustrative purposes only.** There is no guarantee that the investment objectives or the desired results of any strategy, account or portfolio will be achieved

# Why should LDI portfolios incorporate a significant degree of active management?

## 1. Potential to achieve significantly lower overall asset-liability risk for same return target

- There are many ways to seek a specific return that is in line with the sponsor’s objectives
- Investors should select the approach that minimizes risk relative to liabilities among those that meet the return target
- **The higher alpha active approach may lead to a significantly lower risk than both the passive and lower alpha active approaches**

THREE LDI APPROACHES

	Passive LDI approach	Active LDI approach (lower active risk / lower alpha)	Active LDI approach (balanced active risk / higher alpha)	
Asset alloc	Return-seeking	50%	40%	25%
	LDI fixed income	50%	60%	75%
	<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Hypothetical return	Return-seeking	7.5%	7.5%	7.5%
	LDI fixed income	4.5%	5.0%	5.5%
	<b>Total</b>	<b>6.0%</b>	<b>6.0%</b>	<b>6.0%</b>
Vol	<b>Funding ratio volatility</b>	<b>9.2%</b>	<b>7.5%</b>	<b>4.9%</b>
			<b>18% risk reduction (vs passive)</b>	<b>47% risk reduction (vs passive)</b>

**Hypothetical example for illustrative purposes only.** Not intended to represent any specific PIMCO product or strategy, nor is it intended to be a recommendation for your particular needs. Information may be dated and should not be relied upon when making an investment decision. Hypothetical returns do not reflect PIMCO’s views as to the potential returns of those asset classes. These assumptions are used for illustration purposes only and were selected to be approximately in line with the range of assumptions typically used by many plan sponsors. Refer to Appendix for additional hypothetical example, investment strategy and risk information

# Appendix

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## **PERFORMANCE AND FEE**

**Past performance is not a guarantee or a reliable indicator of future results.** Gross returns do not reflect the deduction of investment advisory fees (for Pacific Investment Management Company LLC described in Part 2 of its Form ADV) in the case of both separate investment accounts and mutual funds; but they do reflect commissions, other expenses (except custody), and reinvestment of earnings. Such fees that a client may incur in the management of their investment advisory account may reduce the client's return. For example, over a five-year period, annual advisory fees of 0.425% would reduce compounding at 10% annually from 61.05% before fees to 57.96% after fees. The "net of fees" performance figures reflect reinvestment of earnings and dividends and the deduction of actual investment advisory fees and brokerage commissions but, typically, do not reflect the deduction of custodial fees. All periods longer than one year are annualized. Separate account clients may elect to include PIMCO sector funds in their portfolio; sector funds may be subject to additional terms and fees. For a copy of net of fees performance, unless included otherwise, please contact your PIMCO representative.

## **CHART**

Performance results for certain charts and graphs may be limited by date ranges specified on those charts and graphs; different time periods may produce different results.

## **CORRELATION**

The correlation of various indexes or securities against one another or against inflation is based upon data over a certain time period. These correlations may vary substantially in the future or over different time periods that can result in greater volatility

## **CREDIT QUALITY**

The credit quality of a particular security or group of securities does not ensure the stability or safety of the overall portfolio.

## **DEFINED BENEFIT GLIDE PATH**

De-risking strategy based on a function of plan funded status. As plan funded status improves, clients may be interested in reducing their plan funded status volatility by shifting out of risk assets and into liability hedging fixed income.

## **GLIDE PATH**

Glide Path is the asset allocation within a Target Date Strategy (also known as a Lifecycle or Target Maturity strategy) that adjusts over time as the participant's age increases and their time horizon to retirement shortens. The basis of the Glide Path is to reduce the portfolio risk as the participant's time horizon decreases. Typically, younger participants with a longer time horizon to retirement have sufficient time to recover from market losses, their investment risk level is higher, and they are able to make larger contributions (depending on various factors such as salary, savings, account balance, etc.). Generally, older participants and eligible retirees have shorter time horizons to retirement and their investment risk level declines as preserving income wealth becomes more important.

## **HEDGE RATIO**

Duration Hedge Ratio = asset duration exposure / liability duration exposure. Credit Spread Duration Hedge Ratio (Beta-Adjusted) = asset duration exposure / credit spread duration exposure.

