

HEALTH WEALTH CAREER

NORTH CAROLINA SUPPLEMENTAL RETIREMENT PLANS

GOAL MAKER GLIDEPATH DISCUSSION

SEPTEMBER 21, 2017

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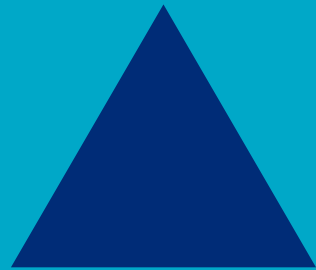
STARTING POINT



CURRENT GOAL MAKER ALLOCATIONS

Portfolios		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
Investment Options	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

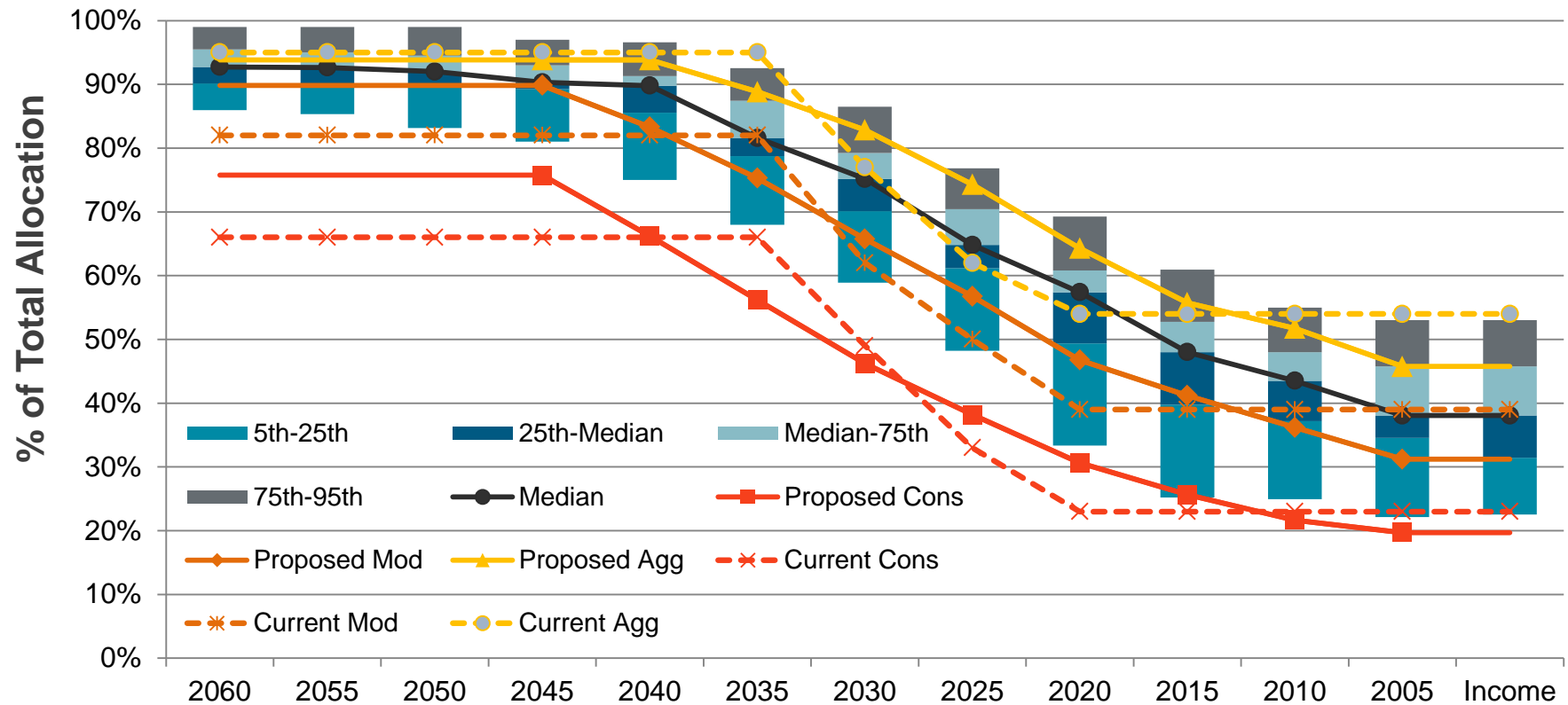
Aggressive	Pre-Retirement						Post-Retirement		
Years to Retirement	26+	21-25	16-20	11-15	6-10	0-5	0-5	6-10	11+
US Large	31%	32%	31%	29%	28%	25%	22%	22%	20%
SMID Growth	12%	12%	11%	10%	9%	8%	7%	6%	5%
SMID Value	12%	12%	11%	10%	9%	8%	7%	6%	5%
International Stocks	25%	24%	23%	22%	19%	15%	13%	12%	11%
Emerging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

