To: North Carolina Supplemental Retirement Board of Trustees

From: Loren de Mey, Assistant Investment Director

Date: August 11, 2017

Subject: GoalMaker® and Glidepath Review

Background

As part of the Board's general fiduciary duties regarding plan design, the Board is responsible for selecting, monitoring, and approving changes to any model asset allocations, including the glidepaths across allocations, that are offered in the Plans. The categories of model allocations/glidepaths include (1) "off-the-shelf" options (such as Morningstar's allocations and glidepath offered through Prudential's GoalMaker service); and (2) modified versions of "off-the shelf" options (such as the modified Morningstar version currently used by the Board).[1] The choice of an off-the-shelf option and the decision of how (if at all) to modify the allocations/glidepath are fiduciary obligations of the Board, and the Board relies on investment experts from the Investment Management Division (IMD) and Mercer in making these decisions.

On March 23, 2017, the Supplemental Retirement Board (Board) approved a recommendation of the Supplemental Investment Subcommittee on the Glidepath Project. The recommendation was to instruct IMD staff to develop a plan with Prudential to finalize the material changes to the glidepath of the GoalMaker® service based on the 2013 Mercer recommendations (i.e., those that were deferred until after the 2015 unbundling) with no incremental fees. As identified by IMD for the Board, those changes included:

1. Smoothing the glidepath; and/or
2. Adding a "through retirement" or income component to the glidepath

GoalMaker / Glidepath Review

As of June 30, 2017, there were $4.6 billion in total assets in GoalMaker (44% of total assets in the 401k and 457 Plans). 61% of all participants and 93% of new participants were using GoalMaker.®

As a reminder, Morningstar provides the underlying asset allocation framework supporting Prudential's GoalMaker® service and is currently enhancing the model portfolios with GoalMaker. IMD and Mercer used this new model, developed by Morningstar, as the starting point in their analysis. The new GoalMaker® model is a "3 x 9" model (That is, the model includes three risk settings and nine retirement

[1] A third alternative – fully-customized allocations/glidepaths using a delegated investment manager or investment consultant – was previously considered by the Board.

target years, with 6 target years in the pre-retirement phase and 3 in the post-retirement phase (See Appendix B).

The new GoalMaker® model improves upon the current model in the following ways:

1. Offers options for participants ***through*** retirement, by adding three age-related groupings in the post-retirement phase.
2. Adds additional exposure to growth assets for younger participants, while adding fixed income and stable value assets for participants approaching or in retirement.
3. Smooths the glidepath by adding additional age groupings so participants will experience less abrupt asset allocation changes as they move through the glidepath.

To better understand some of the discussion and recommendations, it is important to understand the following:

1. This new GoalMaker® model is created by Morningstar under contract with Prudential to be provided as an alternative to Prudential's defined contribution clients that also desire glidepath smoothing as opposed to Standard GoalMaker® (which is a "3 x 4" model).
2. Morningstar's Standard GoalMaker® has been used by Mercer and the SRP Board to create and authorize the customized North Carolina GoalMaker® Model Portfolios. In other words, the current North Carolina glidepath is a customized version of Prudential's Standard GoalMaker® model as approved by the SRP Board in 2013 (See Appendix A).
3. Morningstar's Lifetime Asset Allocation Indexes are their "best ideas" model target date funds with a glidepath for three different risk levels and 14 target dates (i.e., "3 x 14" model).
4. Morningstar periodically updates the Standard GoalMaker® model based on updated methodology and capital market assumptions and communicates changes to Prudential.

IMD reviewed the alternative 3 x 9 GoalMaker® model, including reviewing the reasonableness of the following:

1. Morningstar's glidepath modeling (i.e., methodology and assumptions) and their Lifetime Asset Allocation Indexes (See Appendix C);
2. Any major deviations between the glidepaths of the Lifetime Asset Allocation Indexes and the alternative 3 x 9 GoalMaker®, including the mapping of individual sector/style constituents between the two glidepaths;
3. Any major deviations between the glidepaths of the alternative 3 x 9 GoalMaker® and the North Carolina GoalMaker® Model Portfolio, including the mapping of individual sector/style constituents between the glidepaths; and
4. Throughout the analysis, the allocation to growth and fixed income assets provided by the Prudential model was maintained.

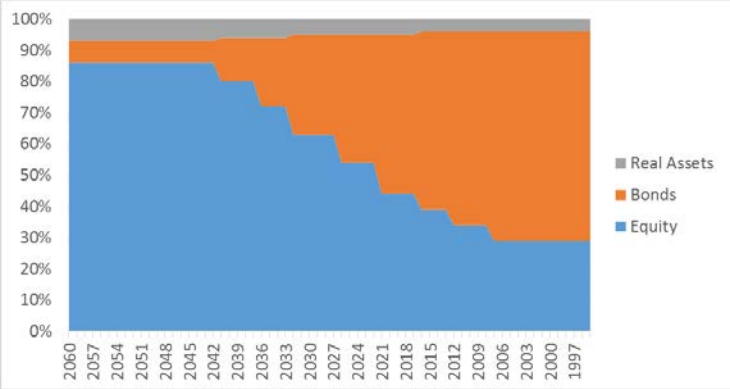
IMD analyzed all of the above, reviewed the analysis with Mercer, and proposes the following components of new North Carolina GoalMaker® Model Portfolios for the Board's consideration in September.

1. Adopt Prudential's new GoalMaker® 3 x 9 model with recommended modifications, as outlined in Mercer's presentation, including the following modifications:
    a. Capping the SMID allocation at 30% in the longer-dated funds and scaling down to 20% as participants near retirement to be more in line with the SMID weighting within the Russell 3000 Index (Prudential's proposed model included a significant overweight to SMID throughout the glidepath);
    b. Increasing the allocation to International Equity to be more in line with the weighting within the MSCI ACWI Index (The allocation to International Equity will decrease as participants approach retirement); and
    c. Adding an Inflation Sensitive allocation (discussed in greater detail below).
        i. The Inflation Sensitive allocation would be implemented with a passive U.S. Treasury Inflation Protected Securities ("TIPS") allocation.
        ii. The changes would improve the inflation protection for participants approaching or in retirement.
        iii. The TIPs allocation will be mainly funded through a reduction in the stable value allocation.
2. Utilize only a passive allocation for U.S. Large Cap (i.e., the current glidepath uses both active and passive U.S. Large Cap)
3. Utilize only an active allocation for fixed income (i.e., the current glidepath model uses both active and passive fixed income)
4. Eliminate active Global Equity and replacing it with passive U.S. Large Cap and active International Equity
    a. Recommend removing the NC Global Equity Fund from the core fund line-up
    b. Approximately 94% of the assets within the Global Equity Fund are from the GoalMaker allocation. If this change is made, only $60 million would remain in the Global Equity Fund (the self-directed assets), and investment management fees would increase 10 basis points to 0.675% for those remaining assets (given the break points on the current fee schedule).

Inflation Sensitive Modification

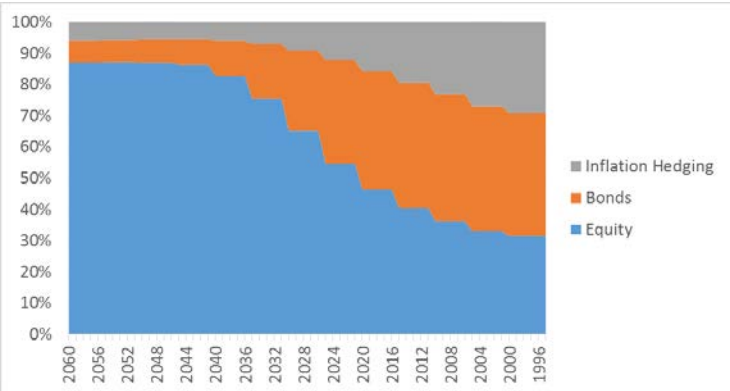
IMD staff and Mercer recommend utilizing an expanded Inflation Sensitive allocation. The current North Carolina GoalMaker® Model Portfolios utilize a Real Assets allocation to the PIMCO Inflation Responsive Multi Asset Fund (IRMAF), and the new GoalMaker® 3 x 9 Model decreases this allocation as participants age into and through retirement (See Chart 1). This decrease occurs because the portfolio is roughly half allocated to growth-oriented assets, rather than inflation hedging.

Chart 1: Morningstar's New GoalMaker 3 x 9 Model (Moderate Portfolio)



Within the Mercer peer group of target date funds, there is instead an Inflation Sensitive allocation, which increases as participants approach retirement. This basic approach is consistent with the Morningstar methodology utilized within Morningstar's Lifetime Asset Allocation Indexes as can be seen in Chart 2.

Chart 2: Morningstar's Lifetime Asset Allocation Indexes (Moderate Portfolio)



The Supplemental Plans' current Inflation Sensitive investment offering, the PIMCO IRMAF, does not correspond closely to the asset categories that Morningstar modeled within their Lifetime Asset Allocation Indexes. The PIMCO IRMAF does have exposure to TIPS, but also has exposure to growth-oriented and higher volatility assets such as REITs, currencies, and commodities. Given these exposures, IMD staff and Mercer do not believe it would be in the best interests of participants to materially increase the allocations to IRMAF (i.e., growth assets) as participants approach retirement.

Therefore, IMD staff and Mercer are recommending adding in a TIPS allocation to the GoalMaker® Model for inflation hedging purposes. The allocations to TIPS would increase for those participants approaching or in retirement.

Fees

The new proposed GoalMaker® model including the new implementation (active/passive split) reduces fees on the GoalMaker® portfolios between7-15 basis points (based on fees as of 6/30/17, which include the recently negotiated fee reductions). Further details on fees can be seen on page 29 of the Mercer presentation.

Summary of Recommendations (for Board Vote in September)

Following is a summary of key points to be presented to the Board for a vote during its September meeting.

1. Approve moving to new GoalMaker® Model (moving from 3 x 4 model to 3 x 9 model).
2. Approve Mercer's recommendations to the new model, including the addition of a TIPS allocation.
3. Approve all implementations, including:
    a. Fully passive for U.S. Large Cap Equity – change from current GoalMaker®
    b. Fully active for Fixed Income – change from current GoalMaker®
    c. Fully active for International Equity – no change from current GoalMaker®
    d. Fully active for Small / Mid U.S. Equity – no change from current GoalMaker®
4. Replace Global Equity in model portfolios with Passive U.S. Large Cap and Active International Equity
5. Remove NC Global Equity Fund from the Plans' Core Menu
6. Add Passive TIPS Fund to Core Menu

Any recommended changes to the glidepath and GoalMaker® portfolios that are approved by the Board in September 2017 are expected to be implemented in June 2018, given the 8-9 month lead time required by Prudential.

Summary

The proposed GoalMaker® Model reduces fees and adds value for participants by enhancing the model in several ways: going through retirement; smoothing the glidepath with less abrupt asset allocation changes; and optimizing the active/passive mix of investment strategies. The new model adds additional exposure to growth assets for younger participants, while increasing fixed income and inflation hedging allocations for those participants approaching and in retirement.

Appendix A: Current GoalMaker® Allocations (highlighted changes are changes that will be implemented along with the Plan Design changes, effective September 29, 2017)

Conservative

The objective of the Conservative Model Allocation is to achieve long term growth in excess of inflation with a minimal risk of capital loss over a full market cycle.

Conservative	C01 0-5 Yrs	C02 6-10 Yrs	C03 11-15 Yrs	C04 16+ Yrs
NC Large Cap Value	~~1%~~	~~2%~~	~~3%~~	~~3%~~
NC Large Cap Index	4%	4%	7%	8%
NC Large Cap Growth	~~1%~~	~~2%~~	~~3%~~	~~3%~~
NC Large Cap Core	2%	4%	6%	6%
NC Small / Mid Cap Value	~~2%~~	~~3%~~	~~5%~~	~~7%~~
NC Small / Mid Cap Index	0%	0%	0%	0%
NC Small / Mid Cap Growth	~~2%~~	~~3%~~	~~5%~~	~~7%~~
NC Small / Mid Cap Core	4%	6%	10%	14%
NC Global Equity	6%	10%	15%	23%
NC International	3%	5%	7%	11%
NC International Index	0%	0%	0%	0%
NC Fixed Income	16%	14%	12%	10%
NC Fixed Income Index	17%	14%	13%	10%
NC Stable Value	40%	35%	22%	10%
NC Inflation Sensitive	8%	8%	8%	8%

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INVESTMENT MANAGEMENT

Moderate

The objective of the Moderate Model Allocation is moderate growth of principal with limited downside risk over a market cycle.

Moderate	M01 0-5 Yrs	M02 6-10 Yrs	M03 11-15 Yrs	M04 16+ Yrs
NC Large Cap Value	~~2%~~	~~3%~~	~~4%~~	~~5%~~
NC Large Cap Index	5%	7%	7%	10%
NC Large Cap Growth	~~2%~~	~~3%~~	~~4%~~	~~5%~~
NC Large Cap Core	4%	6%	8%	10%
NC Small / Mid Cap Value	~~4%~~	~~5%~~	~~7%~~	~~10%~~
NC Small / Mid Cap Index	0%	0%	0%	0%
NC Small / Mid Cap Growth	~~4%~~	~~5%~~	~~7%~~	~~10%~~
NC Smann / Mid Cap Core	8%	10%	10%	20%
NC Global Equity	11%	15%	19%	25%
NC International	6%	7%	9%	12%
NC International Index	0%	0%	0%	0%
NC Fixed Income	13%	12%	10%	4%
NC Fixed Income Index	13%	13%	10%	5%
NC Stable Value	31%	21%	14%	5%
NC Inflation Sensitive	9%	9%	9%	9%

Aggressive

The primary investment objective of the Aggressive Model Allocation is to maximize growth of principal

Aggressive	A01 0-5 Yrs	A02 6-10 Yrs	A03 11-15 Yrs	A04 16+ Yrs
NC Large Cap Value	~~3%~~	~~4%~~	~~5%~~	~~6%~~
NC Large Cap Index	7%	7%	8%	11%
NC Large Cap Growth	~~3%~~	~~4%~~	~~5%~~	~~6%~~
NC Large Cap Core	6%	8%	10%	12%
NC Small / Mid Cap Value	~~6%~~	~~7%~~	~~9%~~	~~11%~~
NC Small / Mid Cap Index	0%	0%	0%	0%
NC Small / Mid Cap Growth	~~6%~~	~~7%~~	~~9%~~	~~11%~~
NC Small / Mid Cap Core	12%	14%	18%	22%
NC Global Equity	16%	19%	24%	30%
NC International	8%	9%	12%	15%
NC International Index	0%	0%	0%	0%
NC Fixed Income	12%	10%	5%	0%
NC Fixed Income Index	12%	10%	6%	0%
NC Stable Value	17%	13%	7%	0%
NC Inflation Sensitive	10%	10%	10%	10%

over the long term with a reasonable level of overall volatility.