## **HYPOTHETICAL EXAMPLE**

No representation is being made that any account, product, or strategy will or is likely to achieve profits, losses, or results similar to those shown. Hypothetical or simulated performance results have several inherent limitations. Unlike an actual performance record, simulated results do not represent actual performance and are generally prepared with the benefit of hindsight. There are frequently sharp differences between simulated performance results and the actual results subsequently achieved by any particular account, product, or strategy. In addition, because trades have not actually been executed, simulated results cannot account for the impact of certain market risks such as lack of liquidity. There are numerous other factors related to the markets in general or the implementation of any specific investment strategy, which cannot be fully accounted for in the preparation of simulated results and all of which can adversely affect actual results.

## **INVESTMENT STRATEGY**

There is no guarantee that these investment strategies will work under all market conditions or are suitable for all investors and each investor should evaluate his/her ability to invest for a long-term especially during periods of downturn in the market. No representation is being made that any account, product, or strategy will or is likely to achieve profits, losses, or results similar to those shown.

## **ISSUER**

References to specific securities and their issuers are not intended and should not be interpreted as recommendations to purchase, sell or hold such securities. PIMCO products and strategies may or may not include the securities referenced and, if such securities are included, no representation is being made that such securities will continue to be included.

## OAS

The option adjusted spread (OAS) measures the spread over a variety of possible interest rate paths. A security's OAS is the average earned over Treasury returns, taking multiple future interest rate scenarios into account.

## PORTFOLIO ANALYSIS

The portfolio analysis is based on several sample client portfolios. No representation is being made that the structure of the average portfolio or any account will remain the same or that similar returns will be achieved. The analysis may not be attained and should not be construed as the only possibilities that exist. Real results will vary and are subject to change with market conditions. Different weightings in the asset allocation illustration will produce different results. Actual results will vary and are subject to change with market conditions. There is no guarantee that results will be achieved. No fees or expenses were included in the estimated results and distribution. The scenarios assume a set of assumptions that may, individually or collectively, not develop over time. The sample analysis reflected in this information is based upon data at time of analysis. Forecasts, estimates, and certain information contained herein are based upon proprietary research and should not be considered as investment advice or a recommendation of any particular security, strategy or investment product.

PIMCO routinely reviews, modifies, and adds risk factors to its proprietary models. Due to the dynamic nature of factors affecting markets, there is no guarantee that simulations will capture all relevant risk factors or that the implementation of any resulting solutions will protect against loss. All investments contain risk and may lose value. Simulated risk analysis contains inherent limitations and is generally prepared with the benefit of hindsight. Realized losses may be larger than predicted by a given model due to additional factors that cannot be accurately forecasted or incorporated into a model based on historical or assumed data.

## RISK

**All investments** contain risk and may lose value. Investing in the **bond market** is subject to certain risks, including market, interest rate, issuer, credit and inflation risk; investments may be worth more or less than the original cost when redeemed. Currency rates may fluctuate significantly over short periods of time and may reduce the returns of a portfolio. **Equities** may decline in value due to both real and perceived general market, economic and industry conditions. **Inflation-linked bonds (ILBs)** issued by the various governments around the world are fixed-income securities whose principal value is periodically adjusted according to the rate of inflation. Repayment upon maturity of the original principal as adjusted for inflation is guaranteed by the government that issues them. Neither the current market value of inflation-indexed bonds nor the value a portfolio that invests in ILBs is guaranteed, and either or both may fluctuate. ILBs decline in value when real interest rates rise. **Sovereign securities** are generally backed by the issuing government. Obligations of U.S. government agencies and authorities are supported by varying degrees, but are generally not backed by the full faith of the U.S. government. Portfolios that invest in such securities are not guaranteed and will fluctuate in value. **High yield, lower-rated securities** involve greater risk than higher-rated securities; portfolios that invest in them may be subject to greater levels of credit and liquidity risk than portfolios that do not. Investing in **foreign denominated and/or domiciled securities** may involve heightened risk due to currency fluctuations, and economic and political risks, which may be enhanced in emerging markets. **Mortgage and asset-backed securities** may be sensitive to changes in interest rates, subject to early repayment risk, and while generally supported by a government, government-agency or private guarantor there is no assurance that the guarantor will meet its obligations. **Infrastructure entities** are involved in the construction, operation, ownership or maintenance of physical structures, networks and other infrastructure assets that provide public services; infrastructure entities, projects and assets may be sensitive to adverse economic, regulatory, political or other developments and may be subject to a variety of events that adversely affect their business or operations. **Bank loans** are often less liquid than other types of debt instruments and general market and financial conditions may affect the prepayment of bank loans, as such the prepayments cannot be predicted with accuracy. There is no assurance that the liquidation of any collateral from a secured bank loan would satisfy the borrower's obligation, or that such collateral could be liquidated. **Derivatives** may involve certain costs and risks, such as liquidity, interest rate, market, credit, management and the risk that a position could not be closed when most advantageous. Investing in derivatives could lose more than the amount invested. Investors should consult their professional prior to making an investment decision.

