



Public Pension Funding Forum: Strategies to Improve Funding

Presented By

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PFM Asset Management LLC

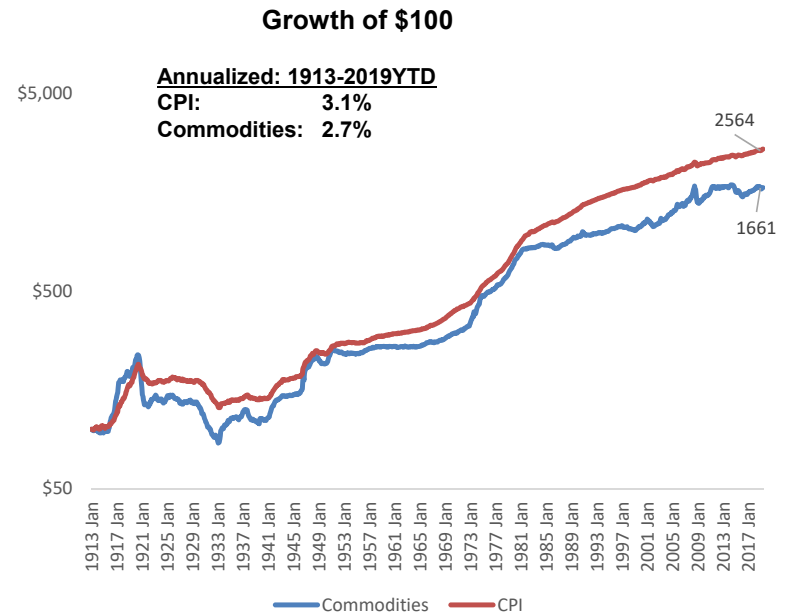
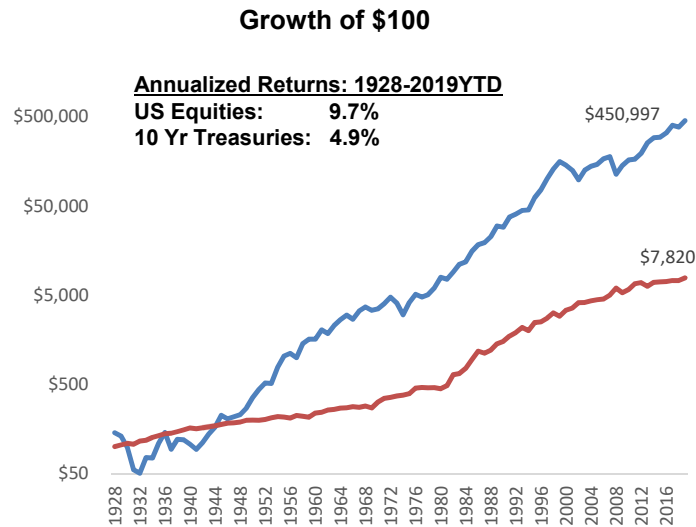
Historical Plan Performance vs. Index

	Median Plan Performance	Index
BSB (1991)	13.4%	13.5%
BHB (1995)	9.0%	10.1%
PFMAM (2015)	9.1%	10.1%



Importance of Strategic, Long-term Asset Allocation

- Studies Have Shown that Strategic Asset Allocation is Responsible for 100% or More of Long Term Returns



Percentage of Active Funds Beaten By Index

Fund Category	Benchmark	1-Year	3-Years	5-Years	10-Years	15-Years
All Domestic Equity	S&P 1500	69%	81%	88%	84%	89%
Large-Cap Equity	S&P 500	64%	79%	82%	85%	92%
Mid-Cap Equity	S&P 400	46%	74%	80%	88%	93%
Small-Cap Equity	S&P 600	68%	84%	89%	86%	97%
Multi-Cap Equity	S&P 1500	67%	82%	89%	86%	91%



Source: Standard & Poor's Dow Jones Indices; SPIVA report as of December 31, 2018.