Appendix B: Prudential's new GoalMaker® Model (3x9)

Conservative

	Pre-Retirement						Post-Retirement		
Years to Retirement	**25+**	**20-25**	**16-20**	**10-15**	**5-10**	**0-5**	**0-5**	**5-10**	**10+**
US Large	28%	24%	21%	17%	14%	13%	11%	11%	10%
SMID Growth	9%	8%	7%	6%	5%	4%	3%	2%	2%
SMID Value	9%	8%	7%	6%	5%	4%	3%	2%	2%
International Stocks	19%	17%	14%	11%	9%	6%	5%	4%	4%
Emerging	8%	7%	5%	4%	3%	2%	2%	1%	0%
Bonds	11%	15%	17%	20%	23%	26%	27%	28%	28%
SV	11%	17%	25%	32%	37%	42%	46%	49%	51%
Real Assets	5%	4%	4%	4%	4%	3%	3%	3%	3%
Equity	73%	64%	54%	44%	36%	29%	24%	20%	18%
Bonds	22%	32%	42%	52%	60%	68%	73%	77%	79%
Alternatives	5%	4%	4%	4%	4%	3%	3%	3%	3%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Moderate

	Pre-Retirement						Post-Retirement		
Years to Retirement	**25+**	**20-25**	**16-20**	**10-15**	**5-10**	**0-5**	**0-5**	**5-10**	**10+**
US Large	33%	31%	28%	24%	22%	17%	16%	16%	14%
SMID Growth	11%	10%	9%	8%	7%	6%	5%	4%	3%
SMID Value	11%	10%	9%	8%	7%	6%	5%	4%	3%
International Stocks	22%	21%	19%	17%	13%	11%	10%	7%	7%
Emerging	9%	8%	7%	6%	5%	4%	3%	3%	2%
Bonds	4%	7%	11%	15%	19%	23%	25%	26%	27%
SV	3%	7%	11%	17%	22%	28%	32%	36%	40%
Real Assets	7%	6%	6%	5%	5%	5%	4%	4%	4%
Equity	86%	80%	72%	63%	54%	44%	39%	34%	29%
Bonds	7%	14%	22%	32%	41%	51%	57%	62%	67%
Alternatives	7%	6%	6%	5%	5%	5%	4%	4%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**25+**	**20-25**	**16-20**	**10-15**	**5-10**	**0-5**	**0-5**	**5-10**	**10+**
US Large	31%	32%	31%	29%	28%	25%	22%	22%	20%
SMID Growth	12%	12%	11%	10%	9%	8%	7%	6%	5%
SMID Value	12%	12%	11%	10%	9%	8%	7%	6%	5%
International Stocks	25%	24%	23%	22%	19%	15%	13%	12%	11%
Emerging	10%	10%	9%	8%	6%	5%	4%	3%	2%
Bonds	2%	2%	5%	8%	12%	17%	20%	21%	23%
SV	1%	1%	3%	6%	11%	16%	22%	25%	29%
Real Assets	7%	7%	7%	7%	6%	6%	5%	5%	5%
Equity	90%	90%	85%	79%	71%	61%	53%	49%	43%
Bonds	3%	3%	8%	14%	23%	33%	42%	46%	52%
Alternatives	7%	7%	7%	7%	6%	6%	5%	5%	5%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Appendix C: Morningstar Lifetime Allocation Indexes

Conservative

Target Retirement Year:	2060	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	Income
Stocks %	**82.92**	**82.37**	**80.54**	**76.50**	**67.82**	**56.59**	**45.96**	**38.00**	**32.19**	**27.42**	**23.67**	**21.37**	**20.61**	**20.61**
U.S. %	48.52	49.17	49.04	47.52	43.00	36.64	30.39	25.64	22.15	19.23	16.91	15.53	15.12	15.12
Non-U.S. %	34.41	33.20	31.50	28.98	24.82	19.95	15.57	12.36	10.04	8.19	6.76	5.84	5.49	5.49
Morningstar Large Value	8.58	8.84	8.95	8.80	8.05	6.92	5.78	4.91	4.27	3.74	3.31	3.08	3.02	3.02
Morningstar Large Core	8.33	8.58	8.69	8.54	7.81	6.72	5.61	4.76	4.15	3.63	3.22	2.99	2.94	2.94
Morningstar Large Growth	8.33	8.58	8.69	8.54	7.81	6.72	5.61	4.76	4.15	3.63	3.22	2.99	2.94	2.94
Morningstar Mid Value	3.68	3.79	3.84	3.77	3.45	2.97	2.48	2.10	1.83	1.60	1.42	1.32	1.30	1.30
Morningstar Mid Core	3.57	3.68	3.72	3.66	3.35	2.88	2.40	2.04	1.78	1.56	1.38	1.28	1.26	1.26
Morningstar Mid Growth	3.57	3.68	3.72	3.66	3.35	2.88	2.40	2.04	1.78	1.56	1.38	1.28	1.26	1.26
Morningstar Small Value	3.57	3.45	3.28	3.01	2.56	2.05	1.58	1.24	0.99	0.79	0.63	0.52	0.48	0.48
Morningstar Small Core	3.47	3.35	3.18	2.92	2.49	1.99	1.53	1.20	0.96	0.76	0.61	0.51	0.47	0.47
Morningstar Small Growth	3.47	3.35	3.18	2.92	2.49	1.99	1.53	1.20	0.96	0.76	0.61	0.51	0.47	0.47
Morningstar US REIT	1.97	1.88	1.80	1.72	1.63	1.55	1.47	1.38	1.30	1.22	1.13	1.05	1.00	1.00
Morningstar Dev Mkts ex-US	23.53	23.04	22.17	20.89	17.97	14.64	11.59	9.32	7.67	6.34	5.30	4.64	4.39	4.39
Morningstar Emerging Mkts	10.87	10.16	9.32	8.29	6.85	5.31	3.99	3.04	2.37	1.85	1.46	1.20	1.10	1.10
Bonds %	**15.08**	**15.63**	**17.46**	**21.08**	**28.09**	**36.45**	**43.14**	**46.60**	**47.63**	**47.27**	**45.71**	**42.87**	**40.68**	**40.68**
U.S. %	12.71	13.30	14.98	18.19	24.26	31.50	37.31	40.33	41.24	40.96	39.62	37.16	35.27	35.27
Non-U.S. %	2.37	2.34	2.48	2.89	3.83	4.95	5.83	6.27	6.38	6.32	6.09	5.71	5.42	5.42
Morningstar Long-Term Core	10.04	10.13	10.35	11.53	14.46	17.43	18.81	18.06	15.76	12.49	8.42	3.73	0.72	0.72
Morningstar Intermediate Core	2.67	3.17	4.63	6.53	9.18	12.62	15.88	18.33	20.13	21.61	22.78	23.51	23.75	23.75
Morningstar Short-Term Core	0.00	0.00	0.00	0.12	0.61	1.46	2.62	3.94	5.35	6.85	8.42	9.93	10.80	10.80
Morningstar Gbl Ex US Govt Bond	2.37	2.34	2.48	2.89	3.83	4.95	5.83	6.27	6.38	6.32	6.09	5.71	5.42	5.42
Inflation Hedge %	**2.00**	**2.00**	**2.00**	**2.35**	**3.72**	**6.08**	**9.33**	**13.03**	**16.98**	**21.19**	**25.56**	**29.80**	**32.23**	**32.23**
Commodities	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Morningstar Long-Term TIPS	0.00	0.00	0.00	0.35	1.72	4.08	7.33	10.01	11.29	11.52	10.51	8.13	6.05	6.05
Morningstar Short-Term TIPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	3.69	7.68	13.05	19.67	24.18	24.18
Cash %	**0.00**	**0.00**	**0.00**	**0.07**	**0.37**	**0.88**	**1.57**	**2.36**	**3.21**	**4.11**	**5.05**	**5.96**	**6.48**	**6.48**
Total %	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Moderate

Target Retirement Year:	2060	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	Income
Stocks %	**90.03**	**90.06**	**89.75**	**88.95**	**85.47**	**78.05**	**67.59**	**57.00**	**48.69**	**42.75**	**38.23**	**35.05**	**33.56**	**33.56**
U.S. %	52.19	53.33	54.28	54.92	53.88	50.27	44.49	38.36	33.48	29.99	27.35	25.55	24.73	24.73
Non-U.S. %	37.84	36.73	35.48	34.03	31.59	27.79	23.10	18.64	15.22	12.75	10.88	9.50	8.84	8.84
Morningstar Large Value	9.07	9.43	9.75	10.02	9.97	9.41	8.40	7.28	6.39	5.76	5.30	5.00	4.87	4.87
Morningstar Large Core	8.80	9.15	9.47	9.73	9.68	9.13	8.15	7.06	6.20	5.59	5.14	4.85	4.72	4.72
Morningstar Large Growth	8.80	9.15	9.47	9.73	9.68	9.13	8.15	7.06	6.20	5.59	5.14	4.85	4.72	4.72
Morningstar Mid Value	3.89	4.04	4.18	4.30	4.27	4.03	3.60	3.12	2.74	2.47	2.27	2.14	2.09	2.09
Morningstar Mid Core	3.77	3.92	4.06	4.17	4.15	3.91	3.49	3.03	2.66	2.40	2.20	2.08	2.02	2.02
Morningstar Mid Growth	3.77	3.92	4.06	4.17	4.15	3.91	3.49	3.03	2.66	2.40	2.20	2.08	2.02	2.02
Morningstar Small Value	3.78	3.68	3.57	3.43	3.18	2.78	2.30	1.83	1.47	1.21	1.01	0.85	0.77	0.77
Morningstar Small Core	3.67	3.58	3.47	3.33	3.08	2.70	2.23	1.78	1.43	1.17	0.98	0.83	0.75	0.75
Morningstar Small Growth	3.67	3.58	3.47	3.33	3.08	2.70	2.23	1.78	1.43	1.17	0.98	0.83	0.75	0.75
Morningstar US REIT	2.97	2.88	2.80	2.72	2.63	2.55	2.47	2.38	2.30	2.22	2.13	2.05	2.00	2.00
Morningstar Dev Mkts ex-US	25.89	25.49	24.98	24.30	22.87	20.39	17.18	14.06	11.63	9.87	8.53	7.55	7.07	7.07
Morningstar Emerging Mkts	11.96	11.24	10.50	9.73	8.72	7.39	5.91	4.59	3.59	2.88	2.35	1.96	1.77	1.77
Bonds %	**7.00**	**7.06**	**7.45**	**8.17**	**11.07**	**17.07**	**24.82**	**31.55**	**35.47**	**36.86**	**36.68**	**35.19**	**33.87**	**33.87**
U.S. %	5.90	6.00	6.39	7.05	9.56	14.76	21.46	27.31	30.71	31.94	31.79	30.50	29.36	29.36
Non-U.S. %	1.10	1.06	1.06	1.12	1.51	2.32	3.35	4.24	4.76	4.93	4.89	4.69	4.51	4.51
Morningstar Long-Term Core	4.66	4.57	4.41	4.47	5.70	8.16	10.82	12.23	11.74	9.74	6.76	3.06	0.60	0.60
Morningstar Intermediate Core	1.24	1.43	1.98	2.53	3.62	5.91	9.13	12.41	14.99	16.85	18.28	19.30	19.78	19.78
Morningstar Short-Term Core	0.00	0.00	0.00	0.05	0.24	0.68	1.51	2.67	3.98	5.36	6.75	8.15	8.99	8.99
Morningstar Gbl Ex US Govt Bond	1.10	1.06	1.06	1.12	1.51	2.32	3.35	4.24	4.76	4.93	4.89	4.69	4.51	4.51
Inflation Hedge %	**2.97**	**2.88**	**2.80**	**2.85**	**3.31**	**4.46**	**6.69**	**9.85**	**13.45**	**17.18**	**21.04**	**24.87**	**27.17**	**27.17**
Commodities	2.97	2.88	2.80	2.72	2.63	2.55	2.47	2.38	2.30	2.22	2.13	2.05	2.00	2.00
Morningstar Long-Term TIPS	0.00	0.00	0.00	0.13	0.68	1.91	4.22	6.78	8.41	8.98	8.44	6.67	5.03	5.03
Morningstar Short-Term TIPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	2.75	5.98	10.47	16.15	20.13	20.13
Cash %	**0.00**	**0.00**	**0.00**	**0.03**	**0.15**	**0.41**	**0.90**	**1.60**	**2.39**	**3.21**	**4.05**	**4.89**	**5.39**	**5.39**
Total %	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Aggressive

Target Retirement Year:	2060	2055	2050	2045	2040	2035	2030	2025	2020	2015	2010	2005	2000	Income
Stocks %	**94.03**	**94.12**	**94.20**	**94.19**	**93.67**	**90.85**	**84.35**	**75.07**	**65.04**	**57.90**	**52.04**	**47.59**	**45.20**	**45.20**
U.S. %	53.57	54.87	56.18	57.43	58.38	57.87	54.93	49.98	44.67	40.26	36.93	34.45	33.10	33.10
Non-U.S. %	40.46	39.25	38.02	36.76	35.29	32.98	29.42	25.09	20.96	17.64	15.10	13.14	12.10	12.10
Morningstar Large Value	9.33	9.71	10.11	10.51	10.85	10.91	10.48	9.63	8.68	7.89	7.31	6.89	6.66	6.66
Morningstar Large Core	9.05	9.43	9.81	10.20	10.53	10.59	10.17	9.35	8.43	7.66	7.10	6.69	6.47	6.47
Morningstar Large Growth	9.05	9.43	9.81	10.20	10.53	10.59	10.17	9.35	8.43	7.66	7.10	6.69	6.47	6.47
Morningstar Mid Value	4.00	4.16	4.33	4.50	4.65	4.67	4.49	4.13	3.72	3.38	3.13	2.95	2.86	2.86
Morningstar Mid Core	3.88	4.04	4.21	4.37	4.51	4.54	4.36	4.01	3.61	3.28	3.04	2.87	2.77	2.77
Morningstar Mid Growth	3.88	4.04	4.21	4.37	4.51	4.54	4.36	4.01	3.61	3.28	3.04	2.87	2.77	2.77
Morningstar Small Value	3.88	3.80	3.70	3.59	3.48	3.23	2.87	2.42	2.00	1.66	1.39	1.17	1.06	1.06
Morningstar Small Core	3.77	3.69	3.59	3.49	3.35	3.13	2.78	2.35	1.94	1.61	1.35	1.14	1.03	1.03
Morningstar Small Growth	3.77	3.69	3.59	3.49	3.35	3.13	2.78	2.35	1.94	1.61	1.35	1.14	1.03	1.03
Morningstar US REIT	2.97	2.88	2.80	2.72	2.63	2.55	2.47	2.38	2.30	2.22	2.13	2.05	2.00	2.00
Morningstar Dev Mkts ex-US	27.68	27.24	26.77	26.24	25.55	24.21	21.09	18.92	16.02	13.66	11.84	10.43	9.68	9.68
Morningstar Emerging Mkts	12.79	12.01	11.25	10.51	9.74	8.77	7.53	6.17	4.95	3.99	3.26	2.71	2.42	2.42
Bonds %	**3.00**	**3.00**	**3.00**	**3.03**	**3.44**	**5.81**	**10.92**	**17.51**	**23.20**	**26.71**	**28.19**	**28.18**	**27.76**	**27.76**
U.S. %	2.53	2.55	2.58	2.62	2.97	5.02	9.45	15.16	20.09	23.14	24.43	24.42	24.06	24.06
Non-U.S. %	0.47	0.45	0.43	0.42	0.47	0.79	1.48	2.36	3.11	3.57	3.76	3.75	3.70	3.70
Morningstar Long-Term Core	2.02	1.97	1.80	1.68	1.79	2.81	4.82	6.87	7.78	7.14	5.26	2.47	0.49	0.49
Morningstar Intermediate Core	0.51	0.58	0.77	0.92	1.10	1.98	3.96	6.80	9.71	12.13	13.99	15.42	16.20	16.20
Morningstar Short-Term Core	0.00	0.00	0.00	0.02	0.08	0.23	0.66	1.48	2.61	3.87	5.19	6.53	7.37	7.37
Morningstar Gbl Ex US Govt Bond	0.47	0.45	0.43	0.42	0.47	0.79	1.48	2.36	3.11	3.57	3.76	3.75	3.70	3.70
Inflation Hedge %	**2.97**	**2.88**	**2.80**	**2.77**	**2.84**	**3.20**	**4.32**	**6.53**	**9.60**	**13.06**	**16.66**	**20.32**	**22.62**	**22.62**
Commodities	2.97	2.88	2.80	2.72	2.63	2.55	2.47	2.38	2.30	2.22	2.13	2.05	2.00	2.00
Morningstar Long-Term TIPS	0.00	0.00	0.00	0.05	0.21	0.65	1.86	3.76	6.60	8.61	8.48	6.34	4.12	4.12
Morningstar Short-Term TIPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	1.80	4.34	8.05	12.93	16.50	16.50
Cash %	**0.00**	**0.00**	**0.00**	**0.01**	**0.05**	**0.14**	**0.40**	**0.89**	**1.56**	**2.32**	**3.11**	**3.92**	**4.42**	**4.42**
Total %	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

