Undertaking #12

Mercer to confirm whether or not the stress tests portrayed on Slide 24 of Appendix 17, Attachment (a) were undertaken, and if so, to provide them. And if they weren't done, if Mercer is aware of the reasons why they were not done.

RESPONSE:

Mercer provided the following response:

On review of our file notes, the stress tests outlined on Slide 24 of Appendix 17, Attachment A were discussed following the November 8, 2017 meeting. Due to time constraints, it was agreed on November 22, 2017 to first proceed with the following 3 scenarios.

- 1. Market Correction: 33% decline in equity return, decline in yields
- 2. Inflation Shock: High inflation, higher yields and lower P/E Ratios
- 6. Deflation

Unfortunately, we were unable to complete the stress tests in advance of the Investment Committee meeting on November 28, 2017. Our modeler indicated that there were quality control issues with the first three stress tests on November 28, 2017. Given that the investment committee meeting had occurred and given concerns regarding overall modeling costs, peer review of the results was not completed and the results were not finalized.

Mercer has recently completed the three stress tests identified above, and the results are provided in Appendix A.

HEALTH WEALTH CAREER

ASSET LIABILITY STUDY

PHASE 2 STRESS TESTS

Manitoba Public Insurance

OCTOBER 25, 2018

Dave Makarchuk
Pawel Piesowicz

MAKE TOMORROW, TODAY MERCER

MPI ASSET LIABILITY STUDY
STRESS TESTING

- The stress tests outlined on Slide 24 of Appendix 17, Attachment A were discussed following the November 8, 2017 meeting. Due to time constraints, it was agreed on November 22, 2017 to first proceed with the following 3 scenarios.

    1. Market Correction: 33% decline in equity return, decline in yields
    2. Inflation Shock: High inflation, higher yields and lower P/E Ratios
    6. Deflation

Unfortunately, we were unable to complete the stress tests in advance of the Investment Committee meeting on November 28, 2017. Our modeller indicated that there were quality control issues with the first three stress tests on November 28, 2017. Given that the investment committee meeting had occurred and given concerns regarding overall modeling costs, peer review of the results was not completed and the results were not finalized.

- In October 2018 we returned to this project and finalized projections for Basic under the 3 scenarios above.

STRESS TESTING

- We have performed the following stress tests of the current and alternative asset mixes*

Scenario	Description
Base Case	5-yr trend to “equilibrium” of inflation = 2.0% and growth = 1.9%
Market Correction	The market correction scenario is meant to capture a swift bear market in equities with a moderately paced recovery. Economic conditions do not change dramatically during the correction; it is mainly an equity market valuation event
Inflation Shock	The Inflation Shock scenario shows the effect of a sharp rise in inflation that is not caused directly by the business cycle, such as the early 1970s period caused by the OPEC oil embargo. As nominal interest rates rise sharply, bonds experience sharp losses. Economic growth slows as consumers and businesses adjust to the sharp price movements. Equity markets experience a sharp drop as valuations adjust to higher interest rates.
Deflation + Recession	This is a similar to the Great Depression of the 1930s or Japan of the 1990s. Economic growth slows and inflation drops near zero, leading to further slowing in economic growth, creating a vicious circle. The recovery period is long. Bond returns are high initially as rates fall, then are very low. Equity returns are very negative for a few years then turn sharply higher as a recovery builds

- The following charts show the impact on return and surplus under each of the above scenarios