Passive Can Outperform in Down Markets Also

Percentage of Active Funds Beaten by Index During Prior Two Bear Markets

Fund Category	Benchmark	2008	2000 to 2002
All Cap Funds	S&P 500	54	53
All Mid-cap Funds	S&P Mid-cap	74	77
All Small-cap Funds	S&P Small-cap	83	71



Source: S&P Indices and CRSP Database

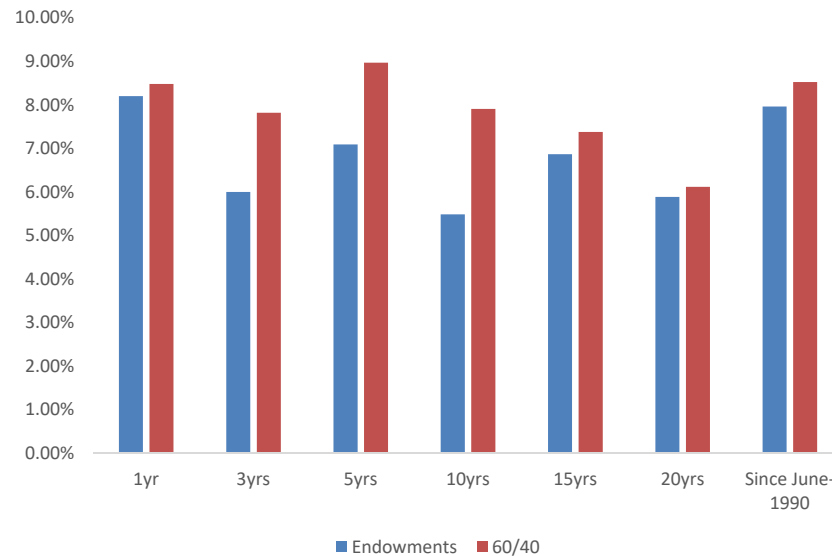
Top Quartile Active Managers Do Not Remain in Top Quartile

	# of Funds	% of Funds Remaining			
	Sep-2014	1-Year	2-Years	3-Years	4-Years
<i>Top Quartile Funds</i>					
All Domestic Equity	561	21.03	3.57	1.60	1.43
Large-Cap Equity	220	21.36	2.27	0.91	0.91
Mid-Cap Equity	83	15.66	2.41	0.00	0.00
Small-Cap Equity	128	17.19	3.12	0.78	0.00
Multi-Cap Equity	130	25.38	6.15	4.62	3.08



Institutional investors are allocating more to alternative investments such as private equity, etc.

	<u>1yr</u>	<u>3yrs</u>	<u>5yrs</u>	<u>10yrs</u>	<u>15yrs</u>	<u>20yrs</u>	<u>Since June-1990</u>
Endowments	8.2%	6.0%	7.1%	5.5%	6.9%	5.9%	8.0%
60/40	8.5%	7.8%	9.0%	7.9%	7.4%	6.1%	8.5%
variance	-0.3%	-1.8%	-1.9%	-2.4%	-0.5%	-0.2%	-0.6%



Elite University Endowments

	June 30, 2008		June 30, 2018	
	5-Year Performance	vs. 60/40	10-Year Performance	vs. 60/40
Columbia	15.4%	9.3%	8.0%	(0.1)
Penn	10.5	4.4	7.7	(0.4)
MIT	16.5	10.4	8.6	0.5
Chicago	15.6	9.5	5.8	(2.3)
Dartmouth	14.3	8.2	7.6	(0.5)
Notre Dame	17.8	11.7	7.3	(0.8)
Princeton	16.5	10.4	8.0	(0.1)
Yale	19.1	13.0	7.4	(0.7)
Stanford	17.2	11.1	6.3	(1.8)
Cornell	14.6	8.5	4.8	(3.3)
Brown	N/A	N/A	5.9	(2.2)
Harvard	17.6	11.5	4.5	(3.6)



Source: Annual Reports; NACUBO. P&I

Endowment model diversification did not help during the financial crisis

	FY2008	FY2009	FY2010	2 YR CAGR (FY2008-09)	3 YR CAGR (FY2008-10)
Over \$1B	0.6%	-20.5%	12.2%	-10.6%	-3.5%
Median	-3.3%	-19.1%	12.1%	-11.6%	-4.3%

Russell 3000	-12.7%	-26.6%	15.7%		
Barclays U.S. Aggregate	7.1%	6.1%	9.5%		
60/40 Index	-4.8%	-13.5%	13.2%	-9.3%	-2.3%

Source: NACUBO; Bloomberg.

