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MoDOT & Patrol Employees' Retirement System

Asset Liability Study

November 2014

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Executive Summary

- **MPERS last conducted a formal asset liability study in January 2010 with your previous consultant Summit Strategies Group**

- **NEPC recommends clients conduct formal asset liability studies every 3-5 years**

- **The purpose of this study is to:**
  - Review key issues facing the plan
  - Review asset-liability projections
  - Compare the current target asset allocation to other asset mixes to reaffirm the Board's comfort with the projected expected return and expected risk for the portfolio

- **This study utilizes NEPC's 2014 projected asset class return, volatility (standard deviation), and correlation assumptions**
  - We will be publishing our 2015 assumptions during the first half of December 2014
    - Therefore, at the February 2015 meeting, we will present the current target asset allocation (and any other mixes discussed as a result of this study) utilizing the NEPC 2015 assumptions to show their expected return and expected risk

- **Funded status projected to rise significantly over the next decade, from 49% to 68%**
  - Net outflows (benefit payments minus contributions) are small at 2% of plan assets each year

- **Long-term ROA assumption of 7.75% is not projected to be met over the next 5-7 years due to lower expected returns amongst the asset classes in relation to long term averages, but is projected to be met over the next 30 years**

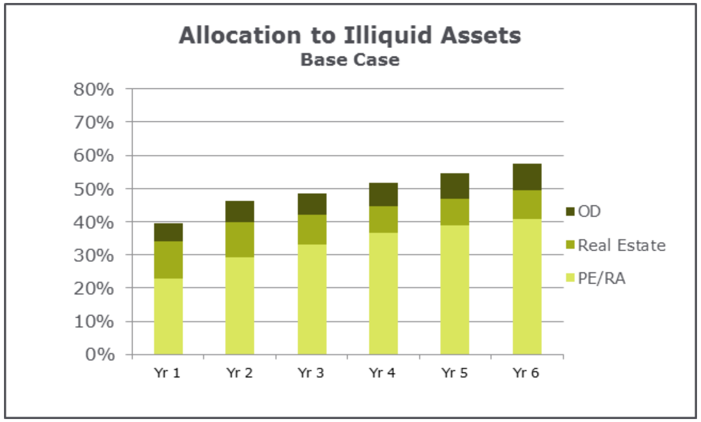
- **We believe the current target allocation is appropriate for this plan**
  - However small tactical re-allocations within the target may be warranted given current market opportunities

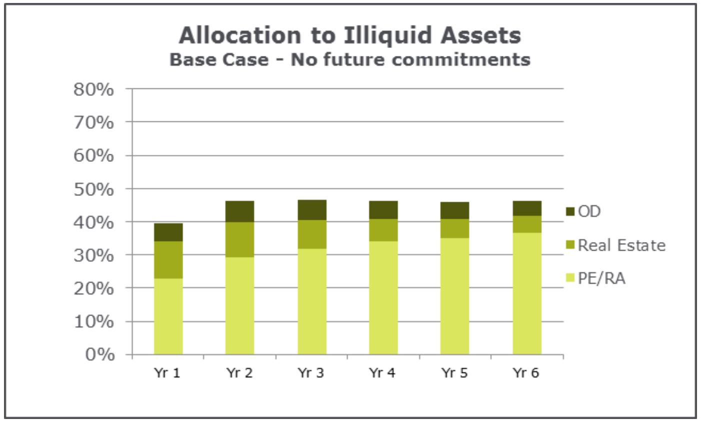
- **While current plan liquidity is sound, certain economic environments (denominator effect) may cause the illiquid portfolio to become over allocated causing stress on the Plan**
  - The portfolio has 35% target to illiquid investments, plus 15% targeted to hedge funds
  - Alternatives, primarily illiquid, consume over 60% of the risk budget

Key Considerations for the Plan

- **While current plan liquidity is sound, certain economic environments (denominator effect) may cause the illiquid portfolio to become over allocated causing stress on the Plan**
  - Continue to review the plans liquidity profile on an annual basis
    - NEPC last conducted a liquidity study on June 2014…outcome was that liquidity was sound
    - Staff has worked with NEPC to develop pacing plans for each illiquid asset class to help better assess future drawdowns and distributions which will likely alter the plan's liquidity profile…these plans will be conducted annually

- **As detailed in the alternative investments pacing plans, new commitments are designed to strike a balance between liquidity and future opportunities**
  - Ideally, invest over a multi-year period to ensure strategy and vintage year diversification
  - But maintain a large enough liquid asset base to rebalance, meet cash flow requirements, and take advantage of future opportunities





After Recent Run, Return Outlook for Equities is Less Promising

- **Equity return outlook remains low after another year of outperformance**
  - Valuations have become more expensive
  - Federal Reserve's ability to support risky assets could come to an end with the conclusion of bond buying activities