## VOLATILITY (ESTIMATED)

We employed a block bootstrap methodology to calculate volatilities. We start by computing historical factor returns that underlie each asset class proxy from January 1997 through the present date. We then draw a set of 12 monthly returns within the dataset to come up with an annual return number. This process is repeated 25,000 times to have a return series with 25,000 annualized returns. The standard deviation of these annual returns is used to model the volatility for each factor. We then use the same return series for each factor to compute covariance between factors. Finally, volatility of each asset class proxy is calculated as the sum of variances and covariance of factors that underlie that particular proxy. For each asset class, index, or strategy proxy, we will look at either a point in time estimate or historical average of factor exposures in order to determine the total volatility. Please contact your PIMCO representative for more details on how specific proxy factor exposures are estimated.

# Appendix

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This material contains the current opinions of the manager and such opinions are subject to change without notice. This material has been distributed for informational purposes only and should not be considered as investment advice or a recommendation of any particular security, strategy or investment product. Information contained herein has been obtained from sources believed to be reliable, but not guaranteed. No part of this material may be reproduced in any form, or referred to in any other publication, without express written permission. PIMCO is a trademark of Allianz Asset Management of America L.P. in the United States and throughout the world. Pacific Investment Management Company LLC, 650 Newport Center Drive, Newport Beach, CA 92660, 800-387-4626. ©2019, PIMCO.

## INDEX DESCRIPTIONS

The Bloomberg Barclays Intermediate Government/Corporate Index is an unmanaged market index comprised of a blend of intermediate government and the investment grade corporate fixed income universe.

The Bloomberg Barclays Intermediate Investment Grade Corporate Index is an unmanaged index of publicly issued U.S. corporate and specified foreign debentures and secured notes that meet the specified maturity, liquidity, and quality requirements.

Bloomberg Barclays Long-Term Treasury consists of U.S. Treasury issues with maturities of 10 or more years.

Bloomberg Barclays Long Term Government/Credit Index is an unmanaged index of U.S. Government or Investment Grade Credit Securities having a maturity of 10 years or more.

The Bloomberg Barclays Long Corporate Index is a component of the Bloomberg Barclays U.S. Long Credit index. Bloomberg Barclays U.S. Long Credit Index is the credit component of the Bloomberg Barclays U.S. Government/Credit Index, a widely recognized index that features a blend of U.S. Treasury, government-sponsored (U.S. Agency and supranational), and corporate securities limited to a maturity of more than ten years.

Bloomberg Barclays U.S. Aggregate Index represents securities that are SEC-registered, taxable, and dollar denominated. The index covers the U.S. investment grade fixed rate bond market, with index components for government and corporate securities, mortgage pass-through securities, and asset-backed securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis.

Bloomberg Barclays U.S. Long Credit Index is the credit component of the Bloomberg Barclays U.S. Government/Credit Index, a widely recognized index that features a blend of U.S. Treasury, government-sponsored (U.S. Agency and supranational), and corporate securities limited to a maturity of more than ten years.

Citigroup STRIPS Index, 20+ Year Sub-Index represents a composition of outstanding Treasury Bonds and Notes with a maturity of at least twenty years. The index is rebalanced each month in accordance with underlying Treasury figures and profiles provided as of the previous month-end. The included STRIPS are derived only from bonds in the Citigroup U.S. Treasury Bond Index, which include coupon strips with less than one year remaining to maturity. The index does not reflect deductions for fees, expenses or taxes.

LIBOR (London Interbank Offered Rate) is the rate banks charge each other for short-term Eurodollar loans.

The MSCI EAFE (Morgan Stanley Capital International Europe, Australasia, Far East Index) is an unmanaged index of over 900 companies, and is a generally accepted benchmark for major overseas markets. Index weightings represent the relative capitalizations of the major overseas markets included in the index on a U.S. dollar adjusted basis.

The NCREIF (National Council of Real Estate Investment Fiduciaries) Property Index is a quarterly time series composite total rate of return measure of performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only.

The S&P 500 Index is an unmanaged market index generally considered representative of the stock market as a whole. The index focuses on the Large-Cap segment of the U.S. equities market.

It is not possible to invest directly in an unmanaged index.

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