Endowment performance expressed net of fees. 60/40 index calculated using 60% S&P 500 Index and 40% Barclays U.S. Aggregate Bond Index.



Access to top managers matters when investing in private equity

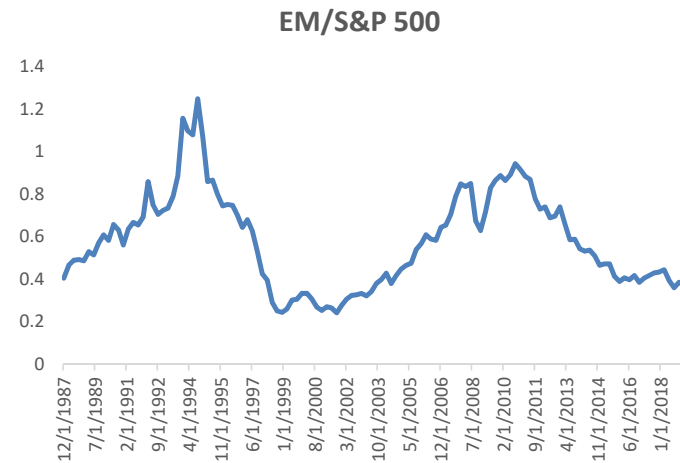
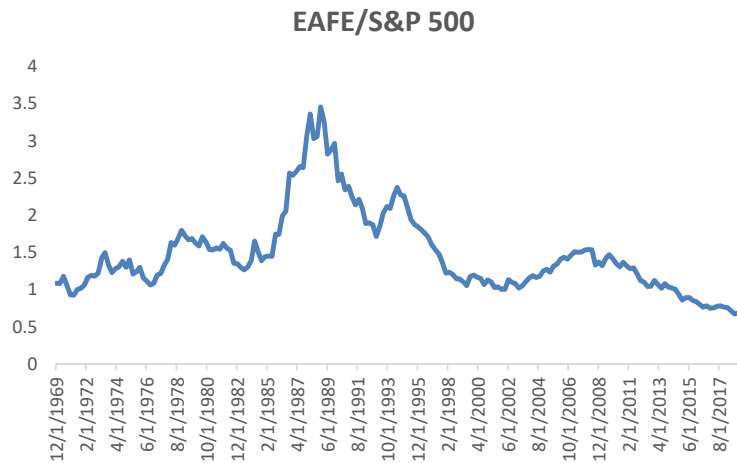
Difference Between 1st & 3rd Quartile

	Average	Median
Private Equity	19.4%	18.7%
US All-Cap Equities	4.5%	4.5%
Core-Plus Fixed Income	2.4%	2.2%
Core Fixed Income	1.5%	1.2%



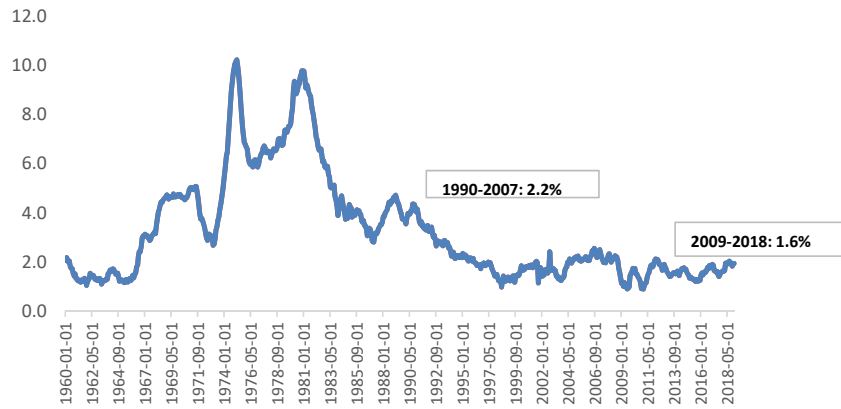
Example of Tactical Asset Allocation: Equities