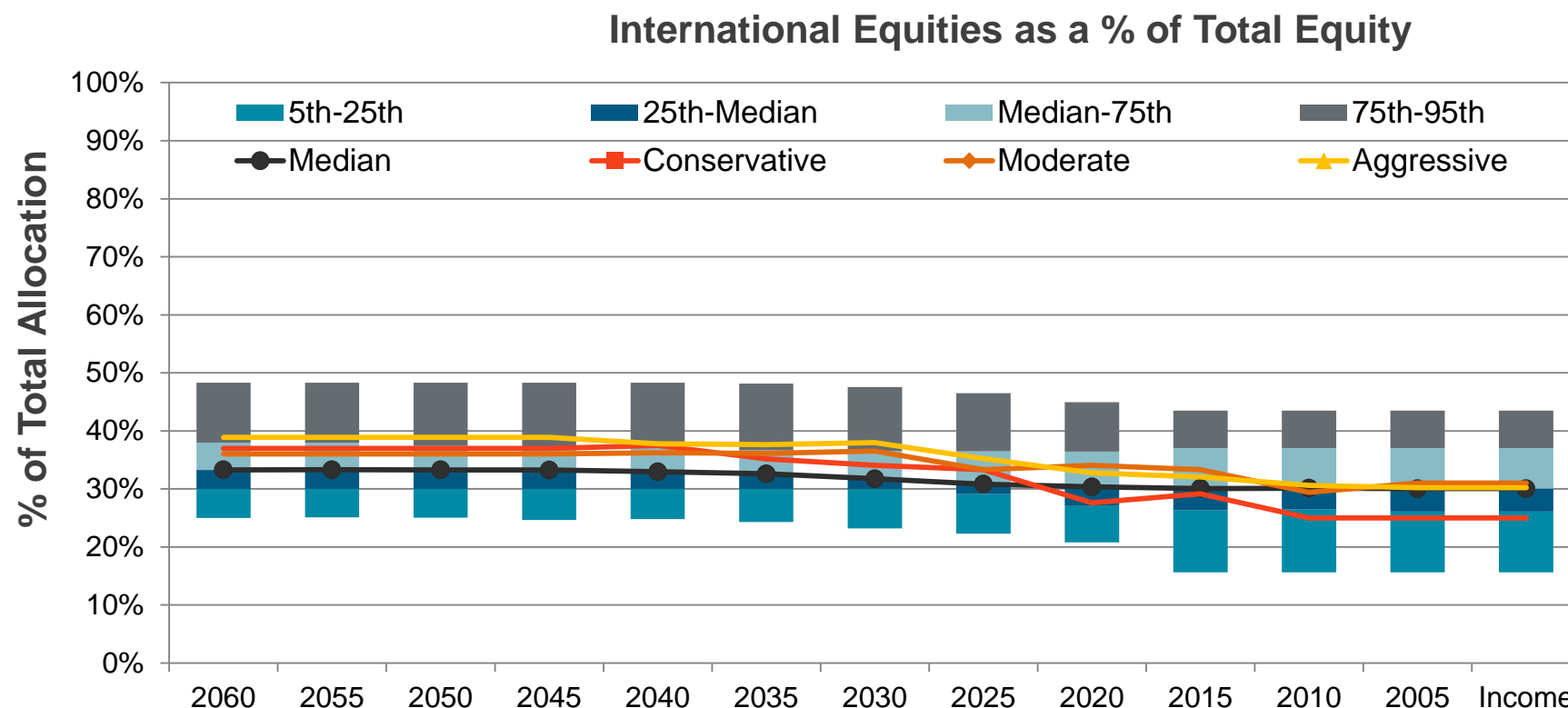
Growth Asset Allocation¹



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

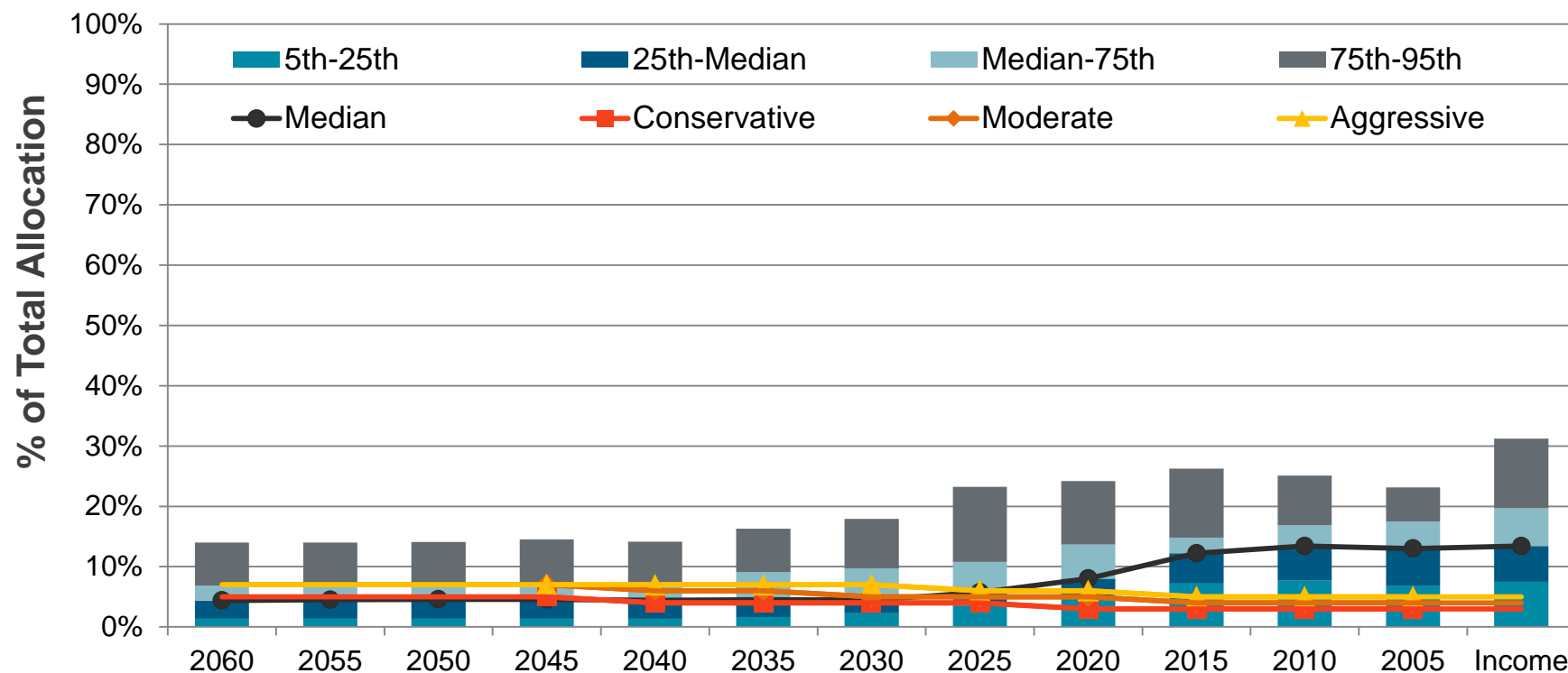


- The domestic/international equity split slightly varies depending on the risk tolerance and age band but is generally in line with the peer group median