- **Divergence in economic conditions broadens range of outcomes by country**
  - Market risks continue to simmer beneath strong equity returns

- **Current target allocation is well diversified but largely exposed to growth risk factors**
  - 46% allocation to public/private equities accounts for 68% of the risk
  - NEPC will be conducting a factor analysis of the portfolio with Staff
  - A potential deviation away from the current structure (reliance on growth risk factors) could be the implementation of a risk balanced portfolio/approach
    - NEPC and Staff presented the pro's/con's of risk parity to the Board earlier in the 2014
      - It was determined by the Board not to implement such a strategy at the total portfolio level, however the Board was open to implementing risk parity as a piece of the overall allocation
    - Staff and NEPC will continue to evaluate the merits of risk parity and implement if warranted

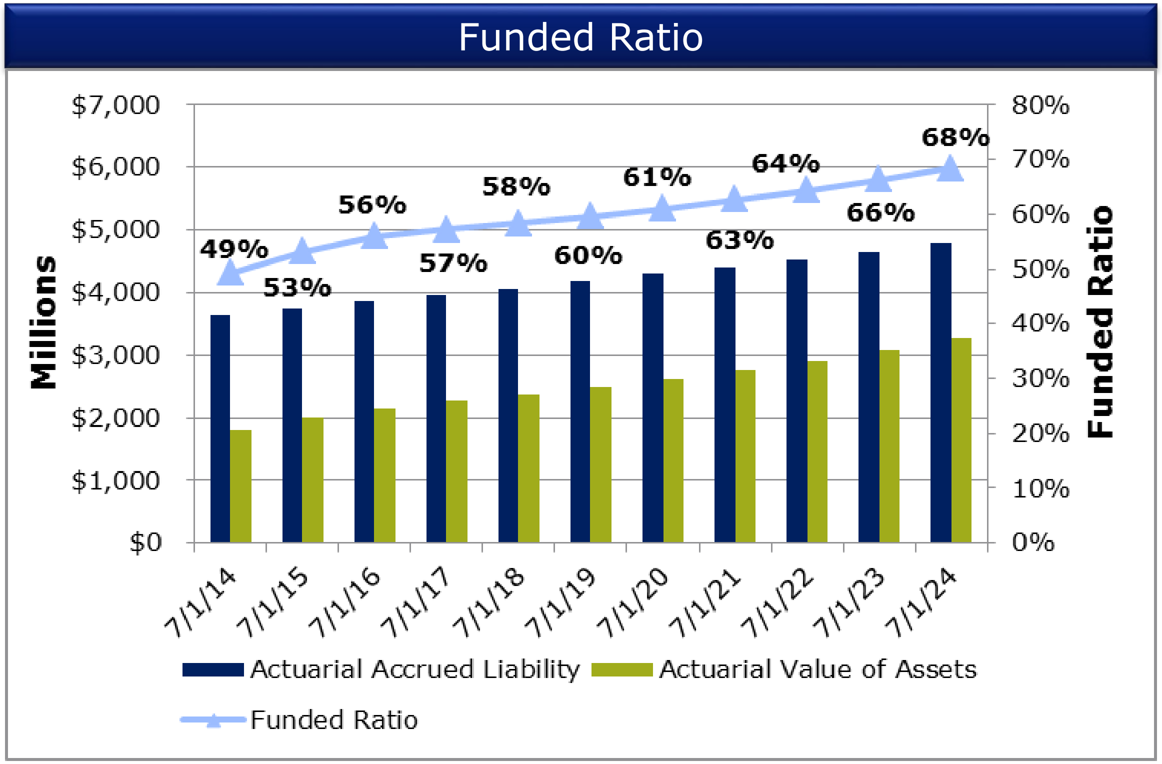
Asset-Liability Projections

Plan Summary (All $ in Millions)

Retirement Plan Funded Ratio	7/1/2013 Results	7/1/2014 Results	7/1/2015 Estimate
1. Actuarial Value of Assets	$1,657	$1,795	$1,993
2. Actuarial Accrued Liability	$3,584	$3,650	$3,751
3. Funded Ratio (1 divided by 2)	46.2%	49.2%	53.1%
4. Market Value of Assets	$1,682	$1,937	$2,046
5. Market Value Funded Ratio (4 divided by 2)	46.9%	53.1%	54.6%