- US and international equities go through periods of relative over/under-performance
- Since the financial crisis we have favored US over international equities

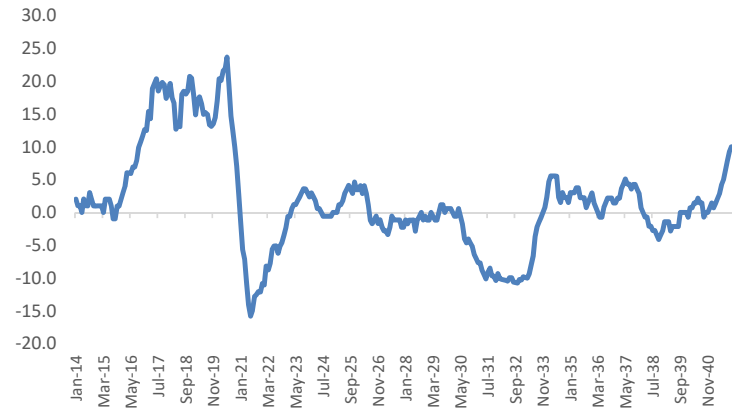


Fed is Reviewing Its Inflation Targeting Framework

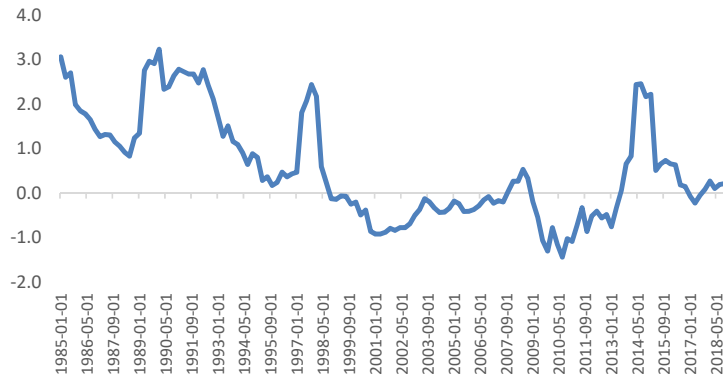
US Core PCE



US CPI