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

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

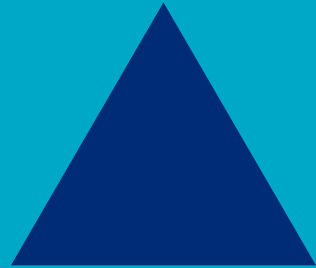
Inflation Sensitive Asset Allocation



- 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

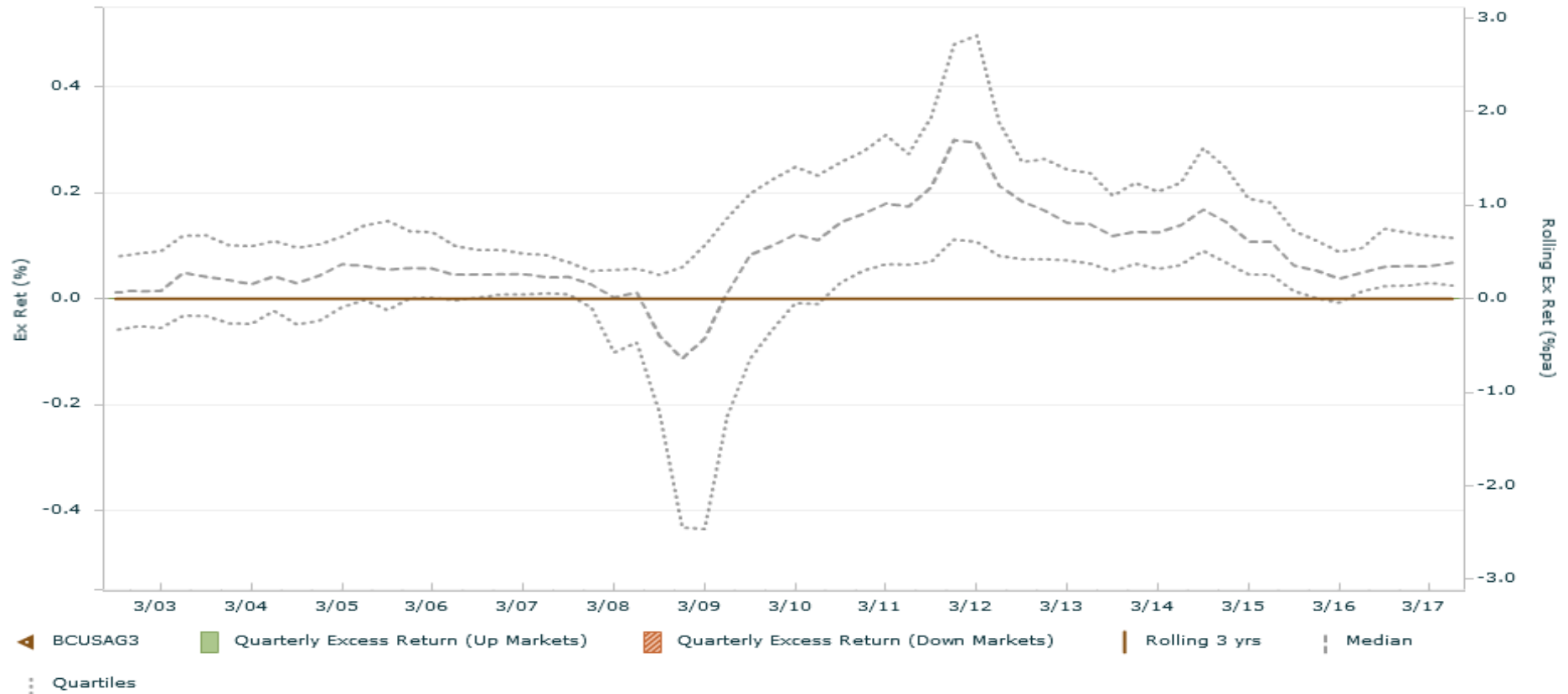
Asset Class	Current	Proposed	Comments
US Large Cap Equity	50/50 Active/Passive	100% Passive	<ul style="list-style-type: none"> • Lower alpha potential due to market efficiency (higher analyst coverage and institutional ownership) • Lower success rate of median manager net of fees
US SMID Cap Equity	100% Active	100% Active	<ul style="list-style-type: none"> • Strong alpha opportunities exist • Implemented in 2012
International Equity	100% Active	100% Active	<ul style="list-style-type: none"> • Good alpha opportunities • Implemented in 2012
Core Fixed Income	50/50 Active/Passive	100% Active	<ul style="list-style-type: none"> • 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

Core Fixed Income Universe

Quarterly Excess Return vs. Bloomberg Barclays US Aggregate with rolling 3 yr line in \$US (before fees) over 15 yrs ending June-17