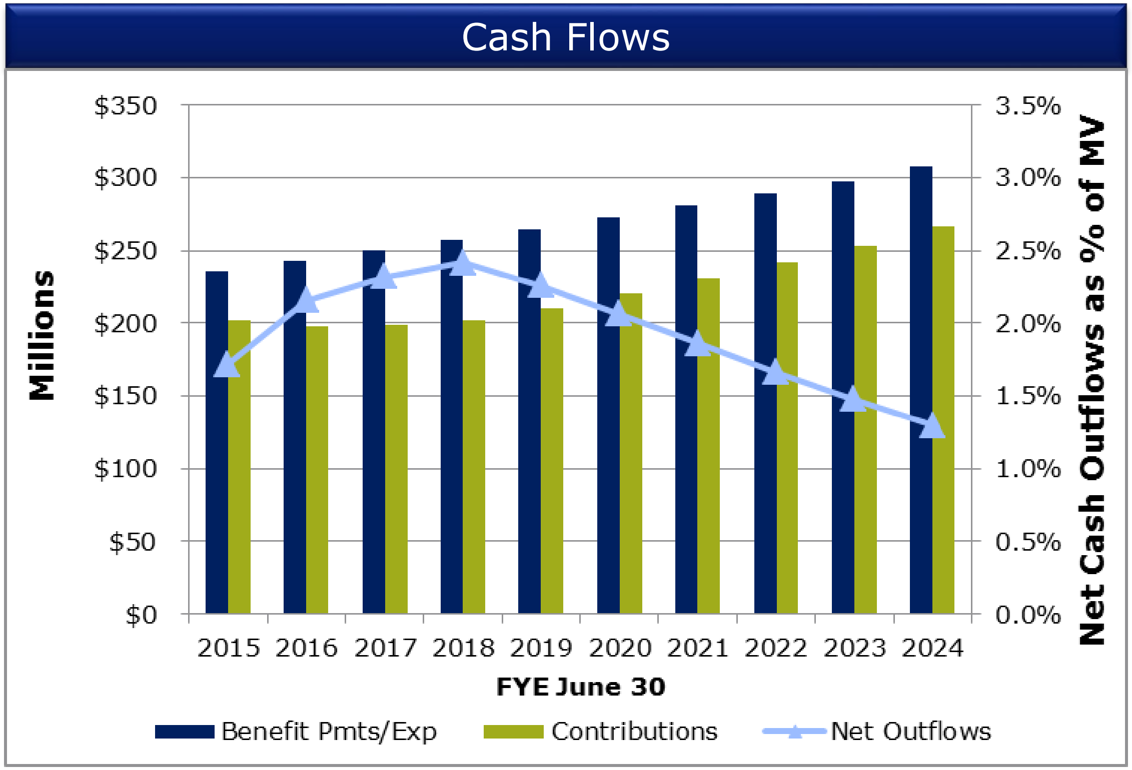
- **Funded ratio improvements are projected at 7/1/2015 as investment returns outpace expected growth in liability**

Deterministic Projections: Funded Percentage (Current Allocation)



- **Significant improvement in the funded ratio over the next 10 years**
  - Average annual liability increase is small at roughly 3% of plan assets
  - Unrecognized gains from past few years are a tailwind for short-term funded status improvements
  - Contributions cover a significant portion of plan outflows
  - Future experience losses, market downturns, benefit changes, etc. would mitigate the progress noted above.

Deterministic Projections: Cash Flows (Current Allocation)