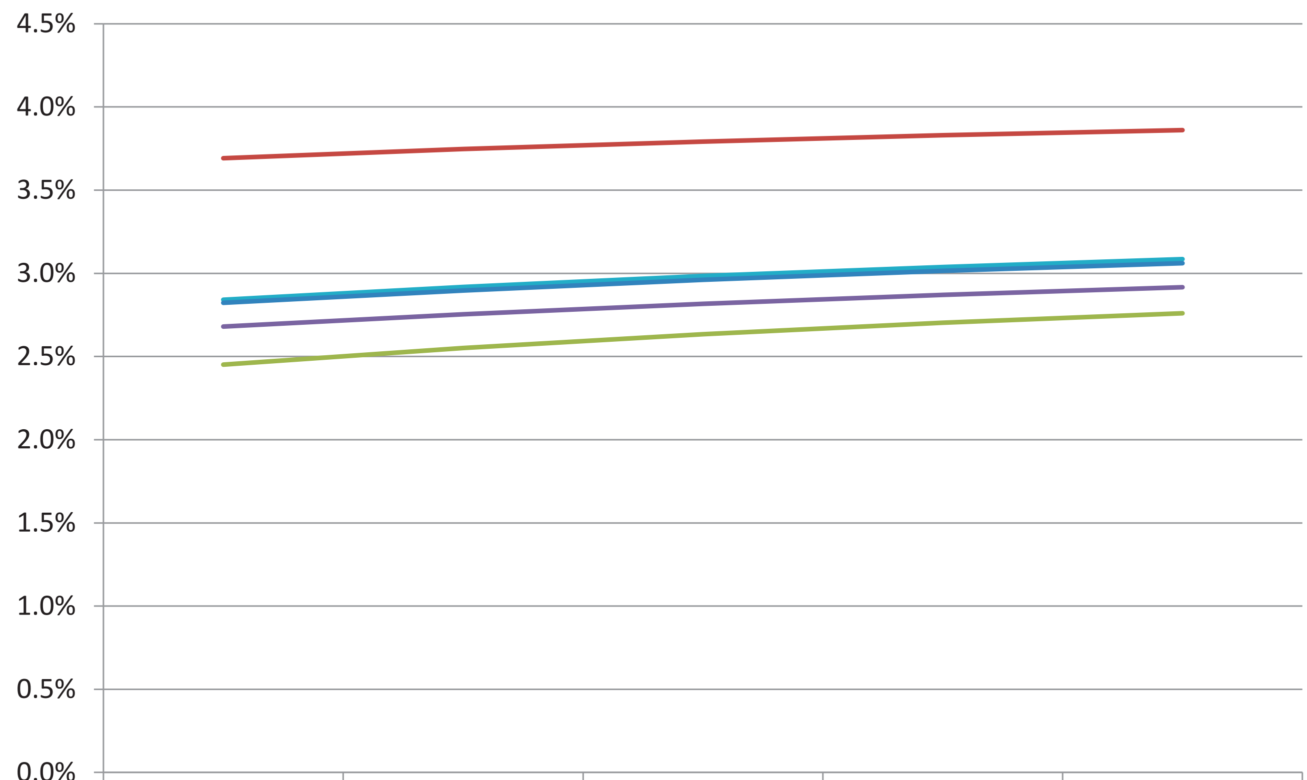
KEY STRESS TEST VARIABLES
MERCER ASSUMPTIONS (NOT FORWARD ASSUMPTIONS)

Scenario	Economic Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Base Case	Inflation	2.0%	2.0%	2.0%	2.0%	2.0%
	Federal Long-term Yield	2.3%	2.3%	2.3%	2.4%	2.4%
	Overall Long-term Spread	0.8%	0.8%	0.8%	0.8%	0.7%
	Large Cap. Equity Return	6.5%	6.5%	6.5%	6.5%	6.5%
Market Correction	Inflation	2.7%	2.4%	2.0%	2.0%	2.0%
	Federal Long-term Yield	2.3%	2.4%	2.5%	2.5%	2.5%
	Overall Long-term Spread	0.8%	0.7%	0.7%	0.7%	0.7%
	Large Cap. Equity Return	-34.7%	37.1%	9.7%	6.5%	6.5%
Inflation Shock	Inflation	4.6%	7.1%	9.7%	5.9%	2.0%
	Federal Long-term Yield	4.8%	7.4%	10.0%	6.3%	2.5%
	Overall Long-term Spread	0.8%	0.7%	0.7%	0.7%	0.7%
	Large Cap. Equity Return	0.7%	3.4%	6.1%	34.5%	9.1%
Deflation + Recession	Inflation	0.1%	-0.9%	-1.8%	-1.2%	-0.5%
	Federal Long-term Yield	1.9%	1.5%	1.1%	1.3%	1.6%
	Overall Long-term Spread	1.1%	1.3%	1.5%	1.4%	1.2%
	Large Cap. Equity Return	-17.7%	-18.3%	-18.8%	39.7%	21.6%

- Asset gains/losses are reflected in the market value of assets each year
- Liability values are adjusted annually based on market value changes implied by the liability benchmark. They are also adjusted to reflect the difference (positive or negative) between the period-to-date inflation and 2%.