Comparison with the US Fixed Core Investment Grade universe



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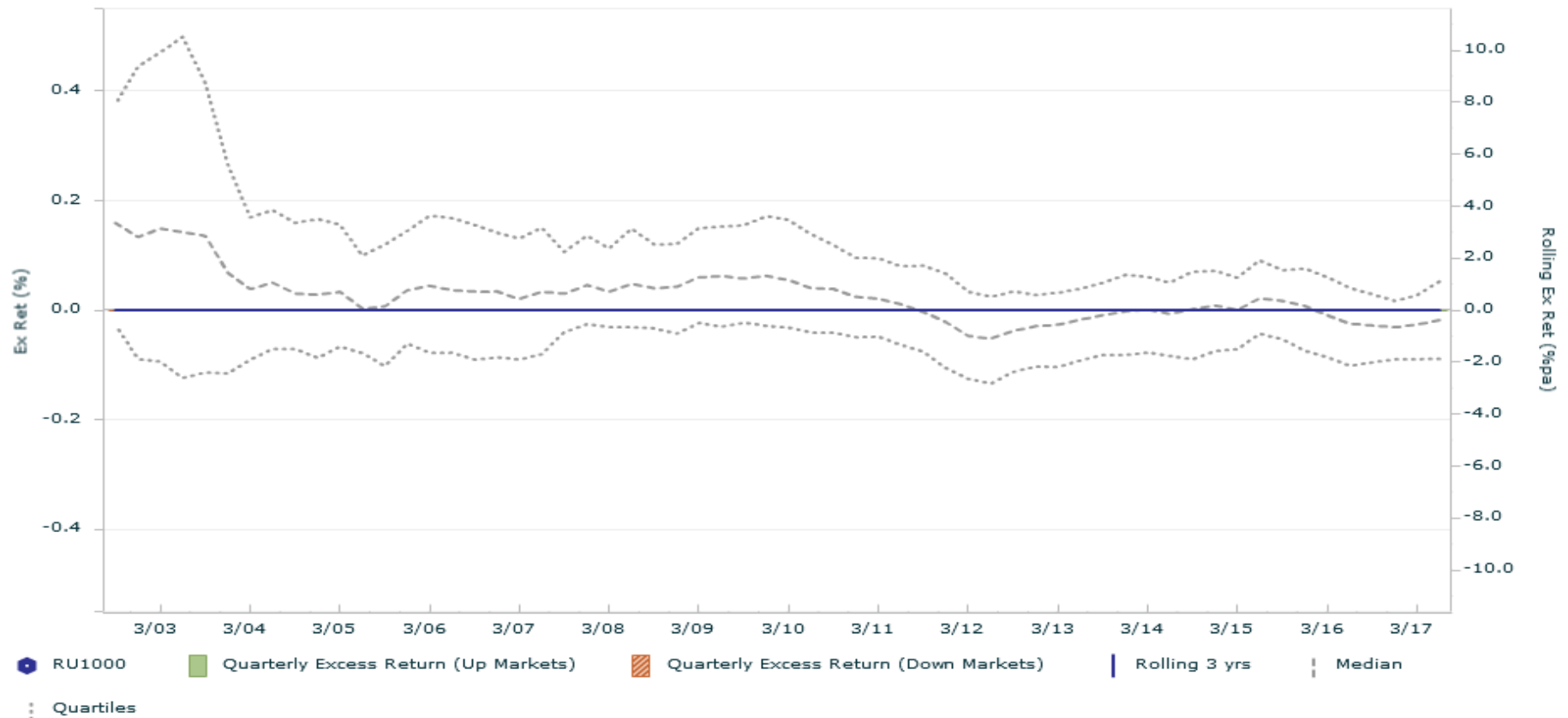
- Median manager has historically outperformed the Bloomberg Barclays U.S. Aggregate Index (gross of fees) based on rolling three-year performance

GOAL MAKER ACTIVE/PASSIVE MIX

Large Cap Universe

Quarterly Excess Return vs. Russell 1000 with rolling 3 yr line in \$US (before fees) over 15 yrs ending June-17

Comparison with the US Equity Large Cap Equity universe

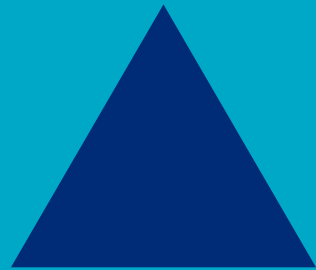


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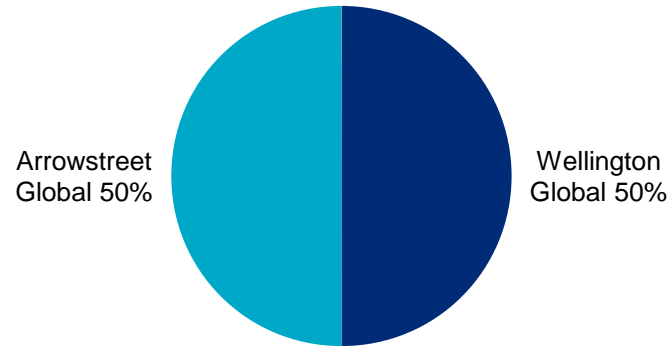


- Median manager outperformed the Russell 1000 Index (gross of fees) prior to 2011 based on rolling three-year periods but performance has been challenged more recently