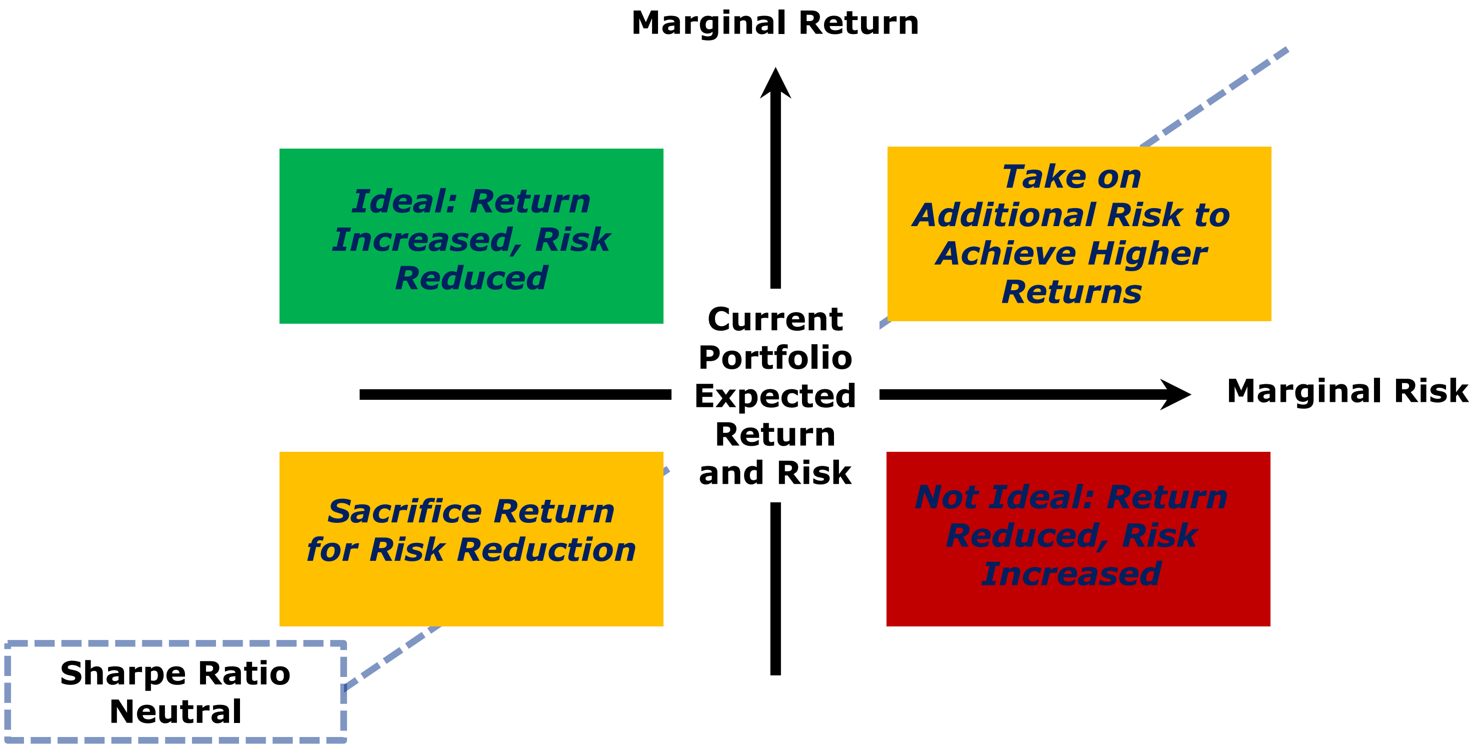


- **Projected benefit payments represent 10-11% of plan assets per year**
  - Current net outflows (benefit payments/expenses minus contributions) are low at 2.2% of plan assets
  - Net outflows projected to decline to 1.3% by 2024 as contributions begin to outpace payments