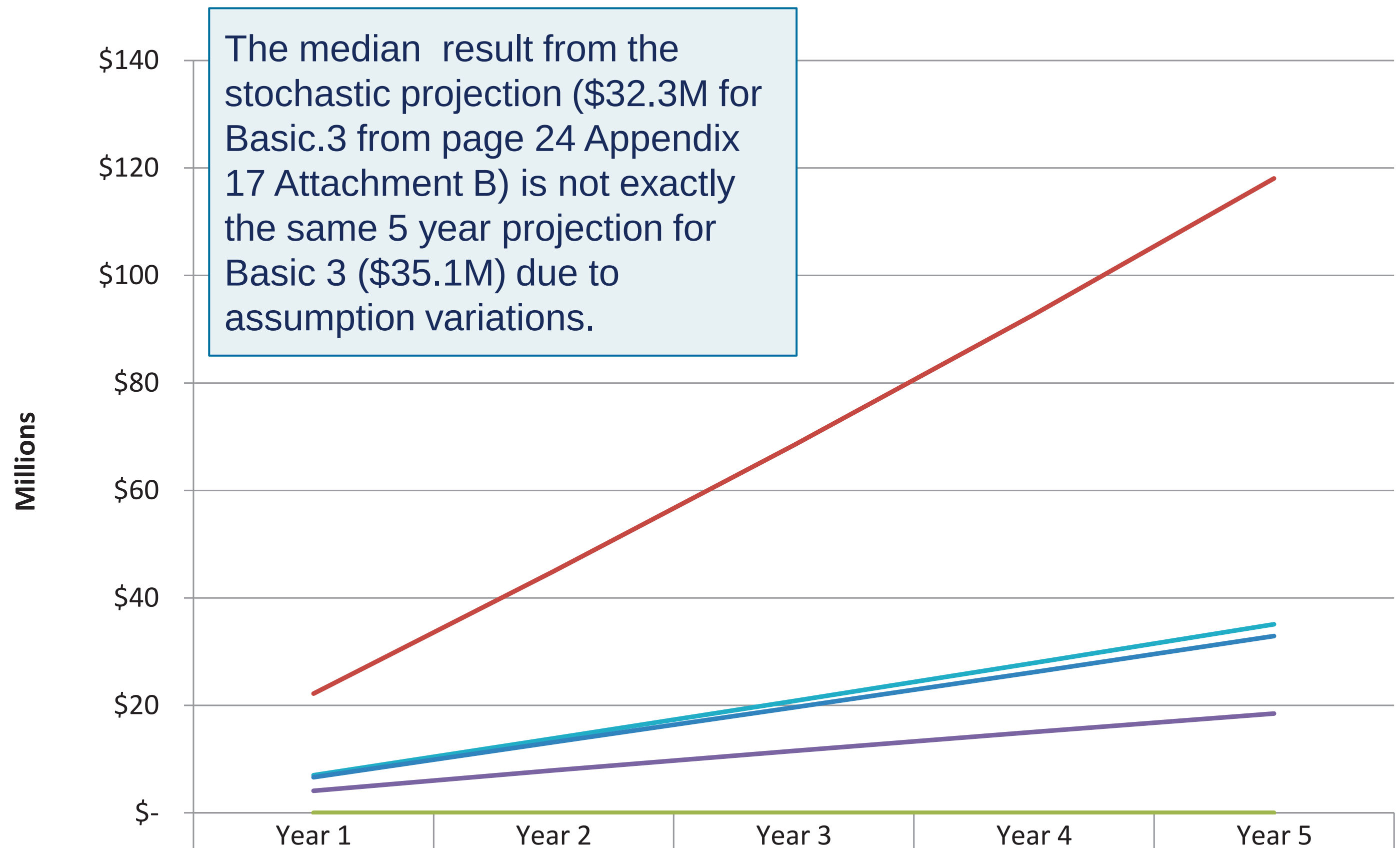
BASE CASE

BASIC / BASE CASE / PORTFOLIO RETURN



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	3.7%	3.7%	3.8%	3.8%	3.9%
Basic.1 (LB)	2.5%	2.6%	2.6%	2.7%	2.8%
Basic.2	2.7%	2.8%	2.8%	2.9%	2.9%
Basic.3	2.8%	2.9%	3.0%	3.0%	3.1%
Basic.4	2.8%	2.9%	3.0%	3.0%	3.1%