GLOBAL EQUITY FUND

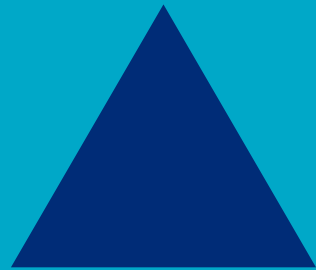


NORTH CAROLINA GLOBAL EQUITY FUND



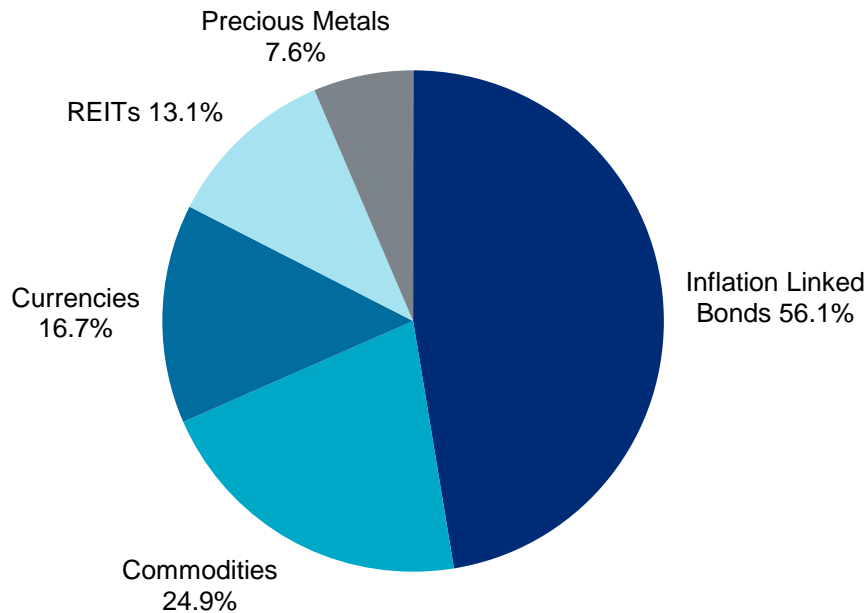
- Currently, the Goal Maker Program utilizes the Global Equity Fund throughout the glidepath
- In order to better manage the US/Non US equity split, we recommend eliminating the Global Equity Fund from the Goal Maker program and allocating those assets between US and non-US allocations
- Roughly 94% 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

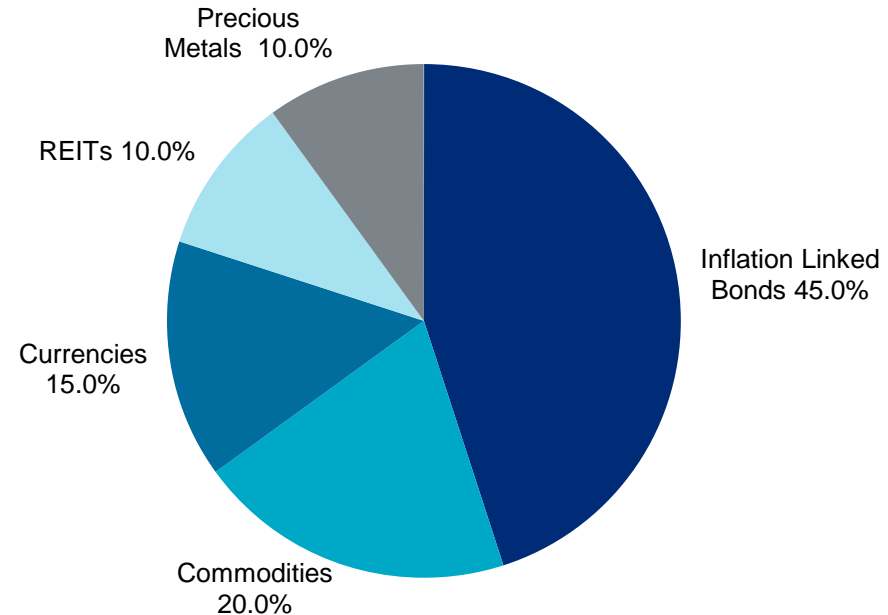


PIMCO IRMAF FUND(3/31/17)

3/31/17 Allocation

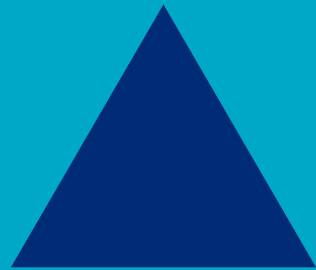


PIMCO IRMAF Target Allocation



- 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

20%-25%
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%

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 Cap Equity	14%	14%	14%	12%	10%	10%	8%	6%	6%
International Stocks	24%	24%	23%	21%	20%	19%	17%	14%	14%
Emerging ¹	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 Cap Equity	14%	12%	12%	10%	8%	6%	6%	4%	4%
International Stocks	23%	21%	19%	17%	14%	11%	12%	9%	8%
Emerging ¹	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 Cap Equity	12%	10%	8%	8%	6%	4%	4%	2%	2%
International Stocks	19%	17%	14%	12%	11%	7%	8%	6%	6%
Emerging ¹	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%

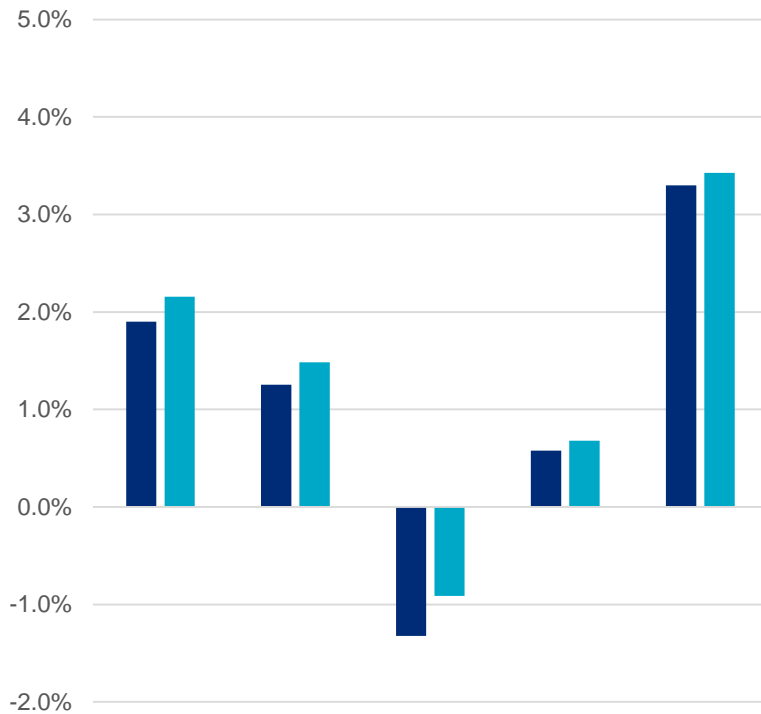
¹ North Carolina does not offer stand alone Emerging Market Equity Fund, the EM exposure will be gained through the International Equity Fund