HEALTH WEALTH CAREER

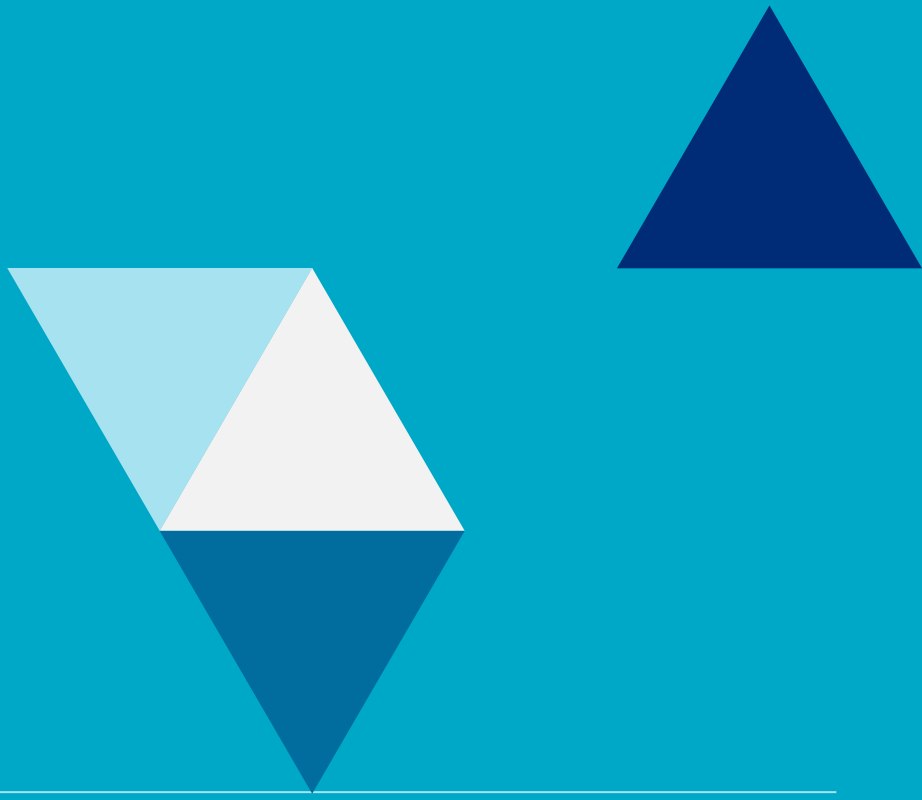
NORTH CAROLINA SUPPLEMENTAL RETIREMENT PLANS

GOAL MAKER GLIDEPATH DISCUSSION

AUGUST 16, 2017

Liana Magner, CFA
Kelly Henson
Will Dillard, CFA

STARTING POINT



CURRENT GOAL MAKER ALLOCATIONS

Investment Options	C01 0-5yrs	C02 6-10yrs	C03 11-15yrs	C04 16+yrs	M01 0-5yrs	M02 6-10yrs	M03 11-15yrs	M04 16+yrs	R01 0-5yrs	R02 6-10yrs	R03 11-15yrs	R04 16+yrs
NC Stable Value	40%	35%	22%	10%	31%	21%	14%	5%	17%	13%	7%	0%
NC Fixed Income Index	17%	14%	13%	10%	13%	13%	10%	5%	12%	10%	6%	0%
NC Fixed Income	16%	14%	12%	10%	13%	12%	10%	4%	12%	10%	5%	0%
NC Inflation Responsive	8%	8%	8%	8%	9%	9%	9%	9%	10%	10%	10%	10%
NC Large-Cap Value	1%	2%	3%	3%	2%	3%	4%	5%	3%	4%	5%	6%
NC Large-Cap Index	4%	4%	7%	8%	5%	7%	7%	10%	7%	7%	8%	11%
NC Large-Cap Growth	1%	2%	3%	3%	2%	3%	4%	5%	3%	4%	5%	6%
NC Small Mid-Cap Value	2%	3%	5%	7%	4%	5%	7%	10%	6%	7%	9%	11%
NC Small Mid-Cap Growth	2%	3%	5%	7%	4%	5%	7%	10%	6%	7%	9%	11%
NC Global Equity Fund	6%	10%	15%	23%	11%	15%	19%	25%	16%	19%	24%	30%
NC International	3%	5%	7%	11%	6%	7%	9%	12%	8%	9%	12%	15%

INCREASING NUMBER OF PORTFOLIOS

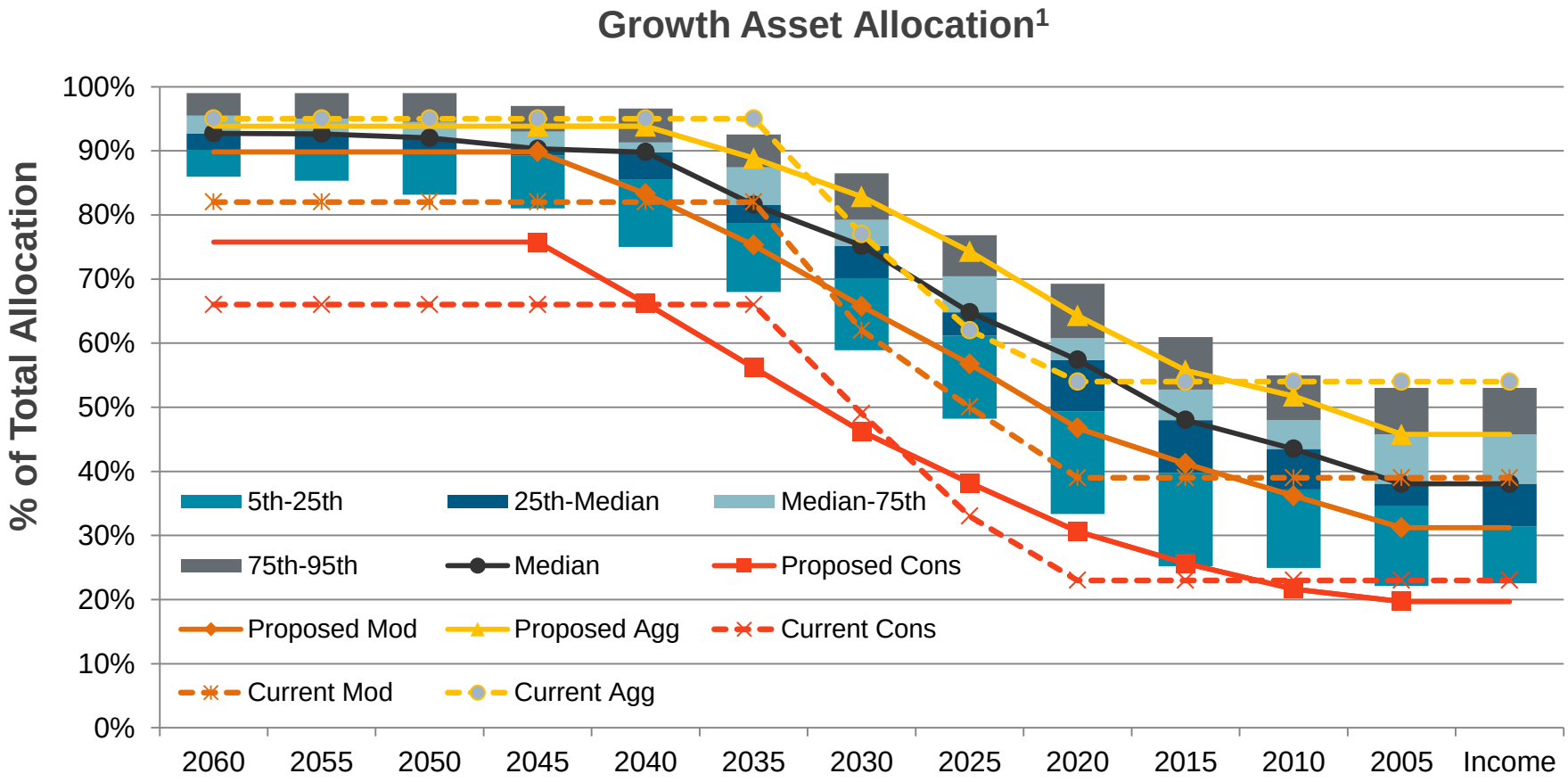
PRUDENTIAL'S PROPOSED GOAL MAKER 3X9 MODEL

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	31%	32%	31%	29%	28%	25%	22%	22%	20%
SMID Growth	12%	12%	11%	10%	9%	8%	7%	6%	5%
SMID Value	12%	12%	11%	10%	9%	8%	7%	6%	5%
International Stocks	25%	24%	23%	22%	19%	15%	13%	12%	11%
Emerging	10%	10%	9%	8%	6%	5%	4%	3%	2%
Bonds	2%	2%	5%	8%	12%	17%	20%	21%	23%
SV	1%	1%	3%	6%	11%	16%	22%	25%	29%
Real Assets	7%	7%	7%	7%	6%	6%	5%	5%	5%

Moderate	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	33%	31%	28%	24%	22%	17%	16%	16%	14%
SMID Growth	11%	10%	9%	8%	7%	6%	5%	4%	3%
SMID Value	11%	10%	9%	8%	7%	6%	5%	4%	3%
International Stocks	22%	21%	19%	17%	13%	11%	10%	7%	7%
Emerging	9%	8%	7%	6%	5%	4%	3%	3%	2%
Bonds	4%	7%	11%	15%	19%	23%	25%	26%	27%
SV	3%	7%	11%	17%	22%	28%	32%	36%	40%
Real Assets	7%	6%	6%	5%	5%	5%	4%	4%	4%

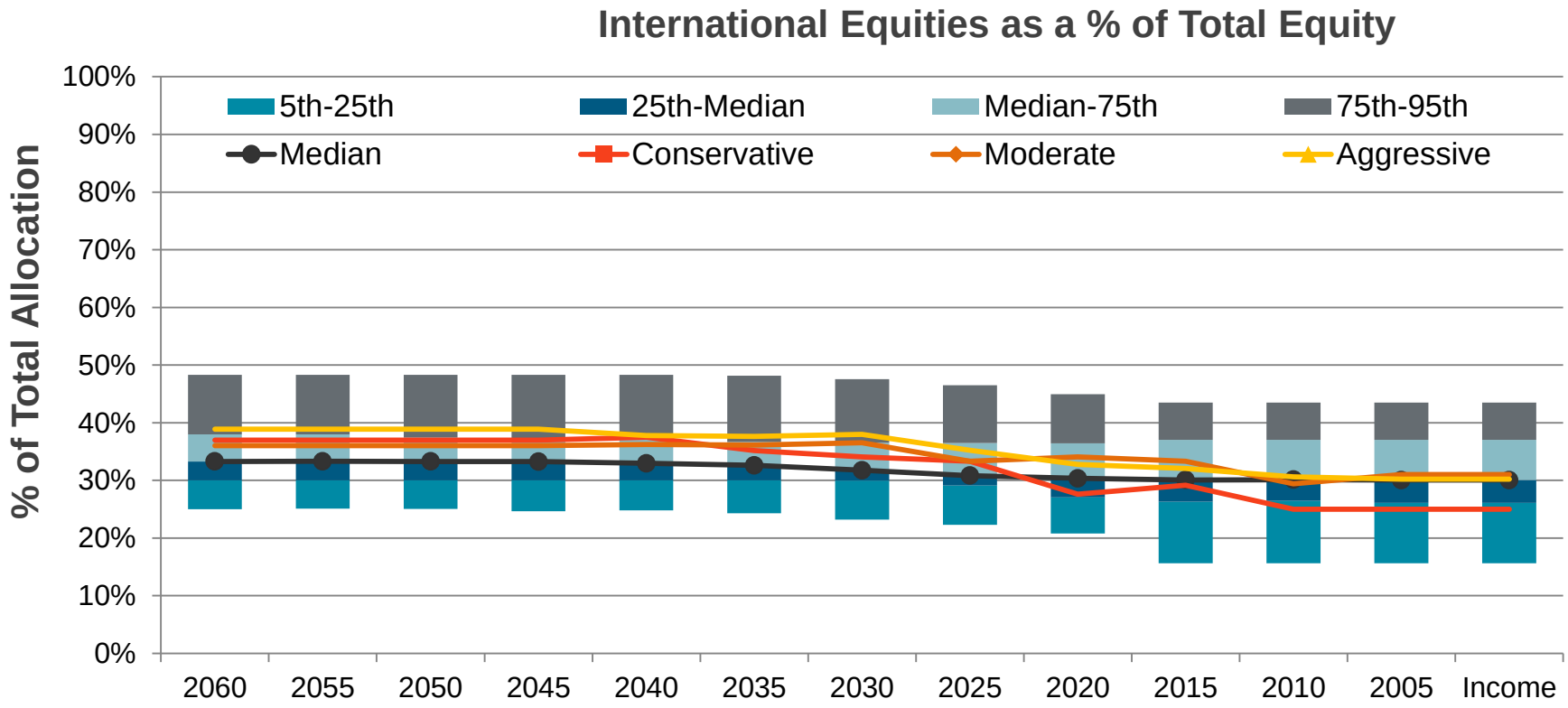
Conservative	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	28%	24%	21%	17%	14%	13%	11%	11%	10%
SMID Growth	9%	8%	7%	6%	5%	4%	3%	2%	2%
SMID Value	9%	8%	7%	6%	5%	4%	3%	2%	2%
International Stocks	19%	17%	14%	11%	9%	6%	5%	4%	4%
Emerging	8%	7%	5%	4%	3%	2%	2%	1%	0%
Bonds	11%	15%	17%	20%	23%	26%	27%	28%	28%
SV	11%	17%	25%	32%	37%	42%	46%	49%	51%
Real Assets	5%	4%	4%	4%	4%	3%	3%	3%	3%

PRUDENTIAL'S PROPOSED GOAL MAKER GLIDEPATH VS. PEER GROUP UNIVERSE



Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)
[1] Assumes 55% of PIMCO IRMAF Fund is growth oriented (strategic targets)