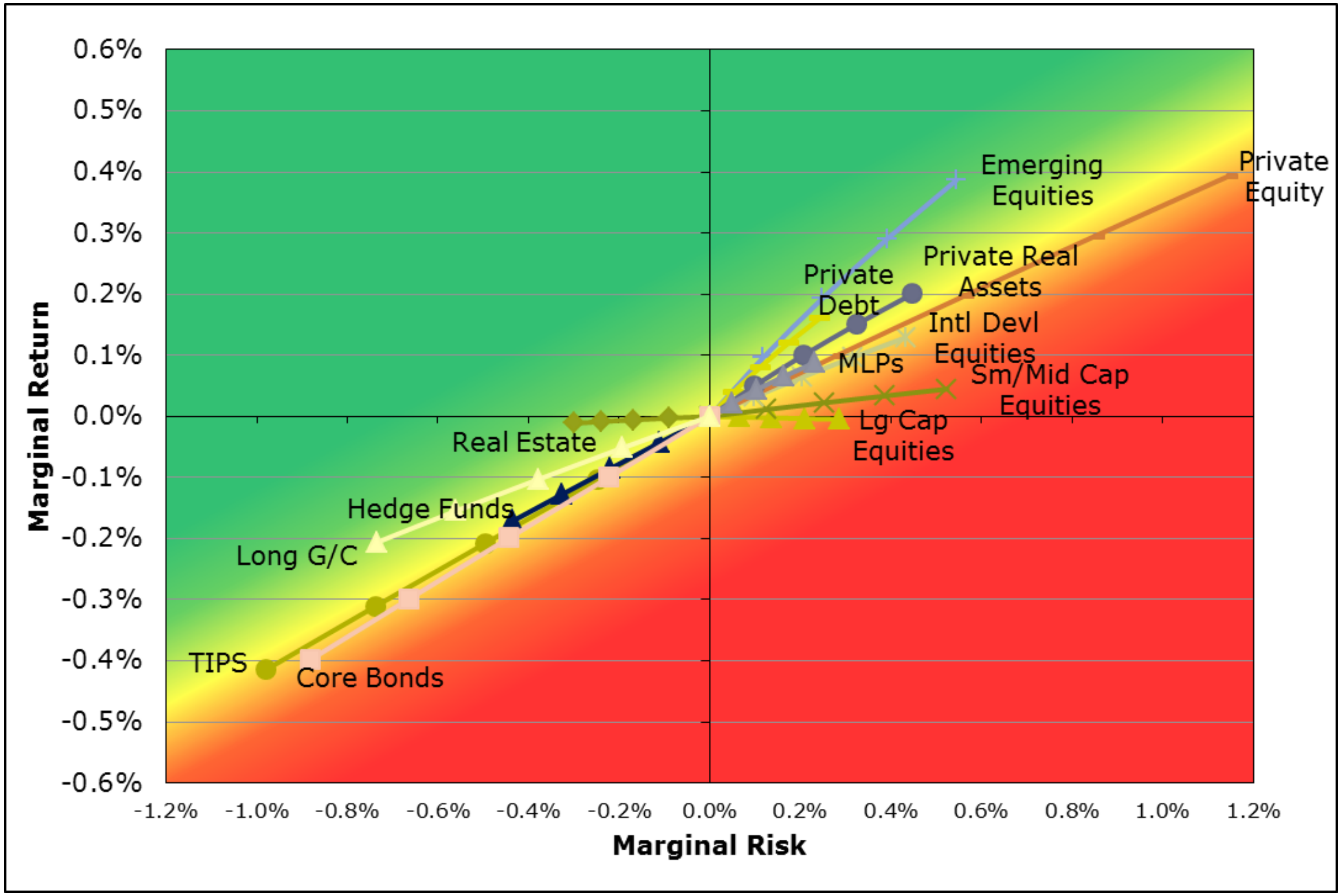
Comparison of Asset Mixes

- **Thinking about risk and return on the margin can help evaluate potential asset allocation decisions**

- **Utilizes mean-variance assumptions**
  - Certain limitations (particularly liquidity) should be considered outside of this framework



Portfolio Efficiency: Marginal Risk and Return (2% shifts)



- **Current target allocation is very efficient with a higher Sharpe ratio than many of your peers**
- **Emerging equities are the only liquid asset class that would improve efficiency on the margin**