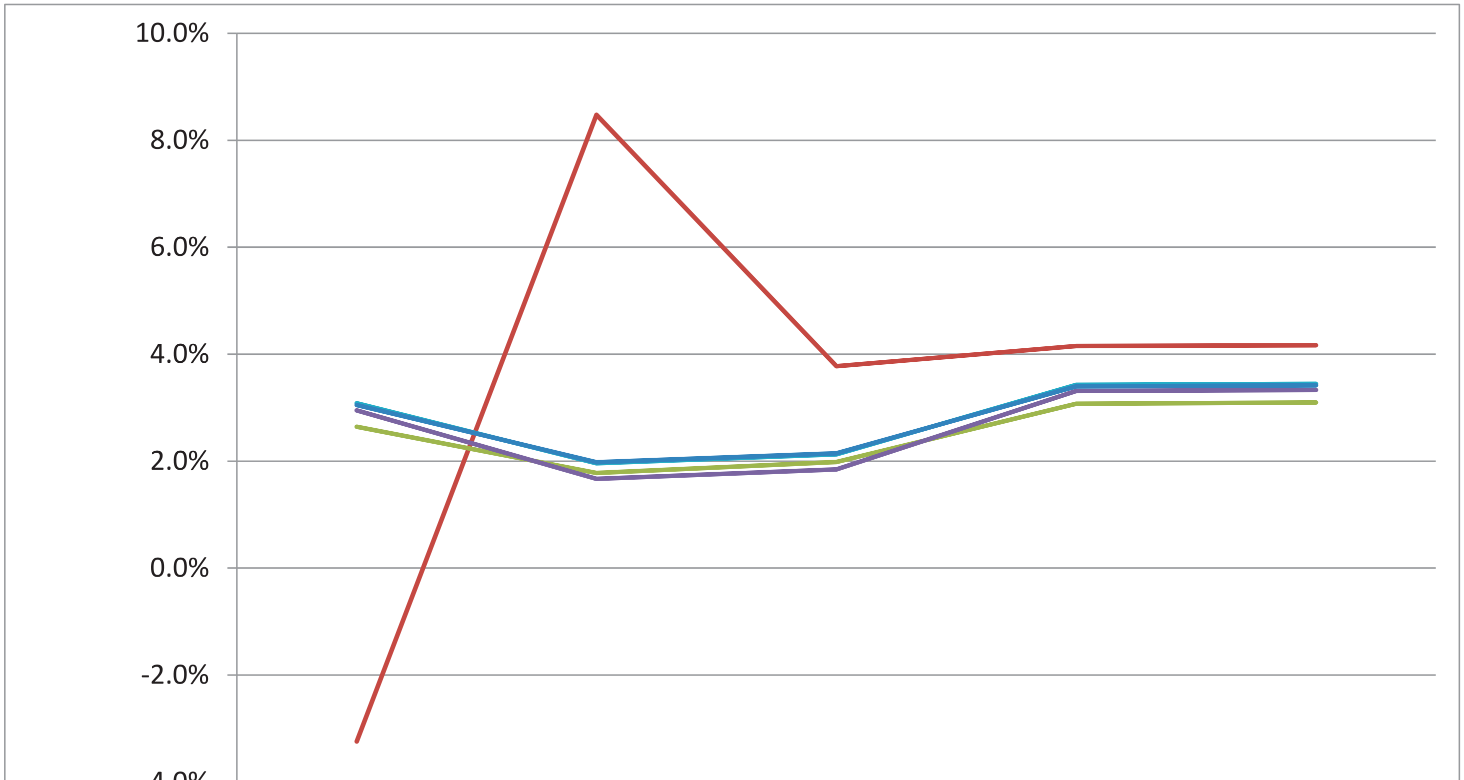
BASIC / BASE CASE / SURPLUS



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	22.2 M	44.9 M	68.4 M	92.7 M	118.0 M
Basic.1 (LB)	0.0 M	0.0 M	0.0 M	0.0 M	0.0 M
Basic.2	4.1 M	7.9 M	11.5 M	15.0 M	18.5 M
Basic.3	7.0 M	13.9 M	20.8 M	27.9 M	35.1 M
Basic.4	6.6 M	13.1 M	19.6 M	26.2 M	32.9 M