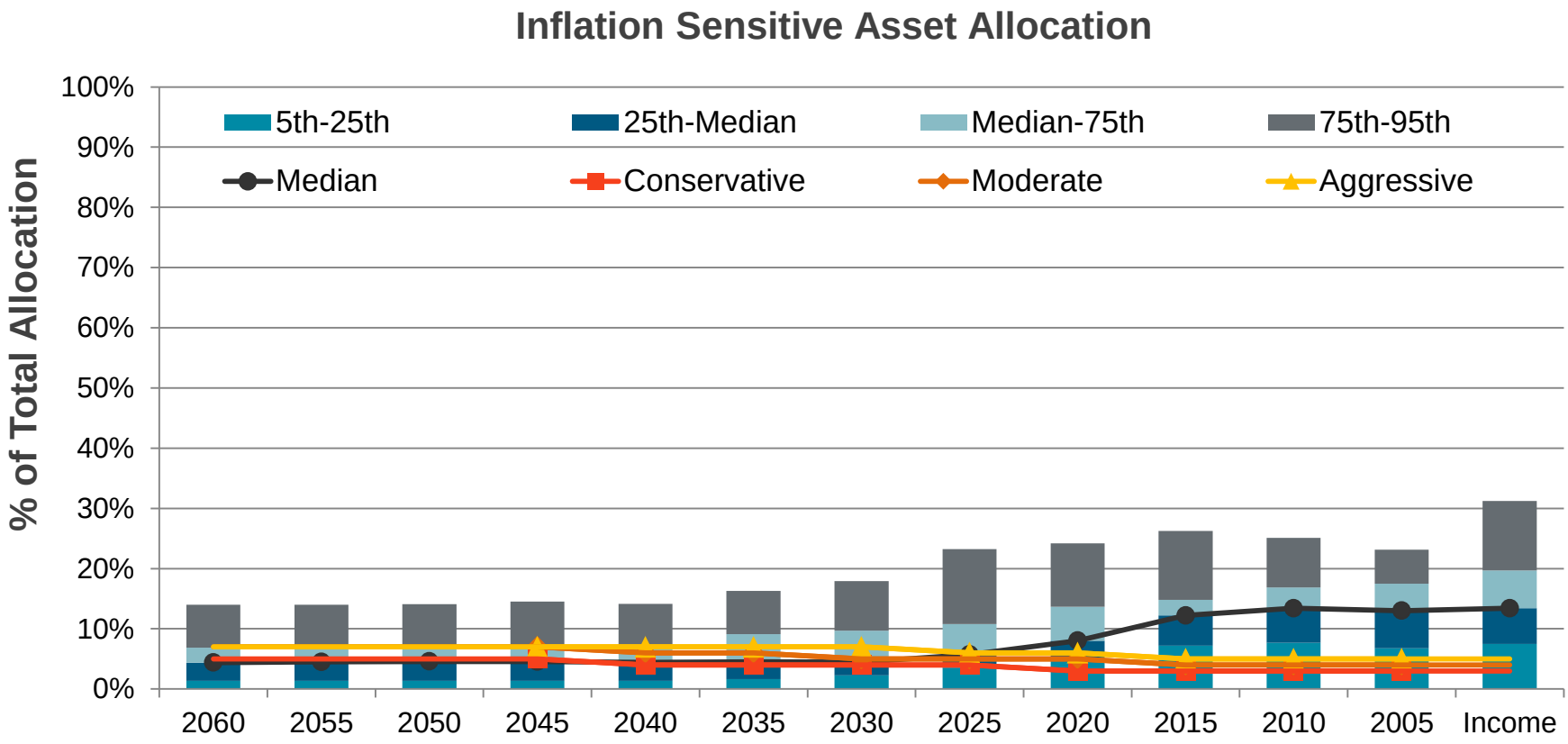
PRUDENTIAL'S PROPOSED GOAL MAKER GLIDEPATH VS. PEER GROUP UNIVERSE



- The domestic/international equity split slightly varies depending on the risk tolerance and age band but is generally in line with the peer group median

Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)

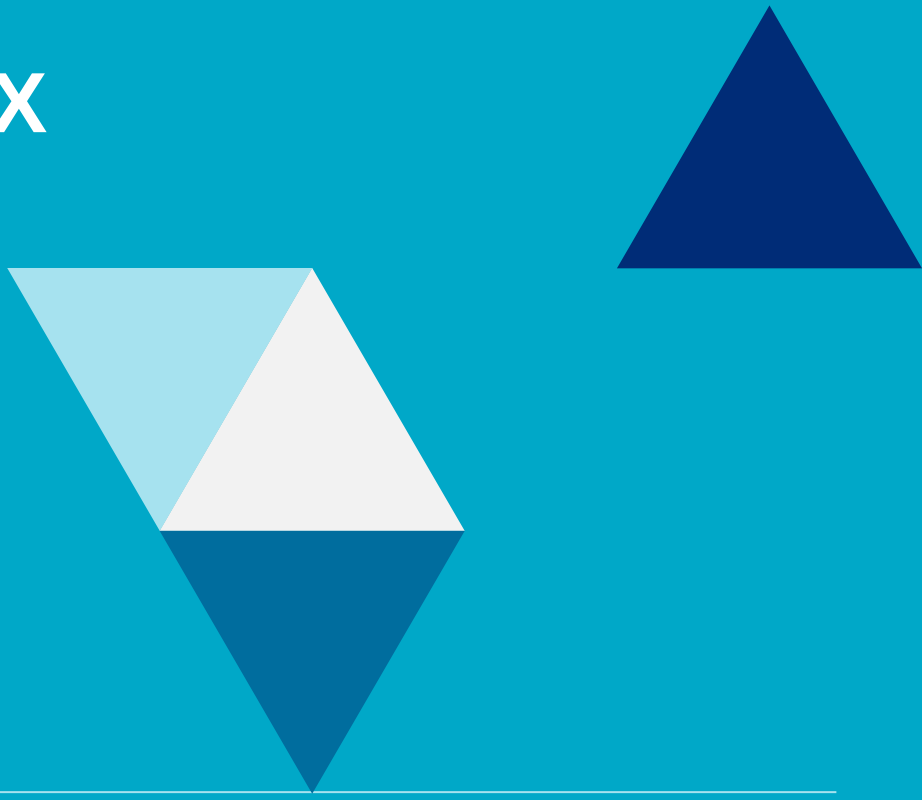
PRUDENTIAL'S PROPOSED GOAL MAKER GLIDEPATH VS. PEER GROUP UNIVERSE



- The proposed real asset allocation is in line with the peer group universe in the longer dated funds but is largely underweight as participants near retirement

Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)

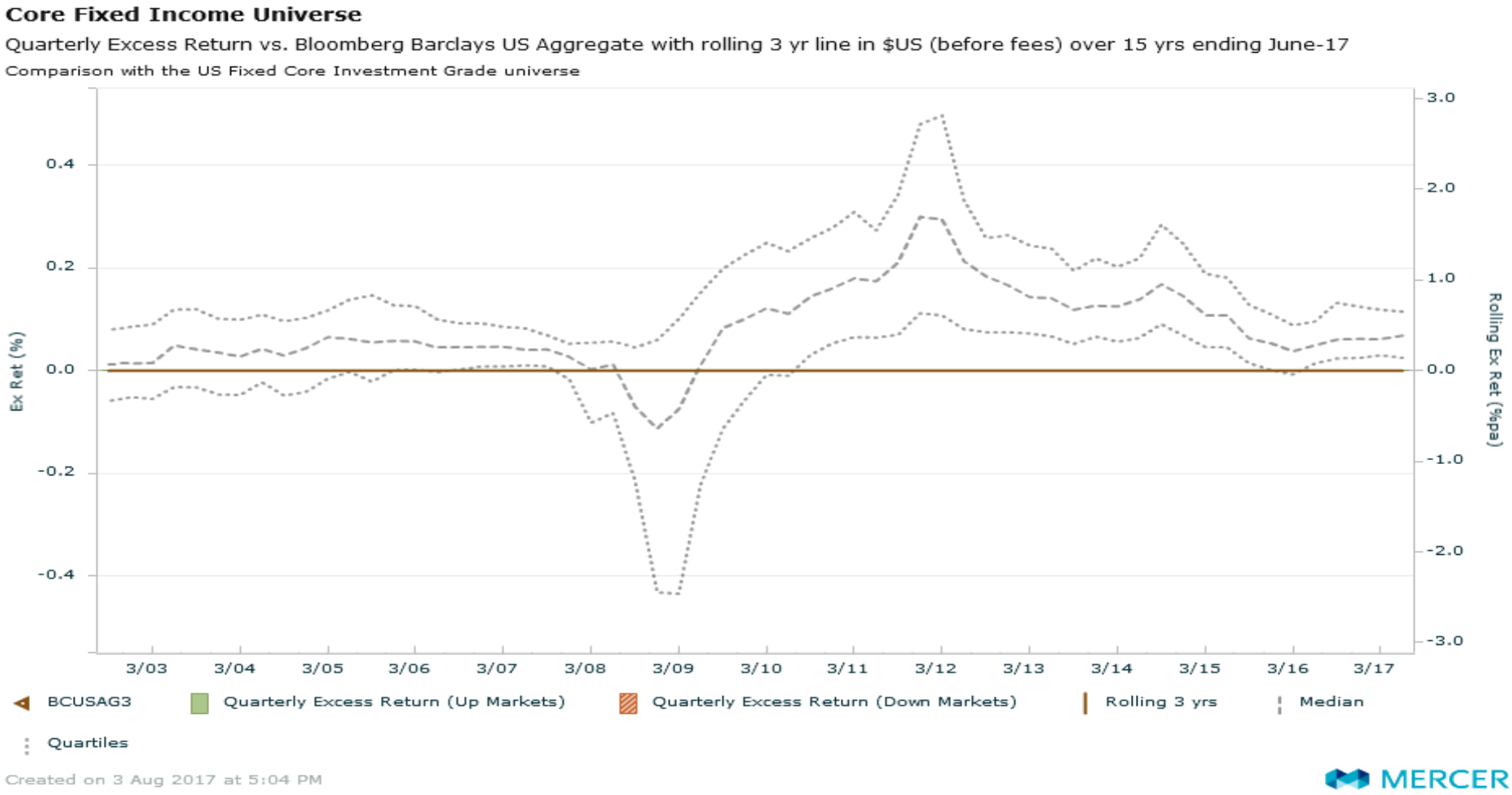
ACTIVE/PASSIVE MIX



GOAL MAKER ACTIVE/PASSIVE MIX

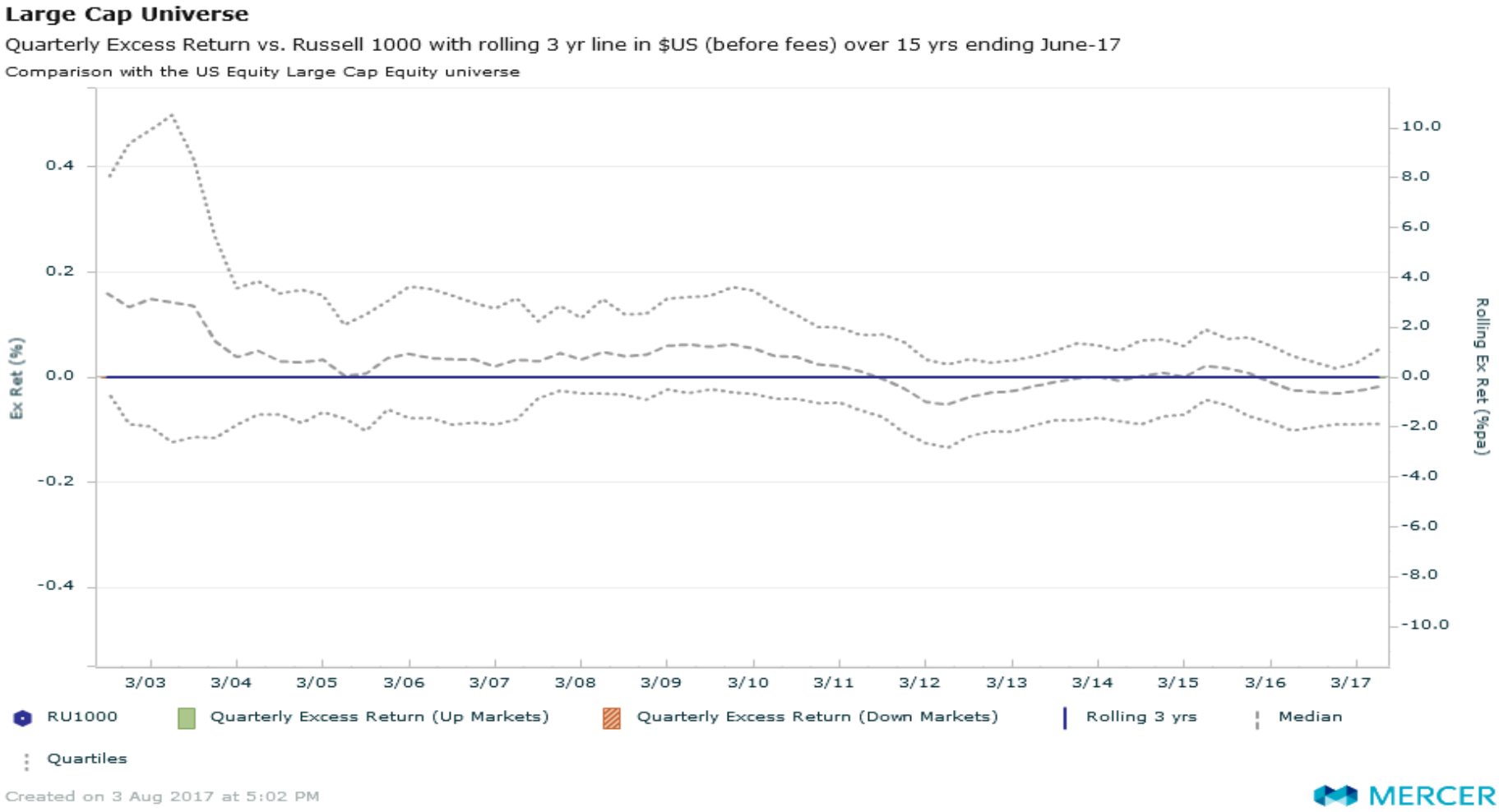
Asset Class	Current	Proposed	Comments
US Large Cap Equity	50/50 Active/Passive	100% Passive	• Lower alpha potential due to market efficiency (higher analyst coverage and institutional ownership) • Lower success rate of median manager net of fees
US SMID Cap Equity	100% Active	100% Active	• Strong alpha opportunities exist • Implemented in 2012
International Equity	100% Active	100% Active	• Good alpha opportunities • Implemented in 2012
Core Fixed Income	50/50 Active/Passive	100% Active	• Good alpha opportunities • Strong results for median active manager relative to the Index • Credit markets offer active management potential for skilled investors able to anticipate downgrades, defaults or manage rating misclassifications

GOAL MAKER ACTIVE/PASSIVE MIX



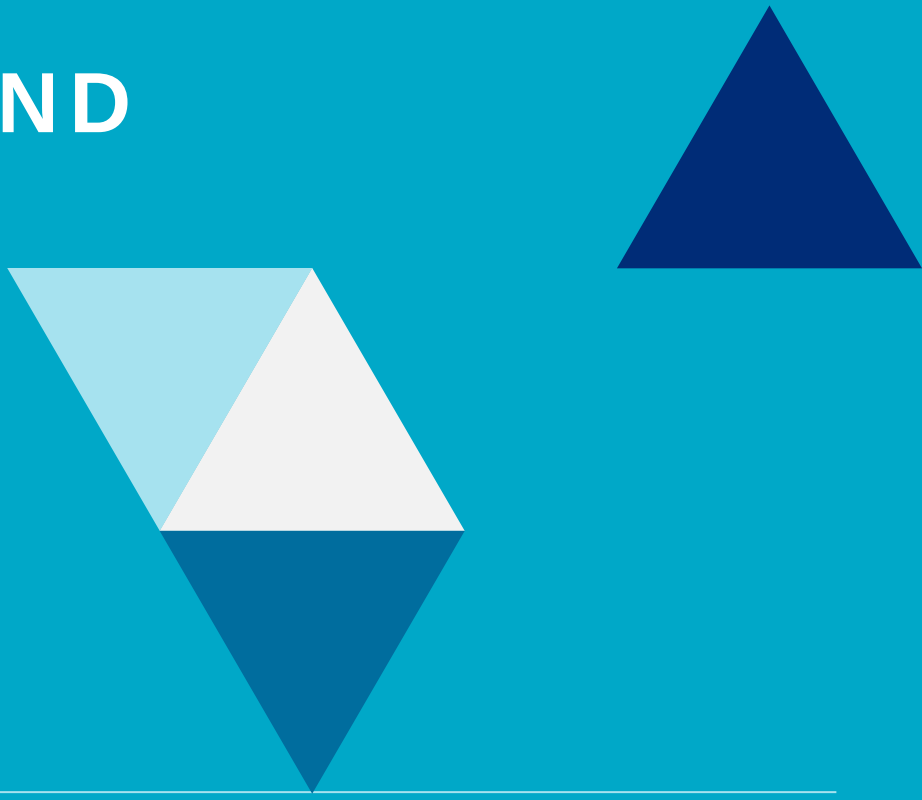
- Median manager has historically outperformed the Bloomberg Barclays U.S. Aggregate Index (gross of fees) based on rolling three-year performance