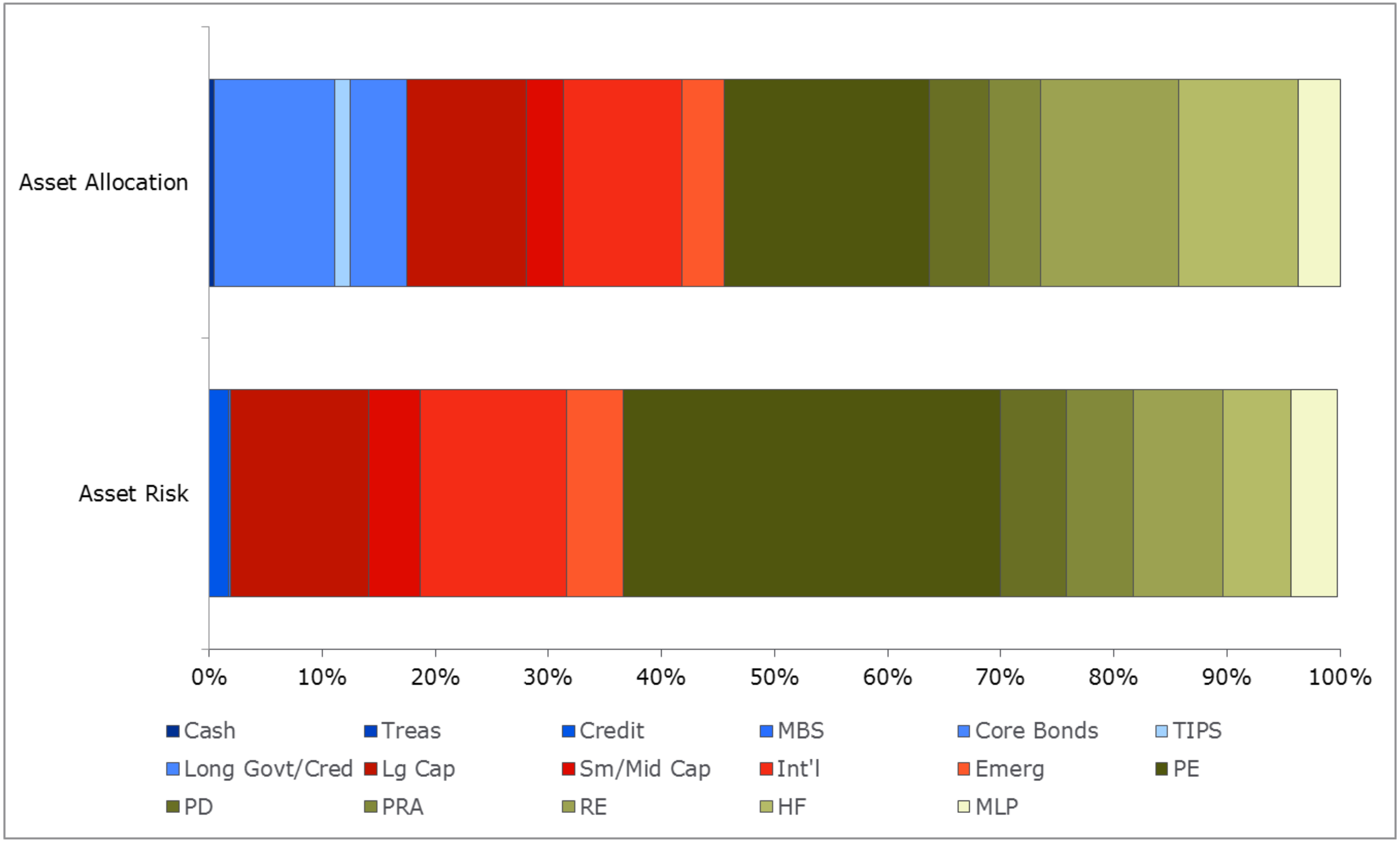
Asset Mixes Modeled

	Current Allocation	Current Target	Lower Vol Mix	7.75% Mix	60/40	75/25	Tactical Target
Cash	**0.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Global Equity	**28.1%**	**30.0%**	**23.0%**	**28.0%**	**60.0%**	**75.0%**	**26.0%**
Core Bonds	10.7%	10.0%	10.0%	0.0%	40.0%	25.0%	10.0%
EMD (External)	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%
EMD (Local Currency)	0.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%
TIPS	1.3%	5.0%	6.0%	0.0%	0.0%	0.0%	5.0%
Long Govt/Credit	5.0%	5.0%	12.0%	5.0%	0.0%	0.0%	5.0%
Diversified Fixed Income	0.0%	0.0%	0.0%	6.0%	0.0%	0.0%	0.0%
Total Fixed Income	**17.1%**	**20.0%**	**28.0%**	**15.0%**	**40.0%**	**25.0%**	**20.0%**
Private Equity	18.2%	15.0%	8.0%	18.0%	0.0%	0.0%	15.0%
Private Debt	5.2%	5.0%	4.0%	8.0%	0.0%	0.0%	7.5%
Private Real Assets	4.6%	5.0%	3.0%	7.0%	0.0%	0.0%	7.5%
Real Estate (Core)	12.2%	10.0%	10.0%	12.0%	0.0%	0.0%	10.0%
Hedge Funds	10.6%	15.0%	8.0%	8.0%	0.0%	0.0%	10.0%
Total Alternatives	**50.8%**	**50.0%**	**33.0%**	**53.0%**	**0.0%**	**0.0%**	**50.0%**
Global Asset Allocation	0.0%	0.0%	12.0%	0.0%	0.0%	0.0%	0.0%
MLPs	3.7%	0.0%	4.0%	4.0%	0.0%	0.0%	4.0%
Total Other	**3.7%**	**0.0%**	**16.0%**	**4.0%**	**0.0%**	**0.0%**	**4.0%**

Expected Return 5-7 yr	***7.3%***	***7.0%***	***6.5%***	***7.7%***	***5.7%***	***6.4%***	***7.2%***
Expected Return 30 yr	***8.3%***	***8.1%***	***7.7%***	***8.7%***	***7.2%***	***7.8%***	***8.2%***
Standard Dev of Asset Return	***13.1%***	***12.3%***	***10.5%***	***14.3%***	***11.3%***	***13.7%***	***12.7%***
Sharpe Ratio	***0.44***	***0.45***	***0.48***	***0.44***	***0.37***	***0.36***	***0.45***