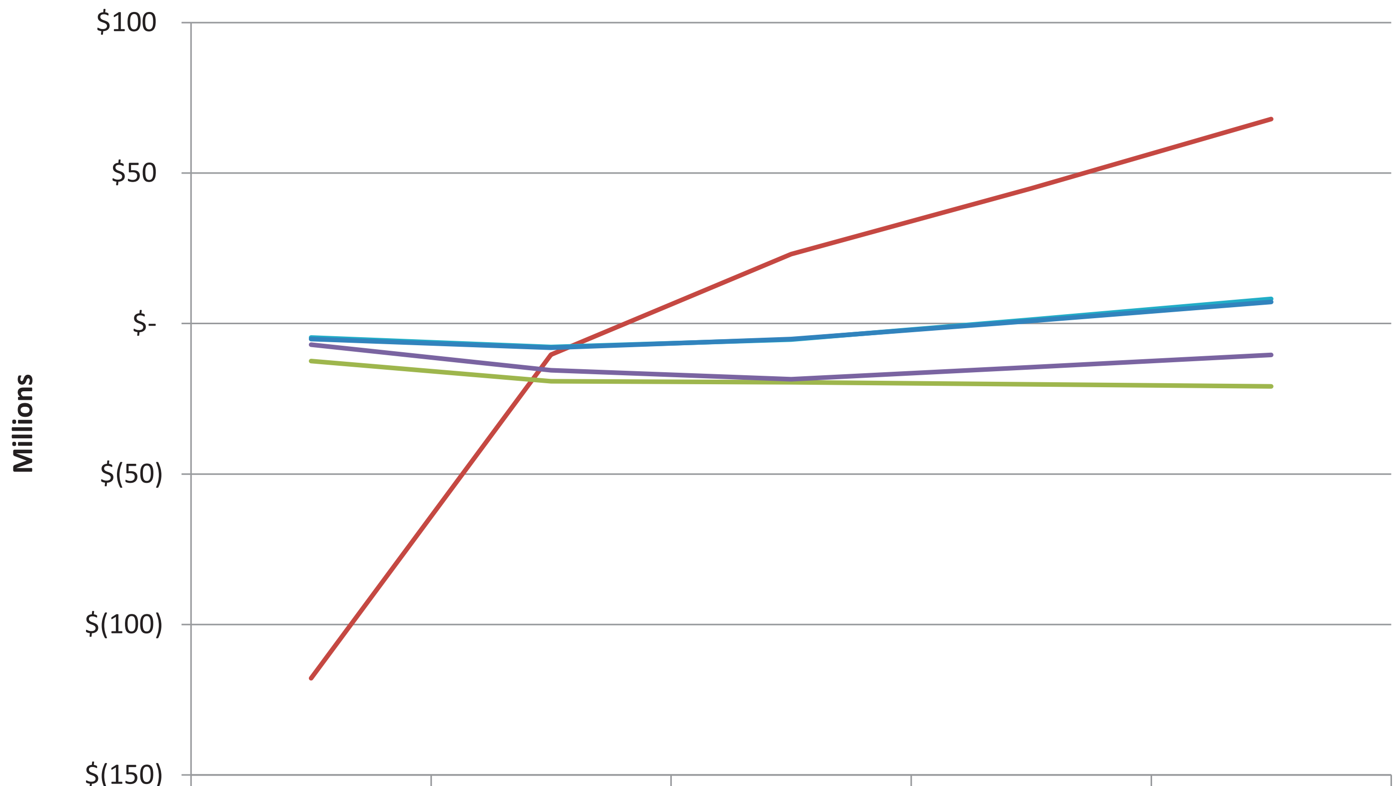
MARKET CORRECTION

BASIC / MARKET CORRECTION / PORTFOLIO RETURN



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	-3.2%	8.5%	3.8%	4.2%	4.2%
Basic.1 (LB)	2.6%	1.8%	2.0%	3.1%	3.1%
Basic.2	2.9%	1.7%	1.8%	3.3%	3.3%
Basic.3	3.1%	2.0%	2.1%	3.4%	3.4%
Basic.4	3.1%	2.0%	2.1%	3.4%	3.4%

BASIC / MARKET CORRECTION / SURPLUS



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	-117.8 M	-10.3 M	23.1 M	44.9 M	68.0 M
Basic.1 (LB)	-12.5 M	-19.1 M	-19.5 M	-20.2 M	-20.8 M
Basic.2	-7.0 M	-15.5 M	-18.5 M	-14.5 M	-10.4 M
Basic.3	-4.6 M	-7.8 M	-5.3 M	1.3 M	8.2 M
Basic.4	-5.2 M	-8.0 M	-5.1 M	0.9 M	7.2 M