GOAL MAKER ACTIVE/PASSIVE MIX

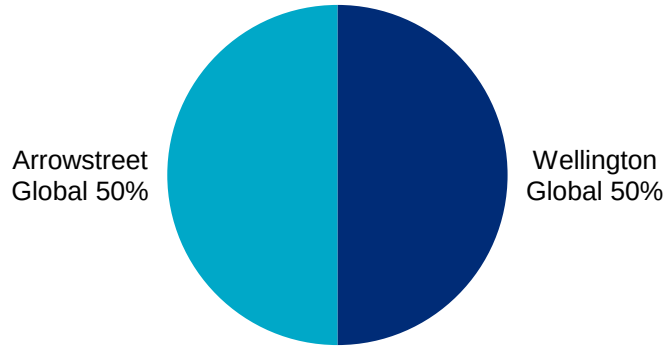


- Median manager outperformed the Russell 1000 Index (gross of fees) prior to 2011 based on rolling three-year periods but performance has been challenged more recently

GLOBAL EQUITY FUND

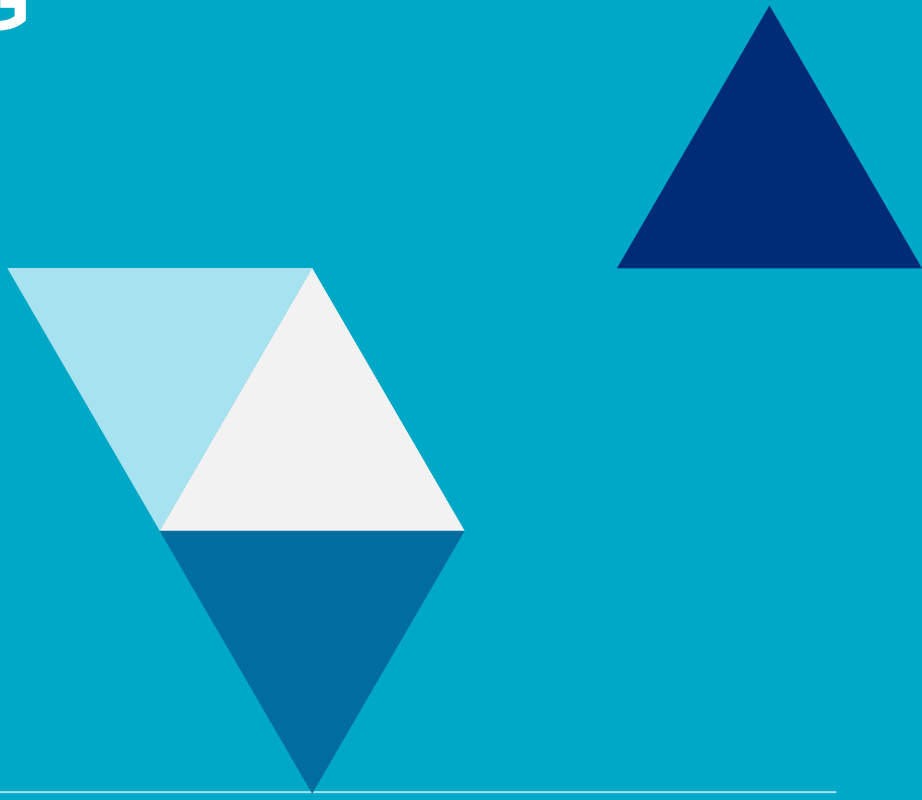


NORTH CAROLINA GLOBAL EQUITY FUND



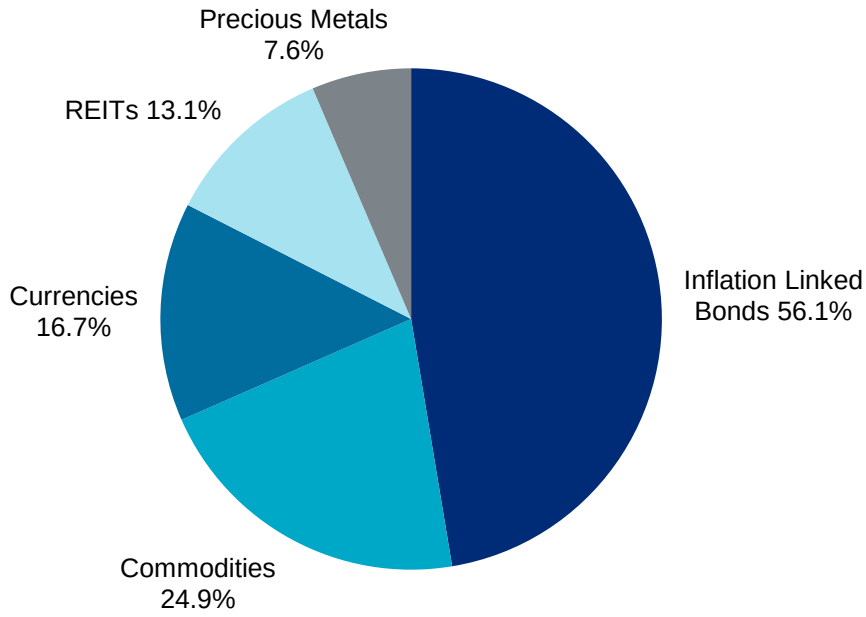
- Currently, the Goal Maker Program utilizes the Global Equity Fund throughout the glidepath
- In order to better manage the US/Non US equity split, we recommend eliminating the Global Equity Fund from the Goal Maker program and allocating those assets between US and non-US allocations
- Roughly 94% of the assets within the Global Equity Fund are from the Goal Maker glidepath allocation (Approximately $60M of the $910M in Fund assets were self directed)
- If GM assets were removed from Global Equity Fund, the Fund's investment management expenses would increase 10 basis points to 0.675%
- Consider eliminating the Global Equity Fund from the NC core line up

INFLATION HEDGING ASSETS

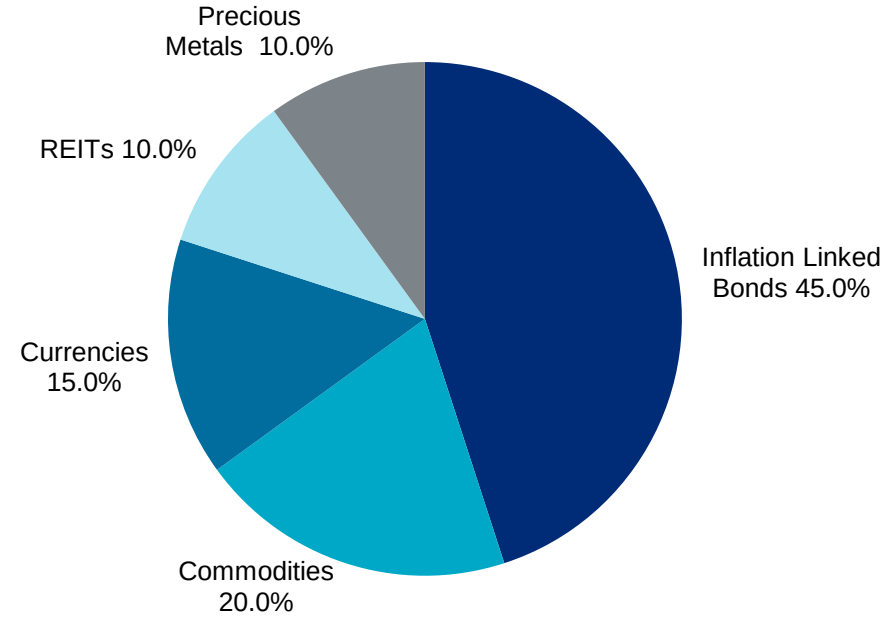


PIMCO IRMAF FUND(3/31/17)

3/31/17 Allocation

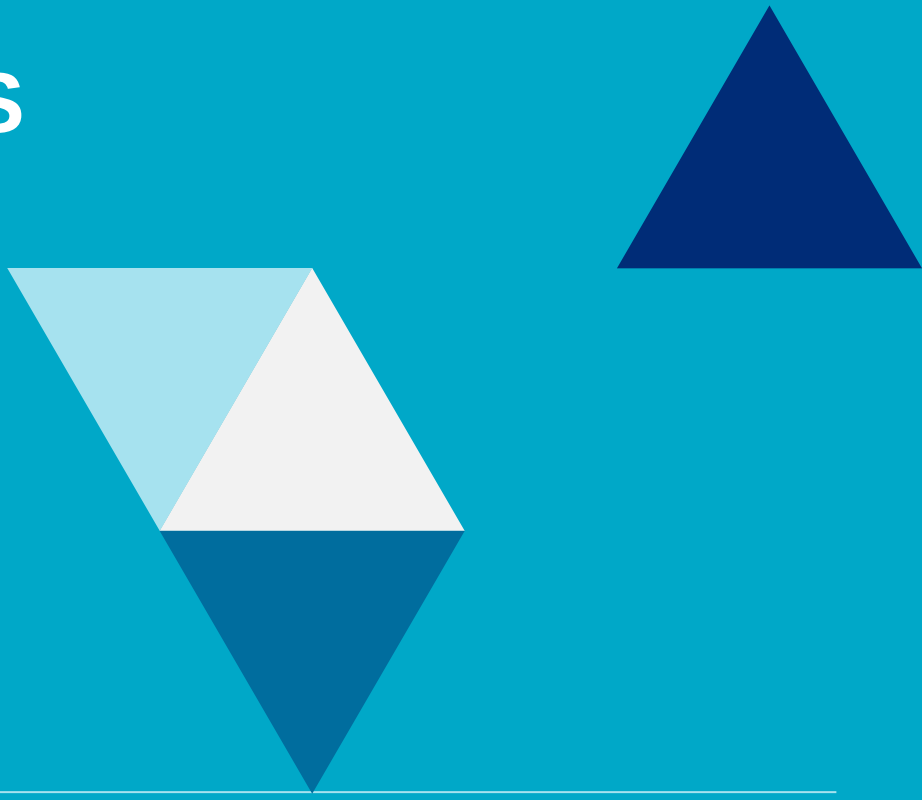


PIMCO IRMAF Target Allocation



- NC offers the PIMCO IRMAF Fund which has varying allocations to ILBs, commodities and REITs
- The Fund has strategic targets to underlying asset classes but this can change based on market opportunities
- In order to better manage the inflation risks for participants nearing or in retirement, we recommend the addition of a dedicated TIPs portfolio

GLIDEPATH RECOMMENDATIONS



MERCER RECOMMENDED CHANGES TO PROPOSED 3X9

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	3.0%	2.0%	1.0%	1.0%	0.0%	2.0%	3.0%	2.0%	1.0%
SMID Growth	-5.0%	-5.0%	-4.0%	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-2.0%
SMID Value	-5.0%	-5.0%	-4.0%	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-2.0%
International Stocks	-1.0%	0.0%	0.0%	-1.0%	1.0%	4.0%	4.0%	2.0%	3.0%
Emerging	6.0%	6.0%	6.0%	7.0%	6.0%	0.0%	0.0%	3.0%	1.0%
Bonds	0.0%	0.0%	2.0%	5.0%	9.0%	10.0%	6.0%	-2.0%	-4.0%
SV	-1.0%	-1.0%	-3.0%	-6.0%	-10.0%	-13.0%	-14.0%	-11.0%	-12.0%
Real Assets	3.0%	3.0%	2.0%	2.0%	1.0%	0.0%	-1.0%	-2.0%	-2.0%
TIPs	0.0%	0.0%	0.0%	0.0%	1.0%	3.0%	8.0%	14.0%	17.0%

5%-9% increase/decrease in allocation

Moderate	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	0.0%	-1.0%	-1.0%	0.0%	-1.0%	2.0%	2.0%	0.0%	0.0%
SMID Growth	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%
SMID Value	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%
International Stocks	1.0%	0.0%	0.0%	0.0%	1.0%	0.0%	2.0%	2.0%	1.0%
Emerging	6.0%	7.0%	6.0%	5.0%	5.0%	4.0%	0.0%	2.0%	2.0%
Bonds	2.0%	6.0%	10.0%	13.0%	14.0%	13.0%	9.0%	1.0%	-4.0%
SV	-3.0%	-7.0%	-11.0%	-14.0%	-16.0%	-18.0%	-18.0%	-17.0%	-18.0%
Real Assets	2.0%	3.0%	2.0%	2.0%	1.0%	0.0%	0.0%	0.0%	-1.0%
TIPs	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	9.0%	16.0%	22.0%

10%-19% increase/decrease in allocation

Conservative	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	-1.0%	0.0%	-1.0%	0.0%	0.0%	0.0%	0.0%	-1.0%	-1.0%
SMID Growth	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-2.0%	-1.0%	-1.0%	-1.0%
SMID Value	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-2.0%	-1.0%	-1.0%	-1.0%
International Stocks	0.0%	0.0%	0.0%	1.0%	2.0%	1.0%	3.0%	2.0%	2.0%
Emerging	5.0%	4.0%	6.0%	2.0%	2.0%	3.0%	-1.0%	2.0%	2.0%
Bonds	10.0%	16.0%	20.0%	21.0%	19.0%	15.0%	9.0%	5.0%	1.0%
SV	-11.0%	-17.0%	-21.0%	-24.0%	-25.0%	-25.0%	-24.0%	-24.0%	-25.0%
Real Assets	3.0%	3.0%	2.0%	1.0%	0.0%	0.0%	0.0%	-1.0%	-1.0%
TIPs	0.0%	0.0%	0.0%	3.0%	6.0%	10.0%	15.0%	19.0%	24.0%

20%-25% increase/decrease in allocation

MERCER RECOMMENDED GLIDEPATH

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	34%	34%	32%	30%	28%	27%	25%	24%	21%
SMID Growth	7%	7%	7%	6%	5%	5%	4%	3%	3%
SMID Value	7%	7%	7%	6%	5%	5%	4%	3%	3%
International Stocks	24%	24%	23%	21%	20%	19%	17%	14%	14%
Emerging	16%	16%	15%	15%	12%	5%	4%	6%	3%
Bonds	2%	2%	7%	13%	21%	27%	26%	19%	19%
SV	0%	0%	0%	0%	1%	3%	8%	14%	17%
Real Assets	10%	10%	9%	9%	7%	6%	4%	3%	3%
TIPs	0%	0%	0%	0%	1%	3%	8%	14%	17%