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

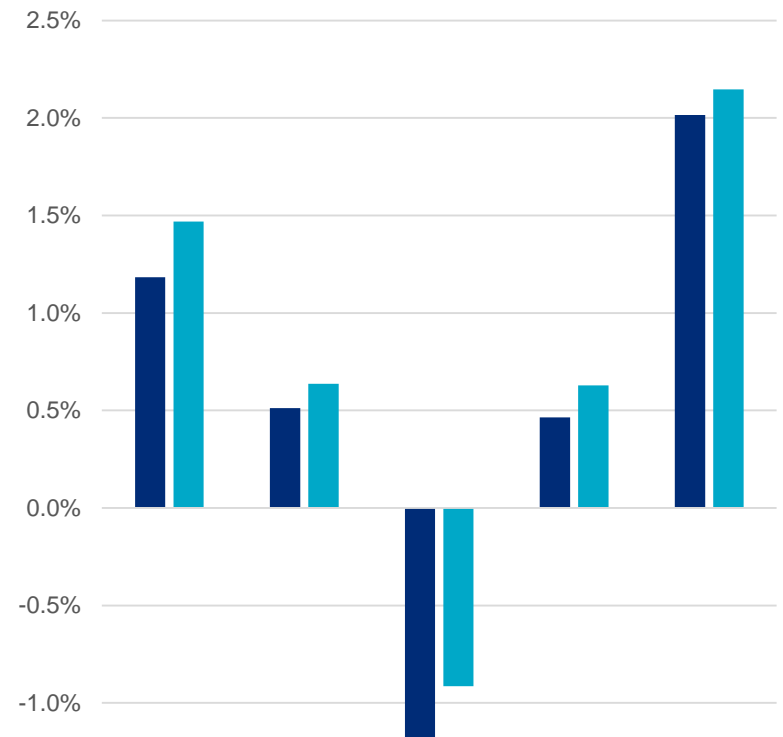
SCENARIO RETURNS – 5 YR HORIZON

Moderate Income Fund



	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%

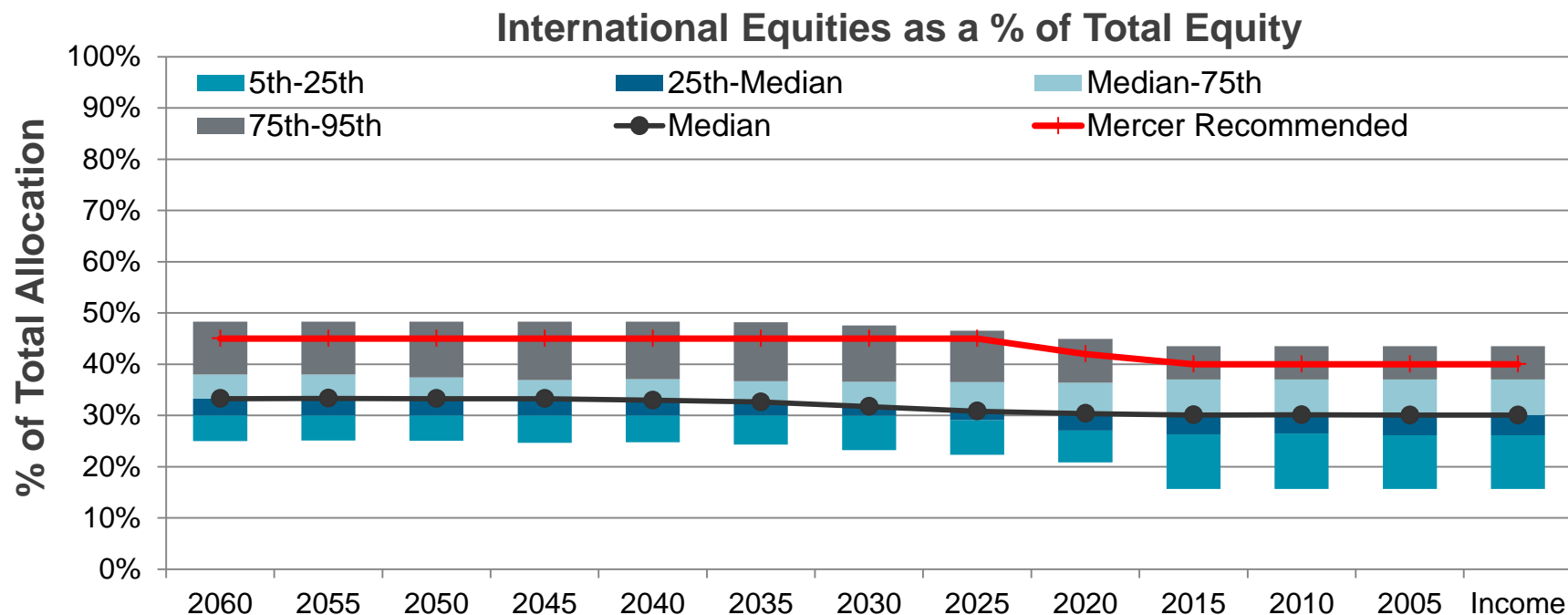
Conservative Income Fund



	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

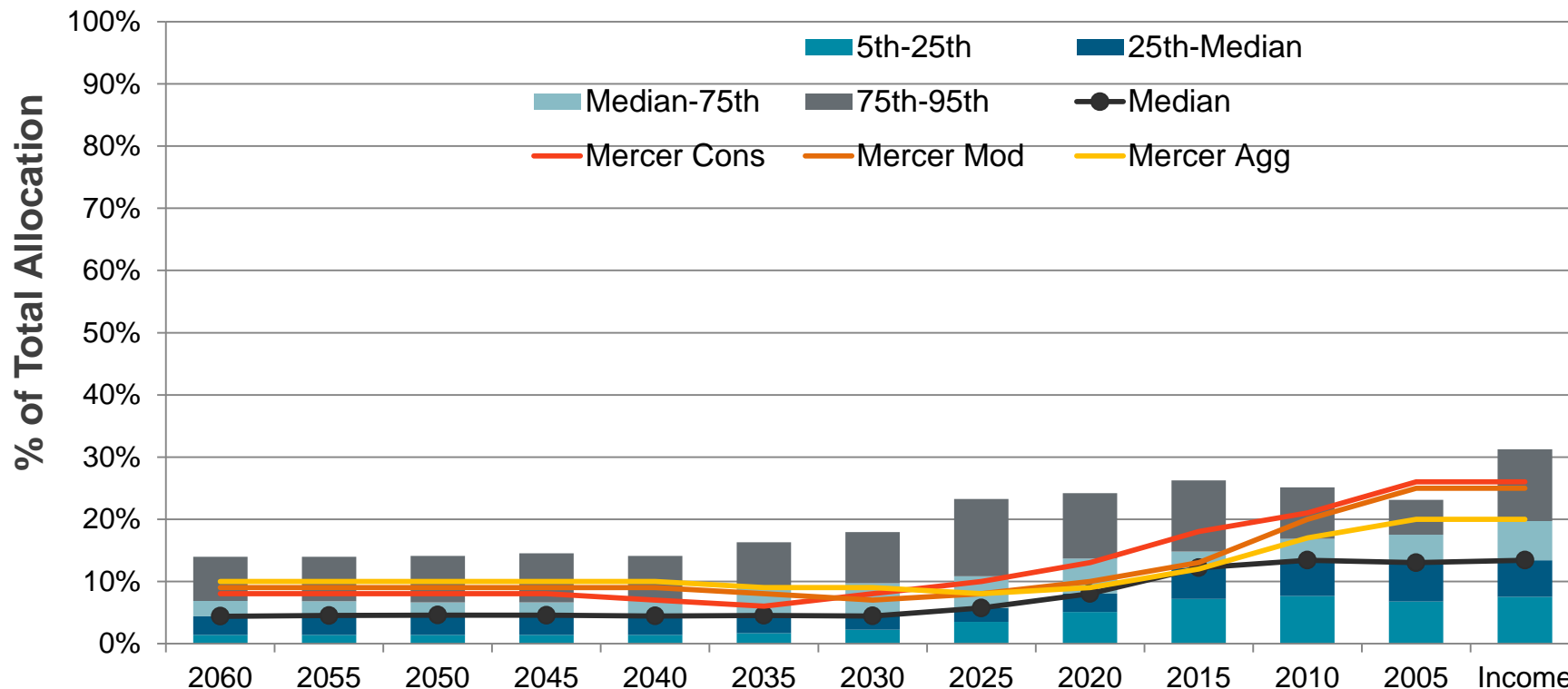


- The domestic/international equity split is consistent across the three risk tolerances