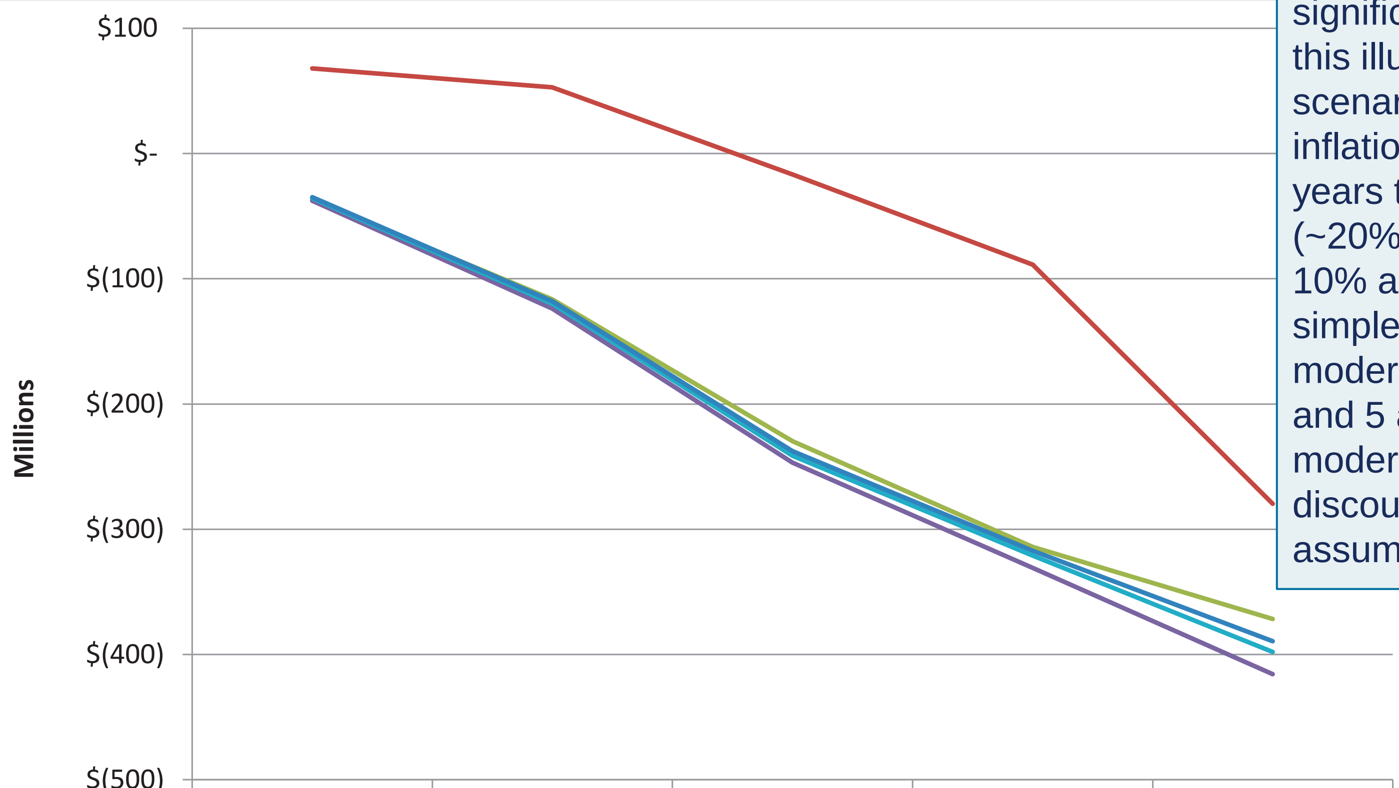
INFLATION SHOCK

BASIC / INFLATION SHOCK / PORTFOLIO RETURN

	Year 1	Year 2	Year 3	Year 4	Year 5
Current	-11.8%	-8.5%	-5.1%	40.2%	37.4%
Basic.1 (LB)	-17.6%	-13.5%	-9.2%	46.4%	50.2%
Basic.2	-17.7%	-13.9%	-10.0%	47.2%	49.1%
Basic.3	-17.6%	-13.8%	-9.9%	47.3%	49.3%
Basic.4	-17.5%	-13.7%	-9.7%	47.2%	49.4%

The ‘shock’ scenarios assume very substantive shocks (both higher and lower for illustrative purposes)