Japan Core CPI

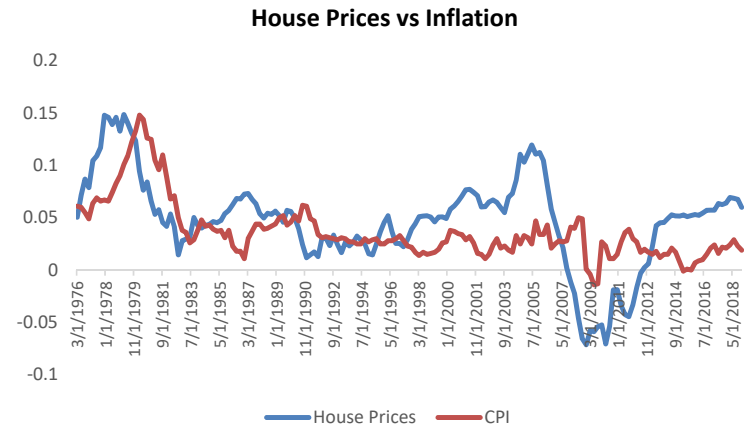
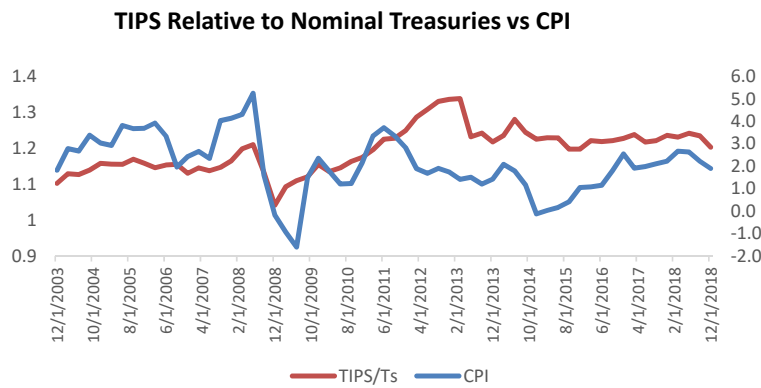
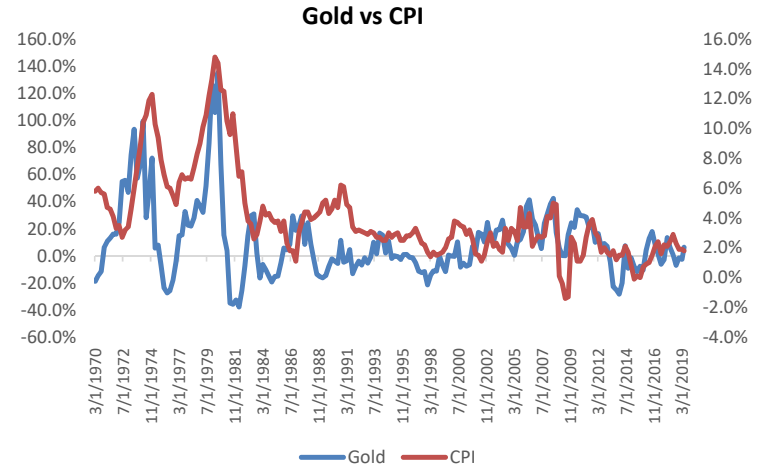
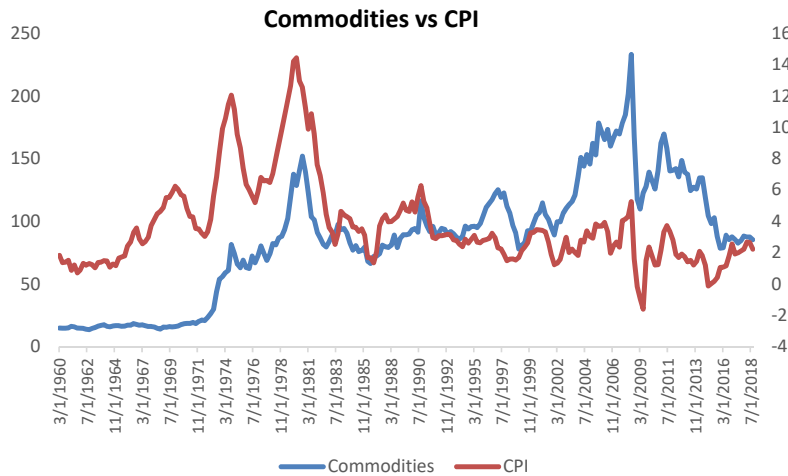


Eurozone core CPI



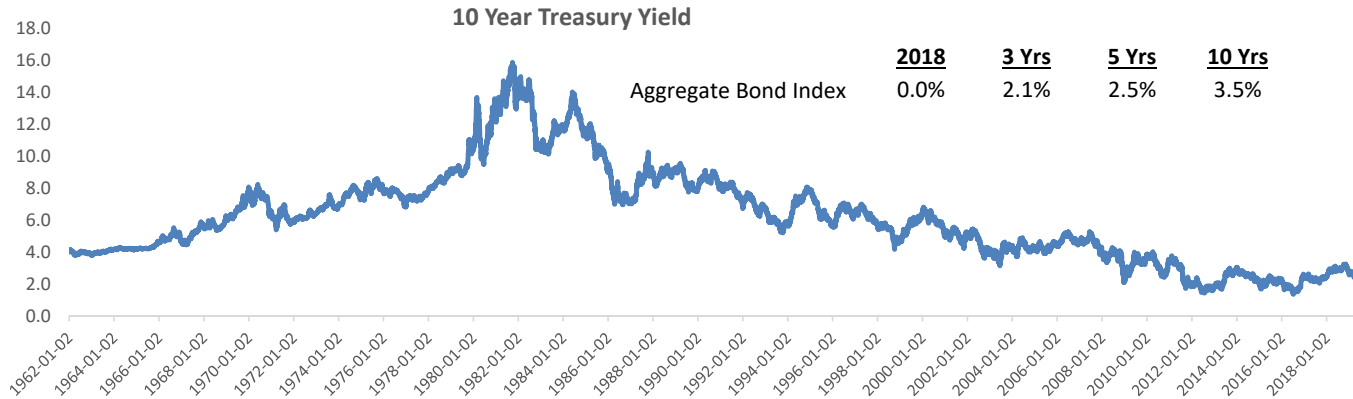
Investment Implications of Possible Changes in the Fed's Inflation Framework