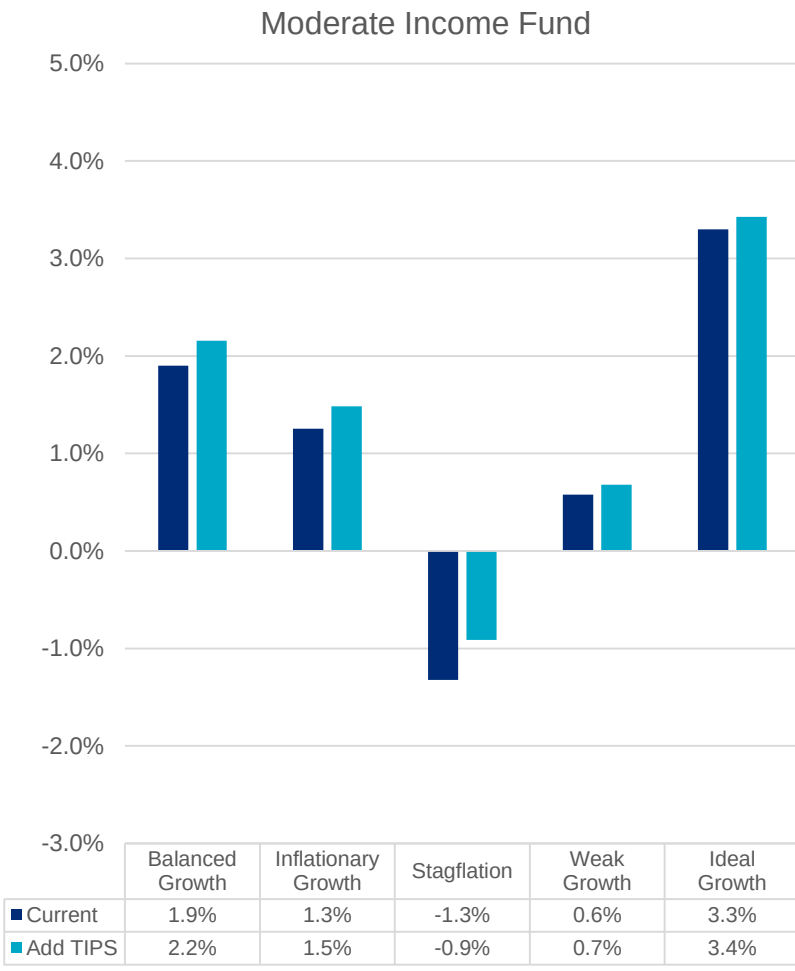
Moderate	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	33%	30%	27%	24%	21%	19%	18%	16%	14%
SMID Growth	7%	6%	6%	5%	4%	3%	3%	2%	2%
SMID Value	7%	6%	6%	5%	4%	3%	3%	2%	2%
International Stocks	23%	21%	19%	17%	14%	11%	12%	9%	8%
Emerging	15%	15%	13%	11%	10%	8%	3%	5%	4%
Bonds	6%	13%	21%	28%	33%	36%	34%	27%	23%
SV	0%	0%	0%	3%	6%	10%	14%	19%	22%
Real Assets	9%	9%	8%	7%	6%	5%	4%	4%	3%
TIPs	0%	0%	0%	0%	2%	5%	9%	16%	22%

Conservative	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	27%	24%	20%	17%	14%	13%	11%	10%	9%
SMID Growth	6%	5%	4%	4%	3%	2%	2%	1%	1%
SMID Value	6%	5%	4%	4%	3%	2%	2%	1%	1%
International Stocks	19%	17%	14%	12%	11%	7%	8%	6%	6%
Emerging	13%	11%	11%	6%	5%	5%	1%	3%	2%
Bonds	21%	31%	37%	41%	42%	41%	36%	33%	29%
SV	0%	0%	4%	8%	12%	17%	22%	25%	26%
Real Assets	8%	7%	6%	5%	4%	3%	3%	2%	2%
TIPs	0%	0%	0%	3%	6%	10%	15%	19%	24%

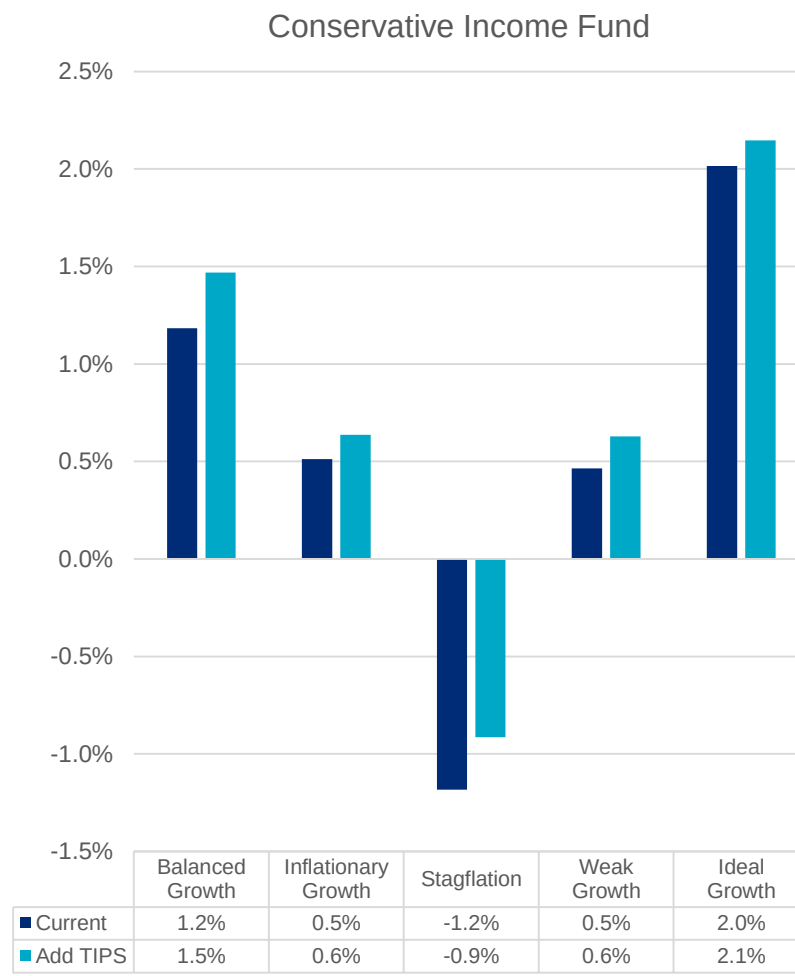
MERCER RECOMMENDED CHANGES TO PROPOSED 3X9 MODEL

- Maintained the growth/fixed income split provided by Prudential throughout the glidepath
- Within domestic equity, the total SMID allocation is capped at 30% in the longer dated funds and scales down to 20% as participants near retirement
  - Prudential's proposed model included a significant overweight to SMID throughout the glidepath
- Mercer recommends maintaining an allocation to real assets along with adding an allocation to short-term TIPS as participants near retirement
- The PIMCO IRMAF allocation is utilized in the longer dated/mid stage of the glidepath and is capped at 10% of the overall growth allocation
- TIPs are introduced as participants near retirement for inflation protection and ramp up to 1/3 of the fixed income allocation in the income portfolio
- TIPs allocation is mainly funded through a reduction in the stable value allocation

SCENARIO RETURNS – 5 YR HORIZON



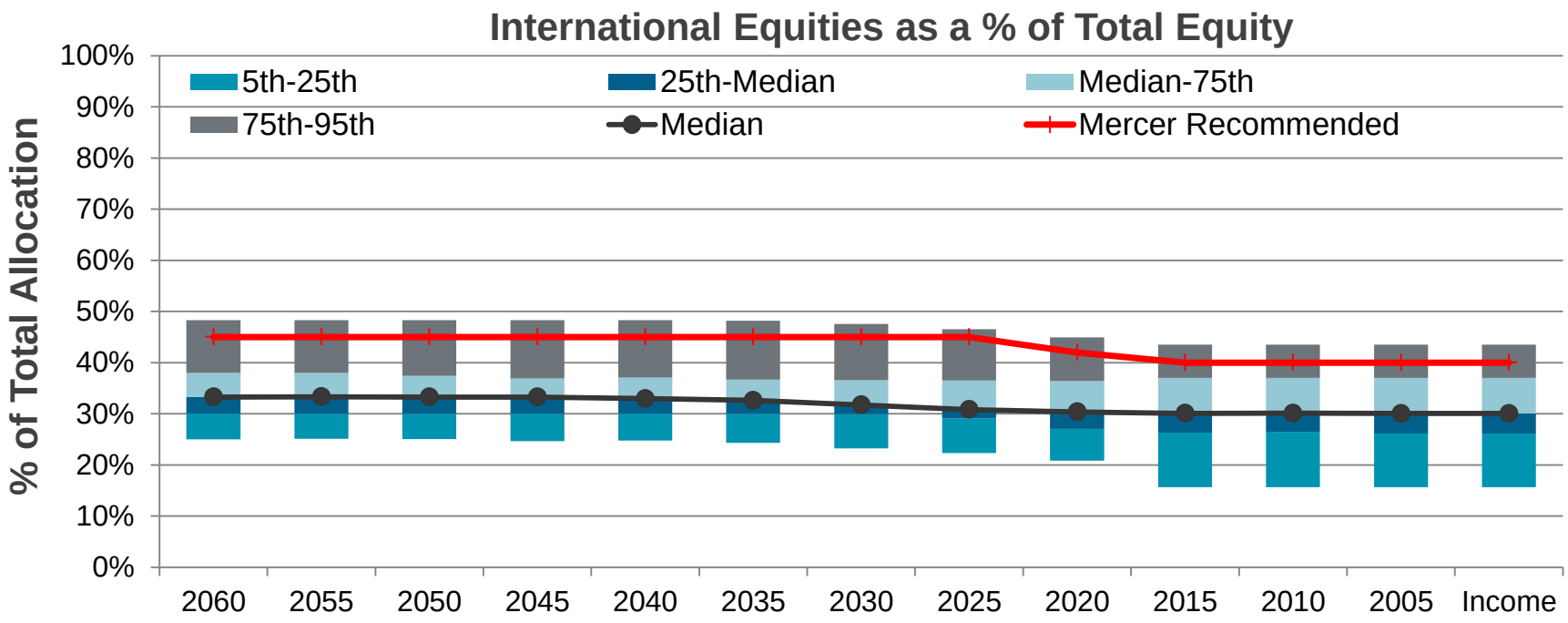
	Balanced Growth	Inflationary Growth	Stagflation	Weak Growth	Ideal Growth
Current	1.9%	1.3%	-1.3%	0.6%	3.3%
Add TIPS	2.2%	1.5%	-0.9%	0.7%	3.4%



	Balanced Growth	Inflationary Growth	Stagflation	Weak Growth	Ideal Growth
Current	1.2%	0.5%	-1.2%	0.5%	2.0%
Add TIPS	1.5%	0.6%	-0.9%	0.6%	2.1%

- Adding TIPs projects favorably in a variety of different economic scenarios

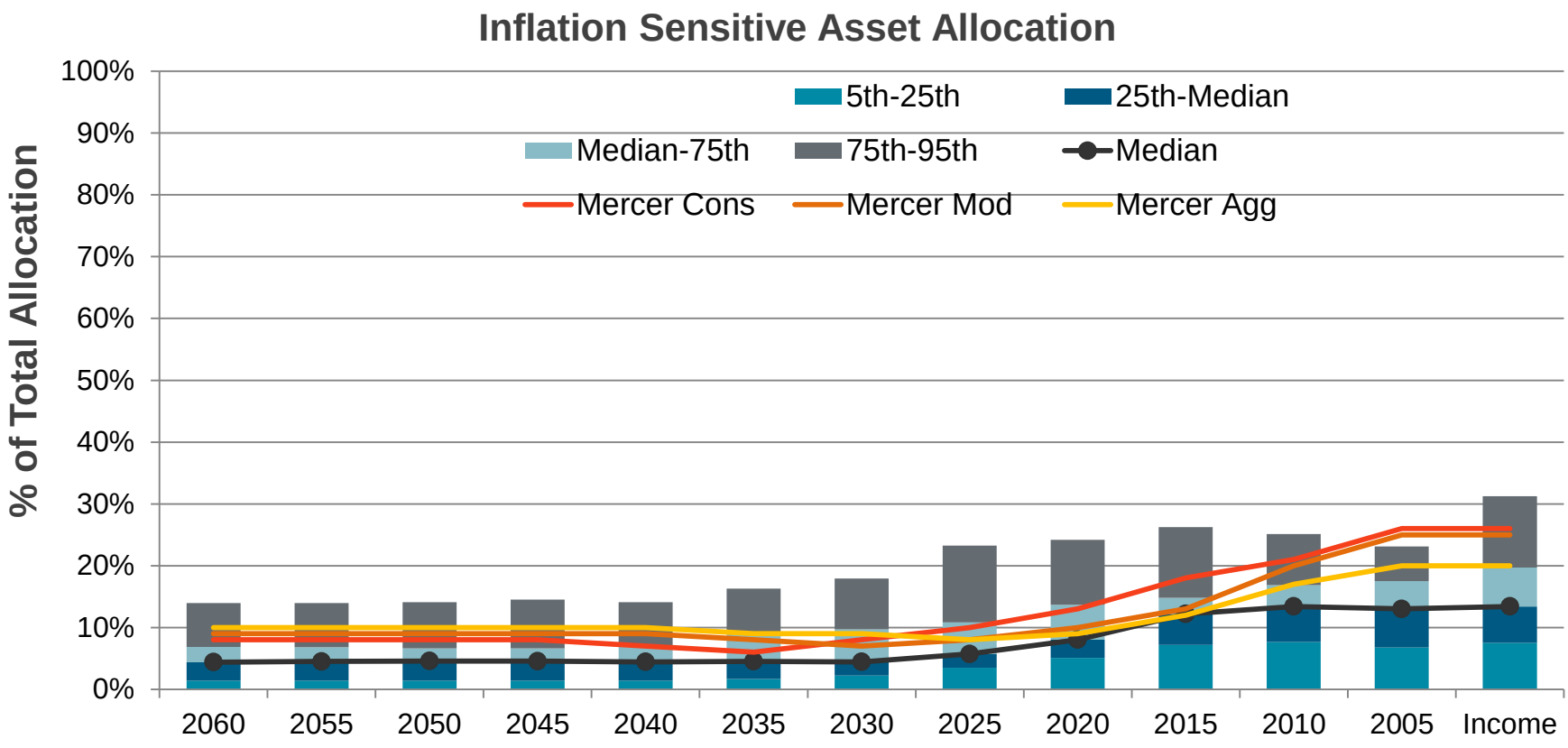
MERCER RECOMMENDATION VS. PEER GROUP UNIVERSE



- The domestic/international equity split is consistent across the three risk tolerances
- The domestic equity allocation is in line with the MSCI ACWI in the longer dated funds but a domestic bias develops as a participant nears retirement

Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)