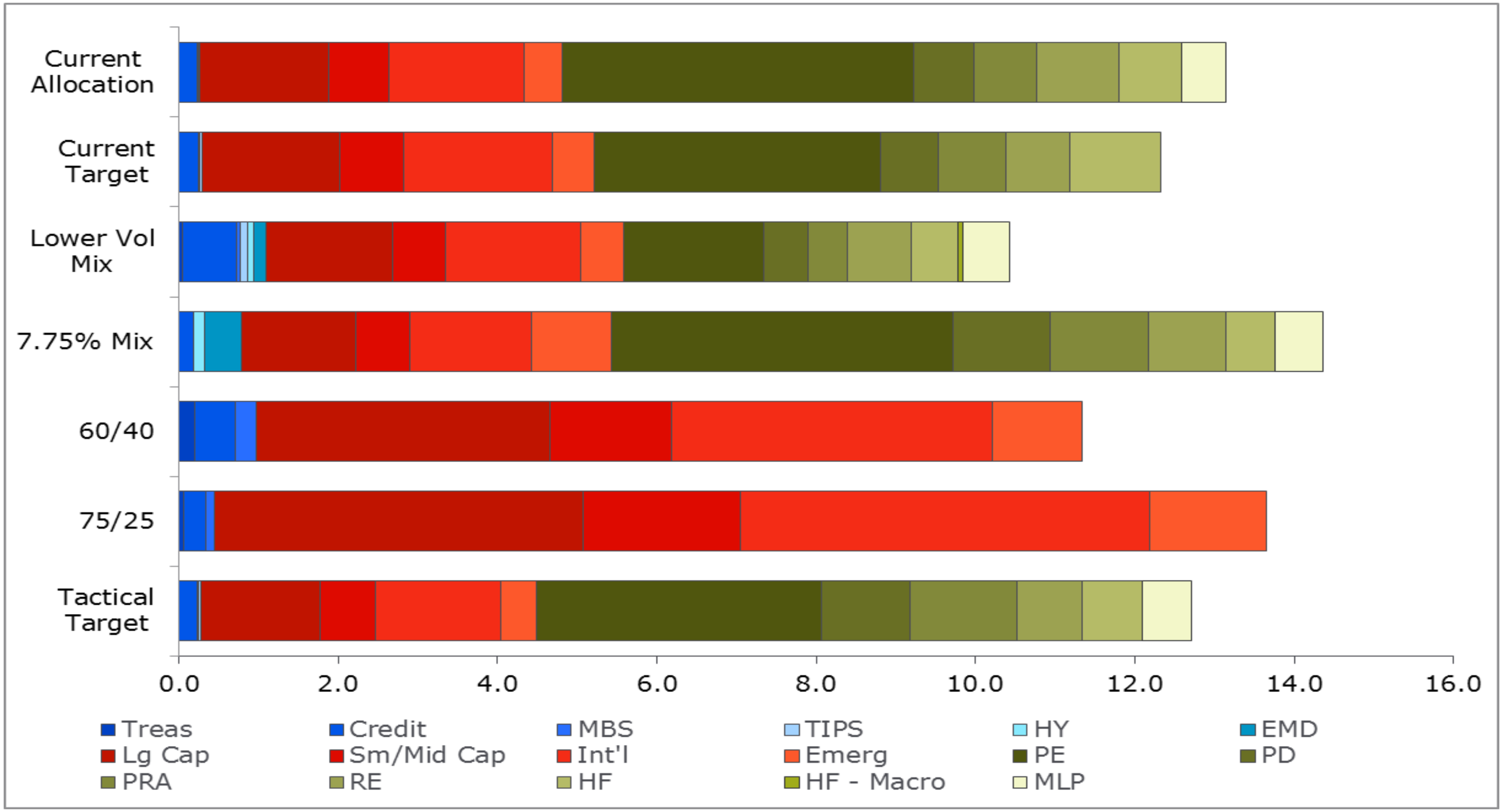
* Mix "7.75%" has a double weight to emerging market equities (within the global equity allocation) compared to the other mixes profiled

Risk Analysis – Current Allocation



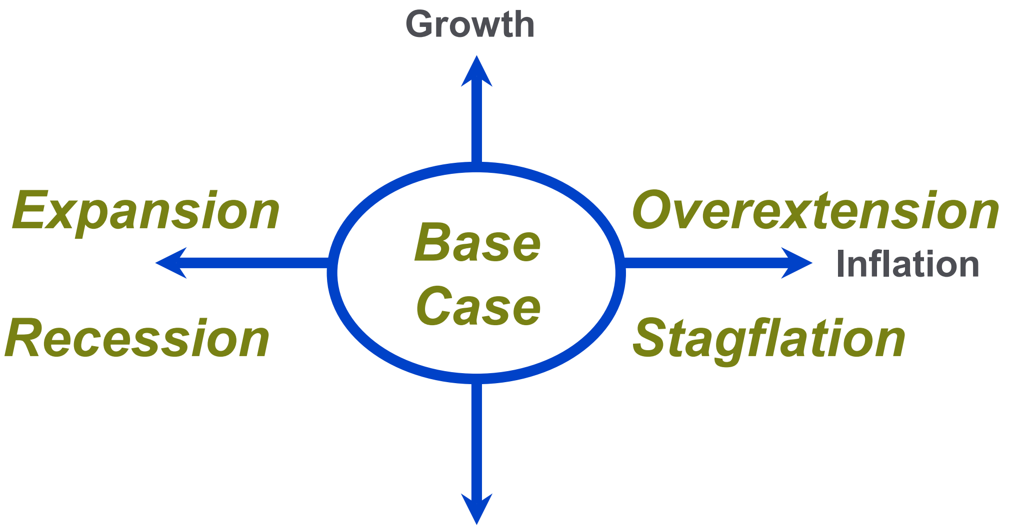
Mix	% Risk from Fixed Income	% Risk From Public Equities	% Risk From Alts/Other
Current Allocation	2%	35%	64%

Risk Analysis Comparison



Mix	% Risk from Fixed Income	% Risk From Public Equities	% Risk From Alts/Other
Current Allocation	2%	35%	64%
Current Target	2%	40%	58%
Lower Vol Mix	11%	43%	47%
7.75% Mix	5%	32%	62%
60/40	9%	91%	0%
75/25	3%	97%	0%
Tactical Target	2%	33%	65%