- Tactical allocations to inflation sensitive asset classes becomes more important

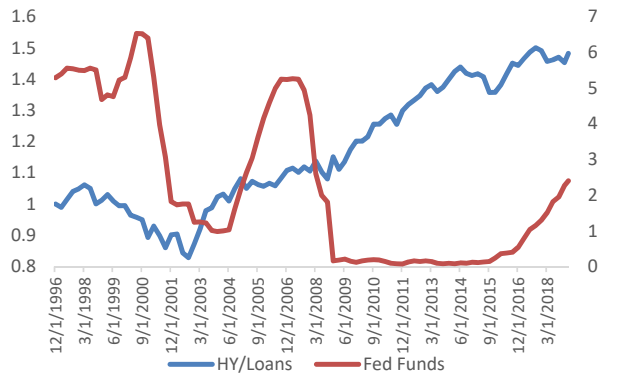


Low Interest Rates will Result in Mediocre Returns from Traditional Fixed Income Investing (Aggregate Bond Index)

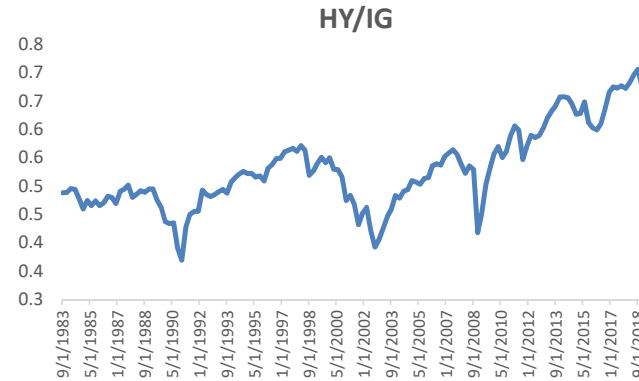
- Investors need to be more tactical in managing their fixed income portfolio



As rates rise, loans tend to perform better than HY bonds, but it is not a perfect relationship with a correlation of -0.6.



Relative performance of high yield vs investment grade



Unconstrained Bond Funds: Manager Selection is Key

Quartile	1 Year	3 Years	5 Years	7 Years	10 Years
Bottom	-2.4	2.1	1.2	2.5	4.2
Median	-0.5	3.0	2.0	3.0	4.9
Second	0.9	4.5	2.7	3.6	6.1
Top	7.9	8.4	5.4	5.6	10.8

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bottom	13.7	5.3	-1.4	7.4	-0.2	0.2	-2.3	4.0	3.0	-2.4
Median	24.1	9.1	0.2	9.7	1.5	2.2	-1.0	5.4	4.5	-0.5
Second	29.5	11.5	1.5	12.5	3.7	3.5	0.3	7.8	6.1	0.9
Top	83.7	18.2	6.1	23.1	9.3	9.3	5.1	17.7	15.2	7.9

	1 Year	3 Years	5 Years	7 Years	10 Years
Median Relative to Universal Bond Index	-0.5	0.7	-0.8	0.6	1.1

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Median Relative to Universal Bond Index	17.0	1.1	-7.2	4.4	3.0	-4.1	-1.5	2.3	0.5	-0.5