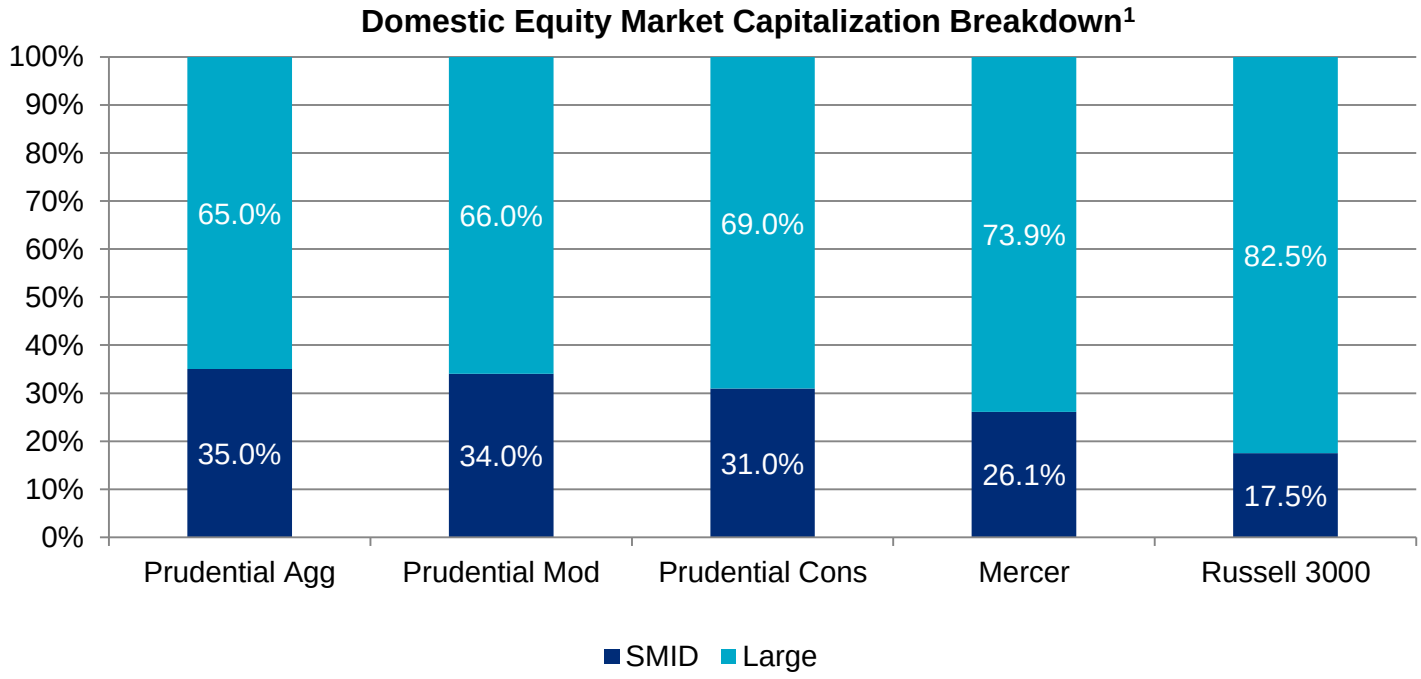
MERCER RECOMMENDATION VS. PEER GROUP UNIVERSE



- Mercer recommends a higher allocation to TIPs as participants near retirement in order to better deal with inflation

Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)

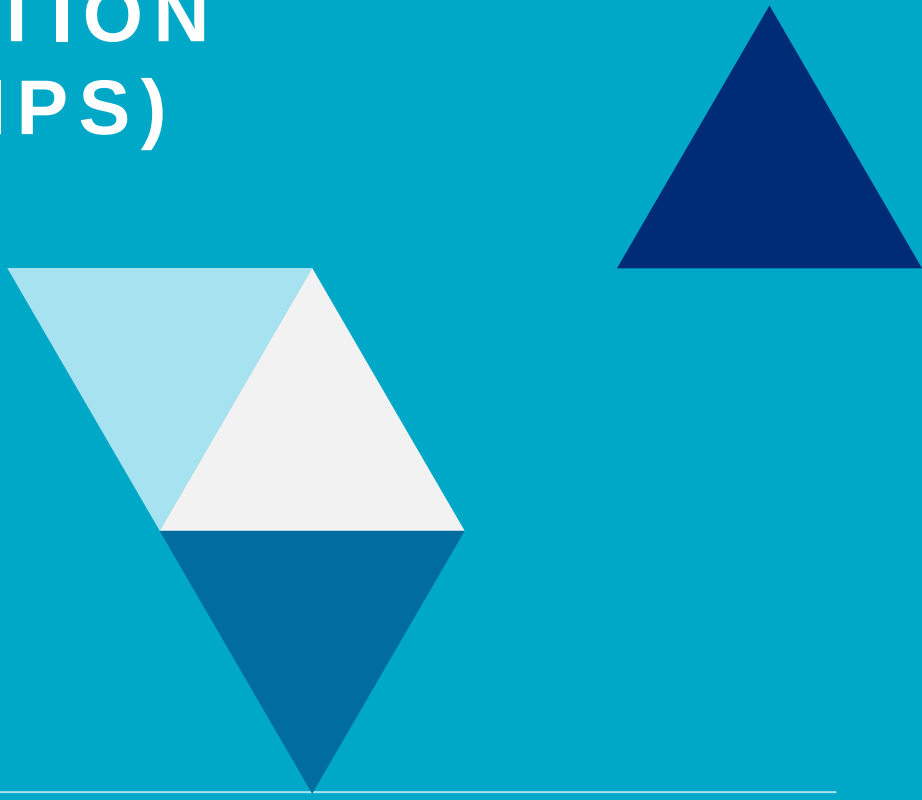
DOMESTIC EQUITY MARKET CAPITALIZATION BREAKDOWN



- The Prudential 3X9 model is largely overweight SMID cap equity relative to the Russell 3000
- Mercer recommends overweighting SMID cap equity relative to large caps but keeps the overweight within 10% of the domestic equity benchmark

[1] Average split large/smid split across the glidepath

ALTERNATIVE SCENARIO: REAL ASSET ALLOCATION ADJUSTMENTS (NO TIPS)



REAL ASSET ALLOCATION CHANGES (NO TIPS)

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	3.0%	2.0%	1.0%	1.0%	0.0%	1.0%	2.0%	0.0%	-1.0%
SMID Growth	-5.0%	-5.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-3.0%	-3.0%
SMID Value	-5.0%	-5.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-3.0%	-3.0%
International Stocks	-1.0%	0.0%	0.0%	-1.0%	1.0%	2.0%	1.0%	2.0%	2.0%
Emerging	6.0%	6.0%	6.0%	7.0%	6.0%	4.0%	3.0%	2.0%	2.0%
Bonds	0.0%	0.0%	2.0%	5.0%	8.0%	9.0%	5.0%	1.0%	2.0%
SV	-1.0%	-1.0%	-3.0%	-6.0%	-9.0%	-9.0%	-6.0%	-3.0%	-4.0%
Real Assets	3.0%	3.0%	2.0%	2.0%	2.0%	1.0%	3.0%	4.0%	5.0%

Moderate	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	0.0%	-1.0%	-1.0%	0.0%	-1.0%	2.0%	2.0%	-1.0%	-1.0%
SMID Growth	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%
SMID Value	-4.0%	-4.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%
International Stocks	1.0%	0.0%	0.0%	0.0%	2.0%	2.0%	1.0%	3.0%	1.0%
Emerging	6.0%	7.0%	6.0%	5.0%	4.0%	2.0%	0.0%	0.0%	0.0%
Bonds	2.0%	6.0%	10.0%	13.0%	14.0%	13.0%	9.0%	4.0%	5.0%
SV	-3.0%	-7.0%	-11.0%	-14.0%	-14.0%	-13.0%	-10.0%	-6.0%	-7.0%
Real Assets	2.0%	3.0%	2.0%	2.0%	1.0%	0.0%	2.0%	4.0%	4.0%

Conservative	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	-1.0%	0.0%	-1.0%	-1.0%	-1.0%	-2.0%	-1.0%	-3.0%	-3.0%
SMID Growth	-3.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%	-1.0%
SMID Value	-3.0%	-3.0%	-3.0%	-3.0%	-3.0%	-2.0%	-2.0%	-1.0%	-1.0%
International Stocks	0.0%	0.0%	0.0%	0.0%	1.0%	2.0%	1.0%	1.0%	0.0%
Emerging	5.0%	4.0%	5.0%	5.0%	4.0%	1.0%	1.0%	0.0%	1.0%
Bonds	10.0%	16.0%	20.0%	21.0%	18.0%	13.0%	15.0%	9.0%	10.0%
SV	-11.0%	-17.0%	-21.0%	-22.0%	-20.0%	-16.0%	-18.0%	-12.0%	-13.0%
Real Assets	3.0%	3.0%	3.0%	3.0%	4.0%	6.0%	6.0%	7.0%	7.0%

5%-9% increase/decrease in allocation

10%-19% increase/decrease in allocation

20%-25% increase/decrease in allocation

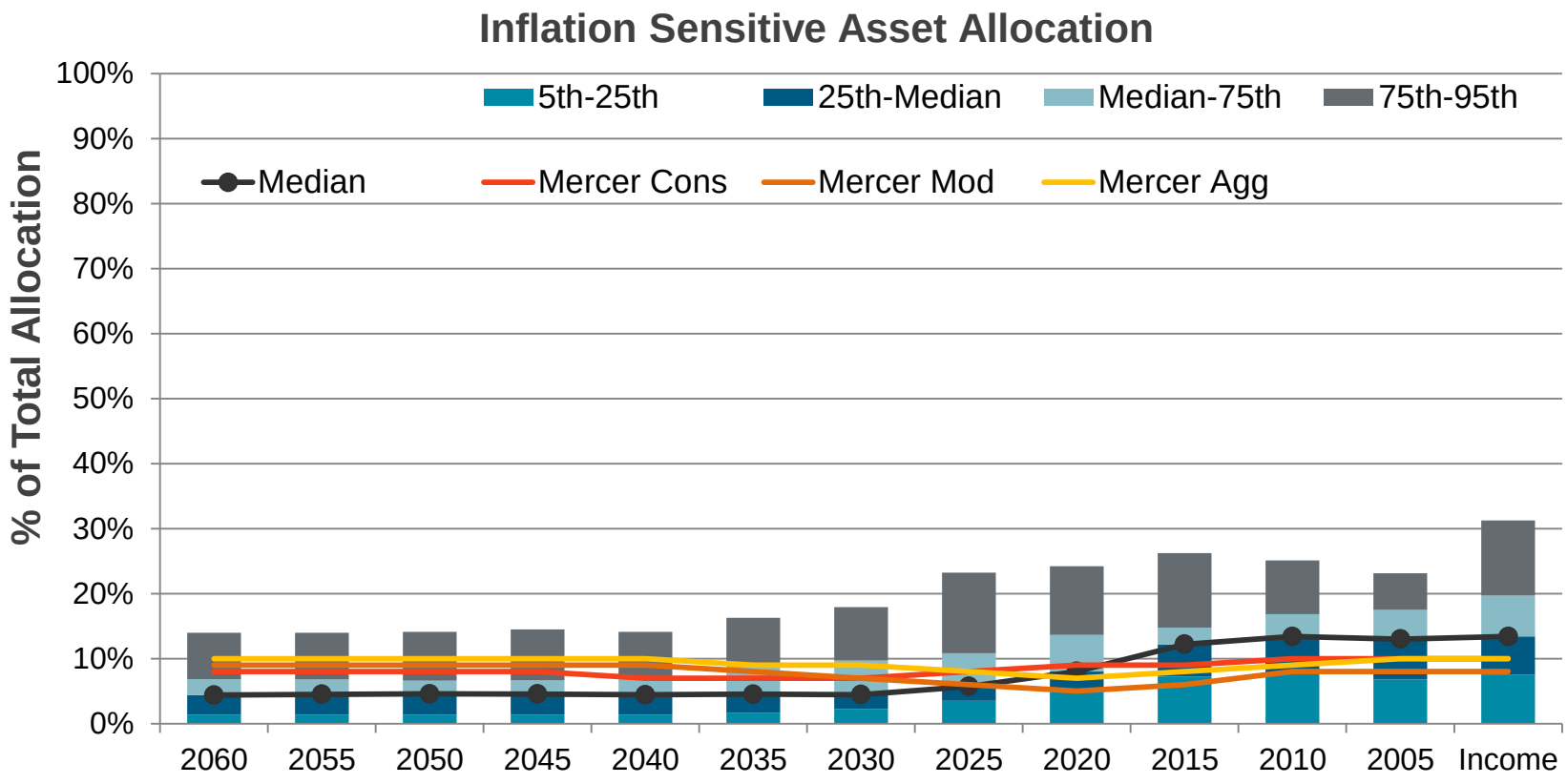
REAL ASSET ALLOCATION CHANGES- GLIDEPATH

Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	34%	34%	32%	30%	28%	26%	24%	22%	19%
SMID Growth	7%	7%	7%	6%	5%	4%	3%	3%	2%
SMID Value	7%	7%	7%	6%	5%	4%	3%	3%	2%
International Stocks	24%	24%	23%	21%	20%	17%	14%	14%	13%
Emerging	16%	16%	15%	15%	12%	9%	7%	5%	4%
Bonds	2%	2%	7%	13%	20%	26%	25%	22%	25%
SV	0%	0%	0%	0%	2%	7%	16%	22%	25%
Real Assets	10%	10%	9%	9%	8%	7%	8%	9%	10%

Moderate	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	33%	30%	27%	24%	21%	19%	18%	15%	13%
SMID Growth	7%	6%	6%	5%	4%	3%	3%	2%	2%
SMID Value	7%	6%	6%	5%	4%	3%	3%	2%	2%
International Stocks	23%	21%	19%	17%	15%	13%	11%	10%	8%
Emerging	15%	15%	13%	11%	9%	6%	3%	3%	2%
Bonds	6%	13%	21%	28%	33%	36%	34%	30%	32%
SV	0%	0%	0%	3%	8%	15%	22%	30%	33%
Real Assets	9%	9%	8%	7%	6%	5%	6%	8%	8%

Conservative	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
US Large	27%	24%	20%	16%	13%	11%	10%	8%	7%
SMID Growth	6%	5%	4%	3%	2%	2%	1%	1%	1%
SMID Value	6%	5%	4%	3%	2%	2%	1%	1%	1%
International Stocks	19%	17%	14%	11%	10%	8%	6%	5%	4%
Emerging	13%	11%	10%	9%	7%	3%	3%	1%	1%
Bonds	21%	31%	37%	41%	41%	39%	42%	37%	38%
SV	0%	0%	4%	10%	17%	26%	28%	37%	38%
Real Assets	8%	7%	7%	7%	8%	9%	9%	10%	10%

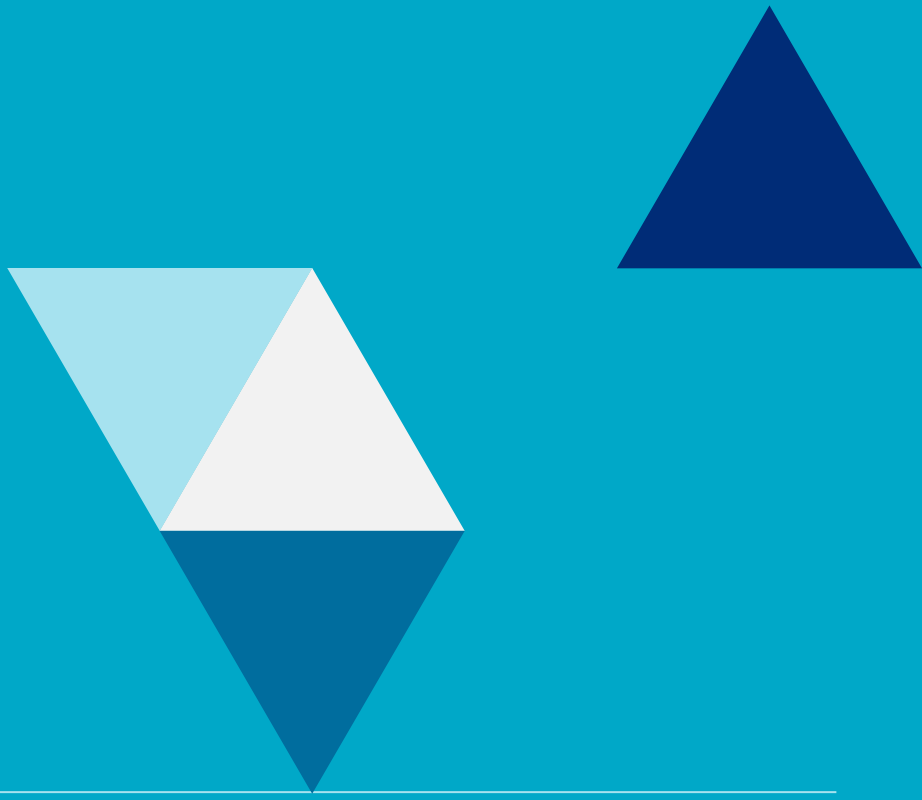
REAL ASSET ALLOCATION ADJUSTMENT (NO TIPS)