BASIC / INFLATION SHOCK / SURPLUS

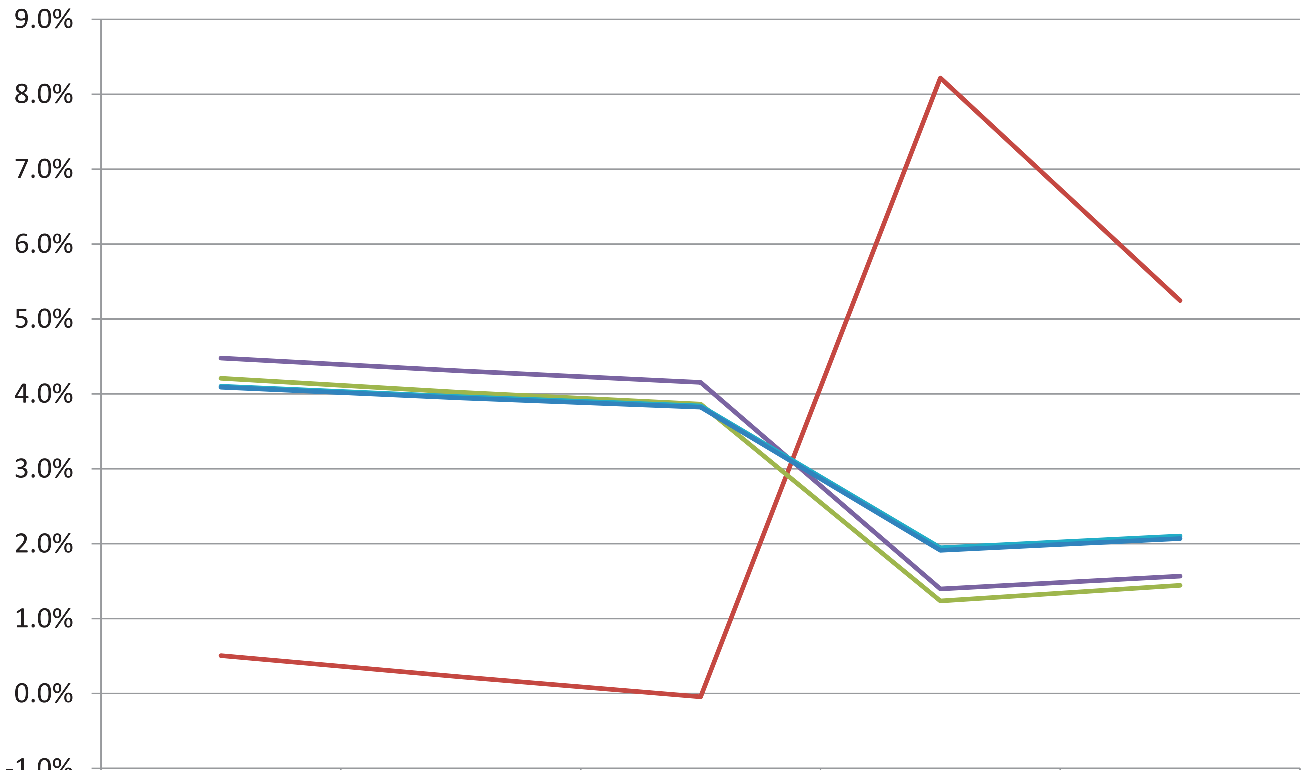


	Year 1	Year 2	Year 3	Year 4	Year 5
Current	67.9 M	52.8 M	-16.8 M	-88.6 M	-279.6 M
Basic.1 (LB)	-36.7 M	-116.5 M	-229.6 M	-314.1 M	-371.6 M
Basic.2	-37.8 M	-123.9 M	-246.9 M	-330.9 M	-415.6 M
Basic.3	-35.6 M	-119.9 M	-241.4 M	-321.0 M	-397.8 M
Basic.4	-34.9 M	-118.0 M	-237.7 M	-317.1 M	-389.4 M

Losses would emerge if inflation and rates significantly rise. In this illustrated scenario, cumulative inflation over the 5 years totals ~30% (~20% higher than the 10% assumed using simple math). Losses moderate in years 4 and 5 as inflation moderates, but the discount rate is assumed to fall.