- The domestic equity allocation is in line with the MSCI ACWI in the longer dated funds but a domestic bias develops as a participant nears retirement

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

MERCER RECOMMENDATION VS. PEER GROUP UNIVERSE

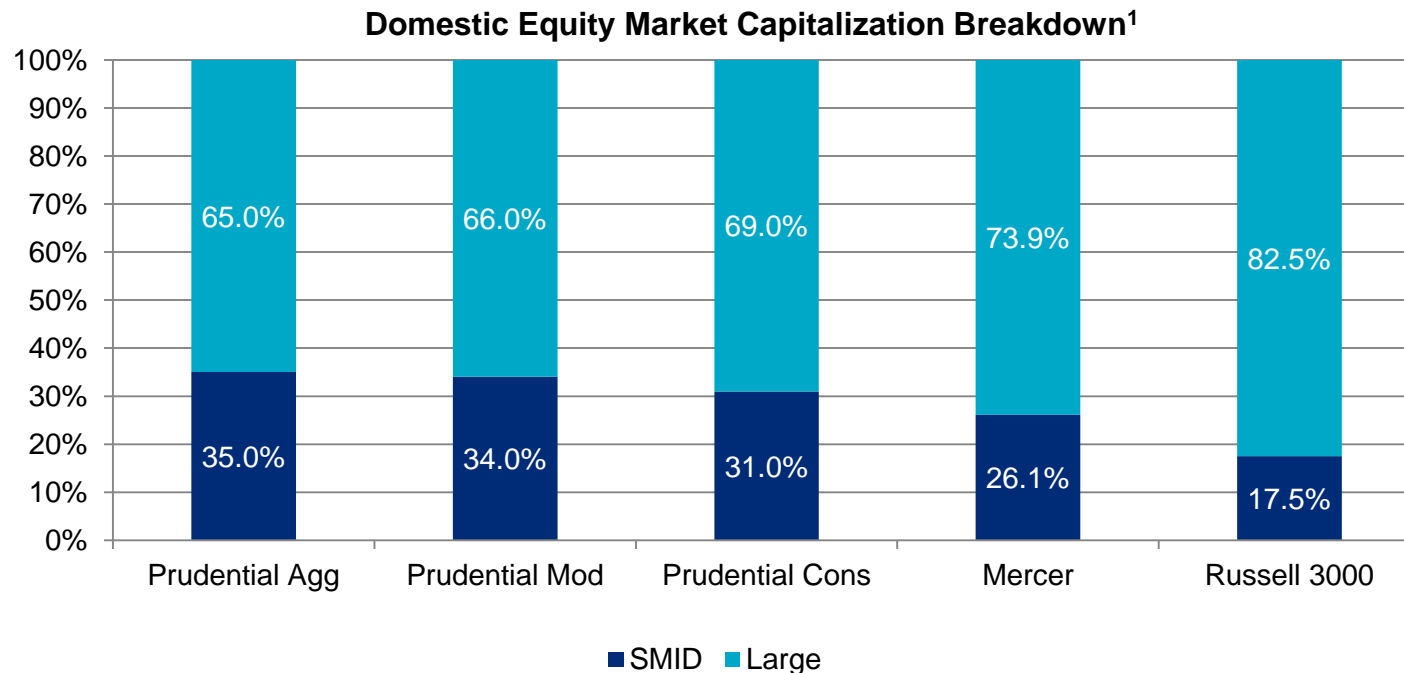
Inflation Sensitive Asset Allocation



- 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/smidsplit across the glidepath