- The recommended real asset allocation is higher than Prudential's 3x9 model across the glidepath, with the funding coming from a reduction in stable value

Source: Mercer Quarterly Target Date Fund Survey (Q1 2017 including 70 TDFs)

FEE EVALUATION

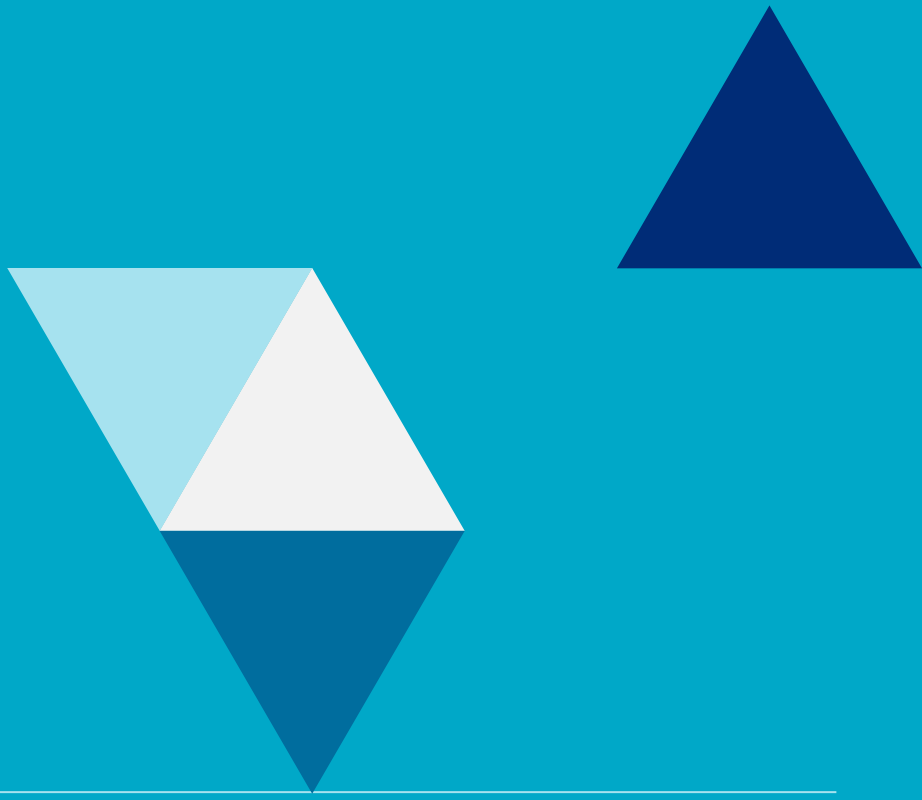


FEE EVALUATION[1]

	Pre-Retirement						Post-Retirement		
Years to Retirement	**26+**	**21-25**	**16-20**	**11-15**	**6-10**	**0-5**	**0-5**	**6-10**	**11+**
Current Agg	0.50%	0.50%	0.50%	0.46%	0.41%	0.39%	0.39%	0.39%	0.39%
Current Mod	0.46%	0.46%	0.46%	0.41%	0.38%	0.37%	0.37%	0.37%	0.37%
Current Cons	0.41%	0.41%	0.41%	0.37%	0.35%	0.32%	0.32%	0.32%	0.32%
Mercer Recommendation Agg (IRMAF and TIPs)	0.36%	0.36%	0.35%	0.34%	0.32%	0.29%	0.26%	0.25%	0.25%
Mercer Recommendation Mod (IRMAF and TIPs)	0.35%	0.34%	0.33%	0.32%	0.30%	0.27%	0.26%	0.25%	0.24%
Mercer Recommendation Cons (IRMAF and TIPs)	0.33%	0.31%	0.30%	0.28%	0.27%	0.25%	0.24%	0.23%	0.22%
Alternative Glidepath Agg (Adjust Real Assets)	0.36%	0.36%	0.35%	0.34%	0.32%	0.30%	0.31%	0.32%	0.32%
Alternative Glidepath Mod (Adjust Real Assets)	0.35%	0.34%	0.33%	0.32%	0.30%	0.29%	0.30%	0.31%	0.31%
Alternative Glidepath Cons (Adjust Real Assets)	0.33%	0.31%	0.30%	0.30%	0.31%	0.31%	0.30%	0.32%	0.32%

[1] Based on 6/30/17 Fund investment management expenses

APPENDIX



Mean-Variance Assumptions

- Assumptions reflect April 2017 conditions
- Returns shown are based on 20-year horizon; fixed income returns are significantly below long-term equilibrium due to current low yield environment and expectation of rising rates

	Asset Class	Geometric Return	Standard Deviation	Correlation Matrix 1	2	3	4	5	6	7	8	9	10	11
1	US Large Cap Equity	6.3%	18.1%	1.00										
2	US Small/Mid Cap Equity (Smid)	6.5%	20.5%	0.95	1.00									
3	Non-US Developed Large Cap Equity Unhedged	7.6%	20.3%	0.77	0.73	1.00								
4	Emerging Markets Equity Unhedged	9.1%	26.4%	0.73	0.70	0.76	1.00							
5	US Aggregate FI	3.6%	5.3%	0.11	0.10	0.03	(0.03)	1.00						
6	Stable Value/GICs	3.6%	3.5%	(0.04)	(0.04)	(0.07)	(0.10)	0.50	1.00					
7	US Inflation Indexed FI	3.2%	5.6%	0.11	0.11	0.03	(0.01)	0.67	0.36	1.00				
8	EM Govt FI - Hard Currency	5.3%	11.6%	0.54	0.51	0.43	0.55	0.55	0.23	0.39	1.00			
9	US Real Estate - REITS	6.5%	21.3%	0.68	0.71	0.54	0.51	0.32	0.11	0.25	0.50	1.00		
10	Commodities - Long Only	3.2%	17.2%	0.31	0.30	0.42	0.40	0.20	0.06	0.33	0.28	0.27	1.00	
11	Gold	3.2%	17.1%	0.18	0.17	0.32	0.26	0.22	0.09	0.35	0.21	0.18	0.67	1.00
	Inflation	2.2%												

5-year Horizon	Balanced Growth	Inflationary Growth	Stagflation	Weak Growth	Ideal Growth
Inflation	2.4%	4.7%	5.5%	1.4%	2.1%
Economic Growth	2.1%	3.3%	0.4%	-0.2%	3.2%
Domestic Equities	5.6%	10.0%	-0.3%	0.9%	10.2%
International Equities	8.1%	10.2%	-0.6%	6.3%	8.5%

MARKET POTENTIAL
LARGE AND SMALL CAPITALIZATION EQUITY

	BREADTH	INSIGHT	DIVERSIFICATION
LARGE CAP	• High levels of liquidity and trading volume	• High levels of broker coverage in large cap markets, particularly the US, though other developed markets are gaining coverage • Market communication infrastructure and regulatory structure have fostered broad and rapid communication of virtually all market-impacting information	• Cross sectional volatility analysis suggests: – Large caps have significantly lower levels of cross sectional volatility than the small cap market
SMALL CAP	• Relatively illiquid market, particularly at smallest market capitalizations. General provision of market liquidity has been reduced following global stresses in financial services industry • Extremely deep market provides greater number of stock names and increases likelihood of identifying undervalued opportunities	• Fewer market participants and lower institutional ownership means greater number of naïve investors in the space, aiding alpha generation potential • Number of market-makers and available capital likely to have reduced following financial crisis • More stock specific characteristics and informational asymmetries than large cap markets	• Large and small cap equity markets are reasonably uncorrelated • Lower levels of correlation in European and Pacific Basin markets relative to the US suggest additional diversification opportunities
SUMMARY	• **Large cap equity markets are more information-efficient than small caps, due to higher analyst coverage and institutional ownership.** • **The US large cap market is very efficient and has the least raw market potential for outperformance compared to other developed large and small cap markets.**		

MARKET POTENTIAL
FIXED INCOME MARKETS

	BREADTH	INSIGHT	DIVERSIFICATION
SOVEREIGN	• High levels of depth and liquidity • Average daily trading volume remains strong • Government bonds account for the majority of global bond markets, although the amount of bonds outstanding has been impacted by quantitative easing initiatives over recent years	• Pricing, executing and settling a trade is very efficient and inexpensive • In Europe just 5% of investors in bonds are individual investors, in the US this is around 10%. • High institutional ownership indicate limited alpha potential • However, increasing level of non-profit maximising participants, including investors seeking to hedge liability risk without price as the dominant variable	• Debt dynamics have grown increasingly worrisome in some advanced economies, and are expected to continue. This provides potentially rich pickings for active managers to add value
CREDIT	• Reasonable levels of liquidity, but turnover has reduced in recent years • Investment grade market was approximately US$ 5 trillion in 2014, with trading volume of US$ 3 trillion Non-Government bonds account for c.30% of world bond markets	• Current volatile conditions and a heightened risk of default provide arguments in favour of active management	• Provide investors with the opportunity to choose from a wide variety of sectors, structures and credit-quality characteristics • Global credit universe offers greater diversification by sector and issuer than regional markets ;though care needed in constructing mandates
SUMMARY	• **Government bond markets are highly efficient and liquid markets, offering limited opportunity for active management over long time horizons. However, current market conditions may provide opportunities in the short to medium term.** • **Credit markets offer active management potential for the skilled investor able to anticipate downgrades, defaults, upgrades or manage rating misclassifications.**		

ACTUAL DELIVERY OF OUTPERFORMANCE
EQUITY MARKETS

- The following tables show the historical excess returns of the median manager across equity markets over the 1,3,5 and 10 years to 31 December 2015, on both a gross and net of fees basis.
- 'Chain linked' annual medians have been used to reduce survivorship bias issues.
- To highlight evidence of 'alpha' we have ranked the 10 year excess historical performance of each asset class on the following basis:

ALPHA RANKING (%PA)	
HIGH	Greater than 2.00%
GOOD	1.00% to 2.00%
MEDIUM	0.50% to 1.00%
SOME	0.00% to 0.50%
LOW	Less than 0.00%

- The results on a gross and net of fee basis indicate:
  - The median developed global equity manager has modestly outperformed the index on a gross of fees basis in the long term. Fees have eroded the alpha gained over the 10 year period to December 2015
  - US large cap equity managers have provided some evidence of outperformance, gross of fees, over time. However, there is no evidence of outperformance net of fees, across any periods analysed
  - Strong evidence of outperformance by the median small cap manager over the 10 year period
  - The median emerging market manager has provided evidence of outperformance over the 10 years gross of fees. However, high fees have eroded most the alpha gained, with net results behind over the 10 year period

EQUITY MARKETS: ACTIVE MANAGER RELATIVE PERFORMANCE, GROSS OF FEES

ASSET CLASS	MEDIAN VERSUS INDEX (GROSS OF FEES)[1] (% PA)				TYPICAL FEE HURDLE[3]	ALPHA RANKING[2]
	1 YEAR	3 YEARS	5 YEARS	10 YEARS		
Global Equity	0.40	-0.17	-0.50	0.38	0.66	SOME
Global ex-US Equity	0.60	0.32	0.46	0.94	0.65	MEDIUM
US Large Cap Equity	0.30	0.19	0.04	0.08	0.50	SOME
Global ex-US Small Cap Equity	4.40	3.18	2.95	1.69	0.89	GOOD
US Small Cap Equity	2.30	1.82	2.00	1.03	0.79	GOOD
Emerging Markets Equity	1.00	1.36	1.02	0.74	0.88	MEDIUM

[1] 'Chain linked' median manager annual return versus index in $US to 31 December 2015. Indices used are provided in the Appendix
[2] Evidence of skill grading ("alpha ranking") based on rolling 10 year median of universe and index returns
[3] Based on Mercer's Global Asset Management Fee Survey 2014 for a $100m mandate. $US Segregated vehicles have been used where available

FIXED INCOME MARKETS: ACTIVE MANAGER RELATIVE PERFORMANCE, GROSS OF FEES

ASSET CLASS	MEDIAN VERSUS INDEX (GROSS OF FEES)[1] (% PA)				TYPICAL FEE HURDLE[2]	ALPHA RANKING[3]
	1 YEAR	3 YEARS	5 YEARS	10 YEARS		
Global Fixed	0.20	0.38	0.68	0.64	0.35	GOOD
US Fixed	0.20	0.38	0.48	0.63	0.28	GOOD
US Government	0.40	-0.02	-0.41	-0.15	0.23	LOW
Global Non-Government	0.50	0.76	0.70	0.95	0.35	GOOD
US Non-Government	0.50	0.56	0.67	0.74	0.29	GOOD
Global High Yield	2.10	1.71	1.05	0.68	0.50	GOOD
Emerging Markets Debt	-1.00	-0.84	-0.21	0.15	0.55	SOME

[1] 'Chain linked' median manager annual return v index in $US to 31 December 2015. Indices used are provided in the Appendix

[2] Based on Mercer's Global Asset Management Fee Survey 2014 for a $100m mandate. $US Segregated vehicles have been used where available

[3] Evidence of skill grading ("alpha ranking") based on annual rolling 10 year relative returns

EQUITY MARKETS CONCLUSION

Asset class	Market opportunity (ex ante)	Actual manager results (ex-post)[1]	Active management conviction	Rationale	Preference
US Large Cap	Low	Low	Low	• High institutional ownership, the availability of information, greater number of analyst coverage and liquidity makes the large cap market efficient • No evidence of historic alpha by the median US large cap manager over periods analysed, net of fees	For passive management (in particular alternative indexation), unless investor has ability to use high tracking error mandates and has robust governance structure
Small Cap	High	High	High	• Inefficient market due to less available information, fewer market participants and lower institutional ownership • Long data history available showing strong evidence of added value by active managers	Clear preference for active management
Global Emerging Markets	High	Low	Medium	• Relatively inefficient and highly volatile markets provide opportunity • Alpha has generally been added by active managers gross of fees, but results after the high fees in the sector are modest or negative over all periods. • However, even passive managers typically modestly underperform in this sector	For active management if: • Investors have strong conviction in managers' skill • Attractive manager fees can be negotiated (compared to the typically high fees in the sector)

[1] Based on "alpha ranking" score of fixed income markets on annual rolling 10 year relative returns to 31 December 2015

FIXED INCOME MARKETS
CONCLUSION

Asset class	Market opportunity (ex ante)	Actual manager results (ex-post)[1]	Active management conviction	Rationale	Preference
Fixed Income (broad based)	Medium	Medium	Medium	• Evidence of added value by active managers, net of fees, across all markets except Europe	For active management if: • Investors have strong conviction in managers' skill • Manager fees are reasonable and targets are aligned
Credit	Medium	Medium	Medium	• Offers active management potential for the skilled investor able to anticipate downgrades, defaults, misclassifications • Asymmetry of risk of sector also favours active management • Evidence of added value by active managers, gross of fees, though alpha eroded by fees in the UK	For active management if: • Investors have strong conviction in managers' skill • Manager fees are reasonable and targets are aligned
Global High Yield	High	Some	Medium	• Less efficient market should provide opportunities for active managers • Some evidence that the median manager has added value after fees. Passive managers tend to underperform the index by a material margin in this sector	For active management if: • High conviction in managers' skill • Attractive fees relative to sector norms
Emerging Market Debt	High	Low	Medium	• Offers high raw market potential for outperformance; fewer market participants than developed and low overall correlations to other asset classes • Long data history available showing little evidence of added value by active managers	For active management if: • Investors have strong conviction in managers' skill

[1] Based on "alpha ranking" score of fixed income markets on annual rolling 10 year relative returns to 31 December 2015

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