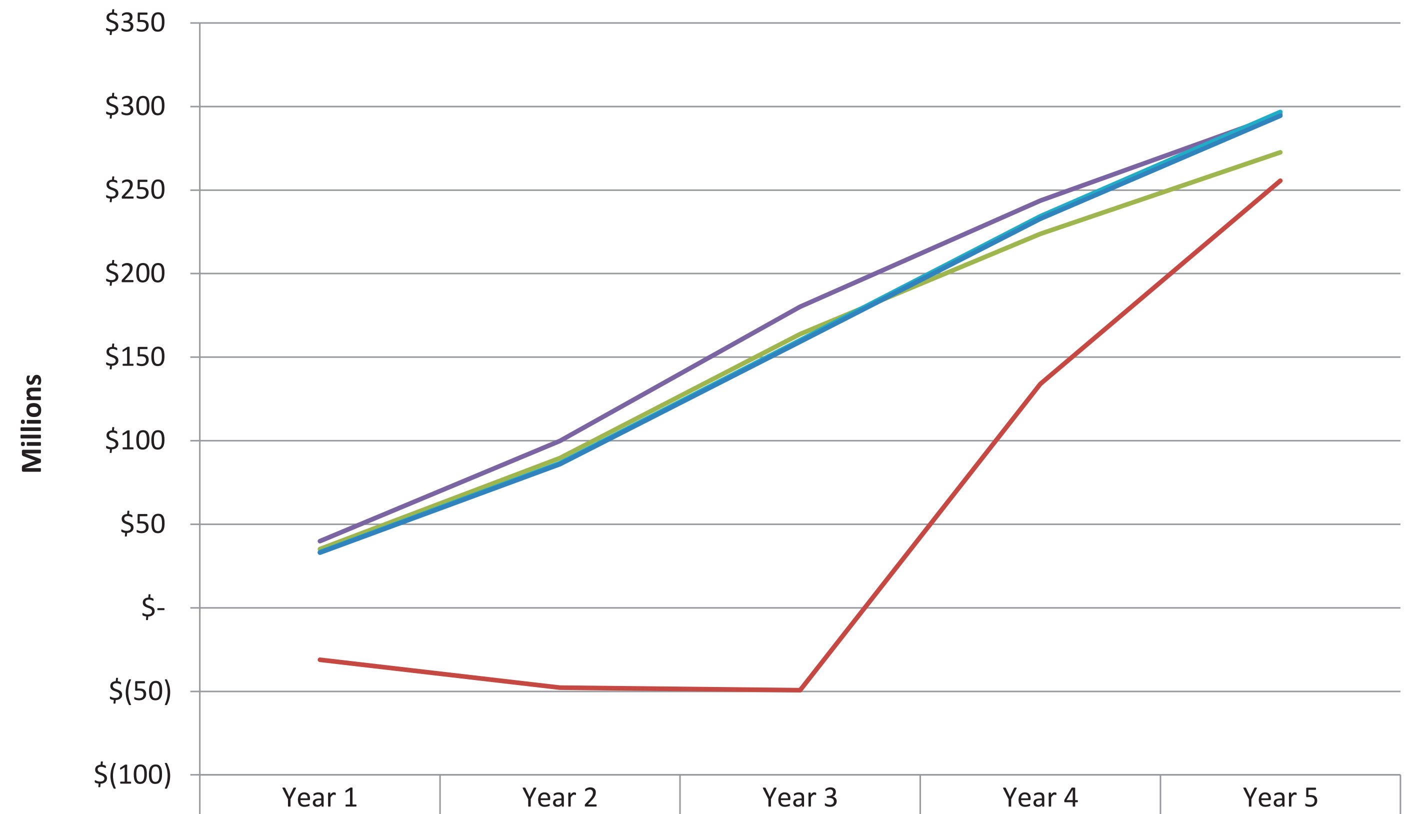
DEFLATION + RECESSION

BASIC / DEFLATION + RECESSION / PORTFOLIO RETURN



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	0.5%	0.2%	0.0%	8.2%	5.2%
Basic.1 (LB)	4.2%	4.0%	3.9%	1.2%	1.4%
Basic.2	4.5%	4.3%	4.2%	1.4%	1.6%
Basic.3	4.1%	4.0%	3.8%	1.9%	2.1%
Basic.4	4.1%	3.9%	3.8%	1.9%	2.1%

BASIC / DEFLATION + RECESSION / SURPLUS



	Year 1	Year 2	Year 3	Year 4	Year 5
Current	-31.2 M	-47.8 M	-49.3 M	133.9 M	255.6 M
Basic.1 (LB)	35.1 M	89.5 M	163.8 M	223.8 M	272.5 M
Basic.2	40.0 M	99.9 M	180.2 M	243.6 M	295.2 M
Basic.3	33.3 M	86.5 M	160.2 M	234.3 M	296.8 M
Basic.4	33.0 M	85.9 M	159.3 M	232.7 M	294.5 M

IMPORTANT NOTICES

References to Mercer shall be construed to include Mercer LLC and/or its associated companies.

The findings, ratings and/or opinions expressed herein are the intellectual property of Mercer and are subject to change without notice. They are not intended to convey any guarantees as to the future performance of the investment products, asset classes or capital markets discussed. Past performance does not guarantee future results. Mercer's ratings do not constitute individualized investment advice.

Information contained herein has been obtained from a range of third party sources. While the information is believed to be reliable, Mercer has not sought to verify it independently. As such, Mercer makes no representations or warranties as to the accuracy of the information presented and takes no responsibility or liability (including for indirect, consequential or incidental damages), for any error, omission or inaccuracy in the data supplied by any third party.

This does not constitute an offer or a solicitation of an offer to buy or sell securities, commodities and/or any other financial instruments or products or constitute a solicitation on behalf of any of the investment managers, their affiliates, products or strategies that Mercer may evaluate or recommend.

For the most recent approved ratings of an investment strategy, and a fuller explanation of their meanings, contact your Mercer representative.

For Mercer's conflict of interest disclosures, contact your Mercer representative or see www.mercer.com/conflictsofinterest.

Mercer universes: Mercer's universes are intended to provide collective samples of strategies that best allow for robust peer group comparisons over a chosen timeframe. Mercer does not assert that the peer groups are wholly representative of and applicable to all strategies available to investors.

The value of your investments can go down as well as up, and you may not get back the amount you have invested. Investments denominated in a foreign currency will fluctuate with the value of the currency. Certain investments carry additional risks that should be considered before choosing an investment manager or making an investment decision.

MERCER

MAKE TOMORROW, TODAY