FEE EVALUATION

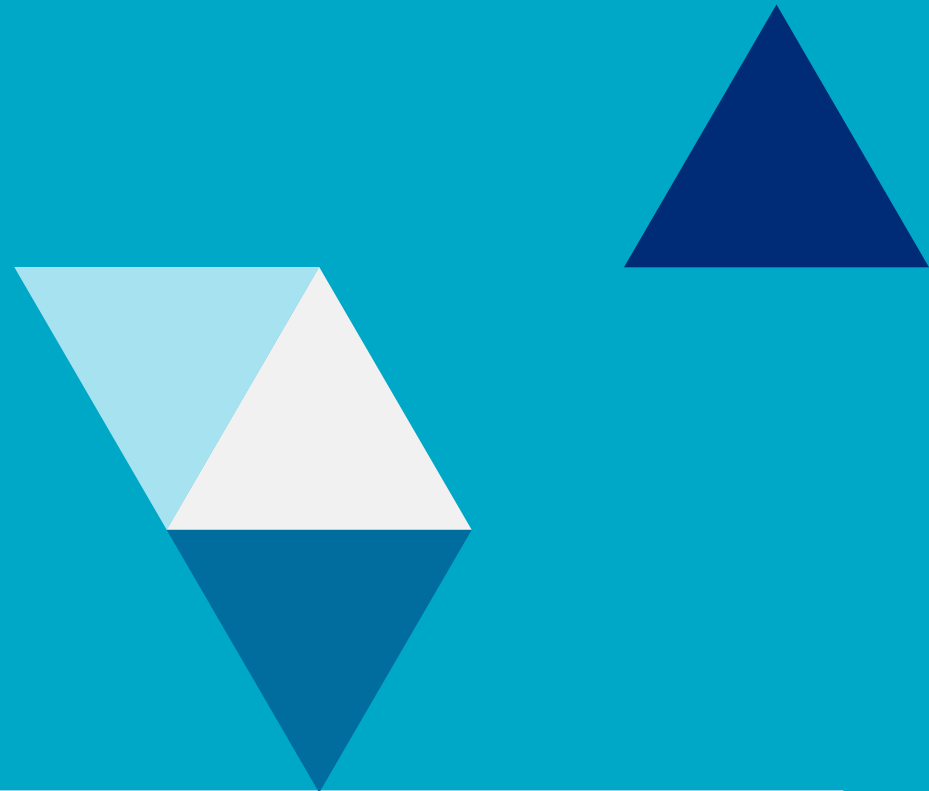


FEE EVALUATION¹

	Pre-Retirement						Post-Retirement		
Years to Retirement	26+	21-25	16-20	11-15	6-10	0-5	0-5	6-10	11+
Current Aggressive	0.50%	0.50%	0.50%	0.46%	0.41%	0.39%	0.39%	0.39%	0.39%
Current Moderate	0.46%	0.46%	0.46%	0.41%	0.38%	0.37%	0.37%	0.37%	0.37%
Current Conservative	0.41%	0.41%	0.41%	0.37%	0.35%	0.32%	0.32%	0.32%	0.32%
Mercer Recommendation Aggressive	0.36%	0.36%	0.35%	0.34%	0.32%	0.29%	0.26%	0.25%	0.25%
Mercer Recommendation Moderate	0.35%	0.34%	0.33%	0.32%	0.30%	0.27%	0.26%	0.25%	0.24%
Mercer Recommendation Conservative	0.33%	0.31%	0.30%	0.28%	0.27%	0.25%	0.24%	0.23%	0.22%

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

APPENDIX



ECONOMIC/ASSUMPTION SETTING

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

	B R E A D T H	I N S I G H T	D I V E R S I F I C A T I O N
L A R G E C A P	<ul style="list-style-type: none"> High levels of liquidity and trading volume 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Cross sectional volatility analysis suggests: <ul style="list-style-type: none"> Large caps have significantly lower levels of cross sectional volatility than the small cap market
S M A L L C A P	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
S U M M A R Y	<ul style="list-style-type: none"> 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

	B R E A D T H	I N S I G H T	D I V E R S I F I C A T I O N
S O V E R E I G N	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
C R E D I T	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Current volatile conditions and a heightened risk of default provide arguments in favour of active management 	<ul style="list-style-type: none"> • 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
S U M M A R Y	<ul style="list-style-type: none"> • 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:
- 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

ALPHA RANKING (% P A)	
H I G H	Greater than 2.00%
G O O D	1.00% to 2.00%
M E D I U M	0.50% to 1.00%
S O M E	0.00% to 0.50%
L O W	Less than 0.00%

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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> Evidence of added value by active managers, net of fees, across all markets except Europe 	For active management if: <ul style="list-style-type: none"> Investors have strong conviction in managers' skill Manager fees are reasonable and targets are aligned
Credit	Medium	Medium	Medium	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Investors have strong conviction in managers' skill Manager fees are reasonable and targets are aligned
Global High Yield	High	Some	Medium	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> High conviction in managers' skill Attractive fees relative to sector norms
Emerging Market Debt	High	Low	Medium	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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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