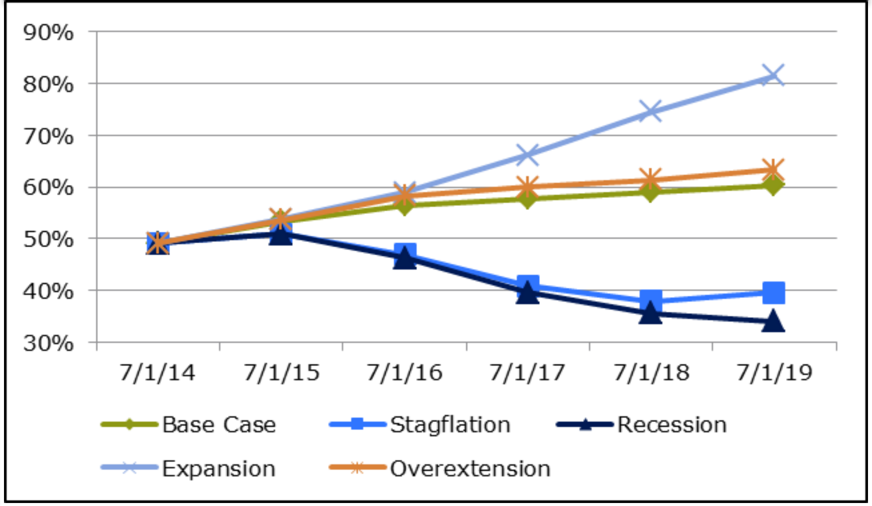
- **NEPC Scenario Analysis allows plan sponsors to test the viability of asset mixes under multiple economic scenarios**
  - Allows better understanding of risk exposures under contrasting inflation and economic growth regimes
  - Can understand the effect on both assets and liabilities (funded status)



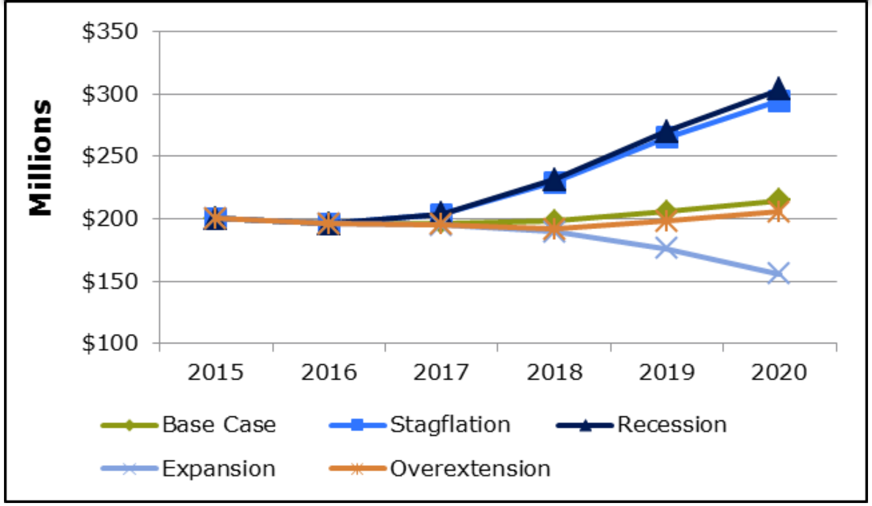
Scenario Analysis: Current Target Allocation

Current Allocation

Funded Ratio

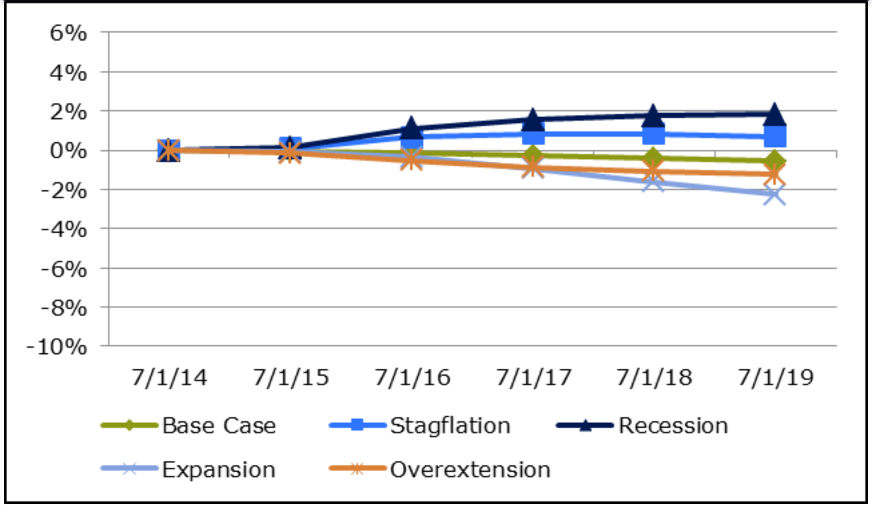


Required Contribution

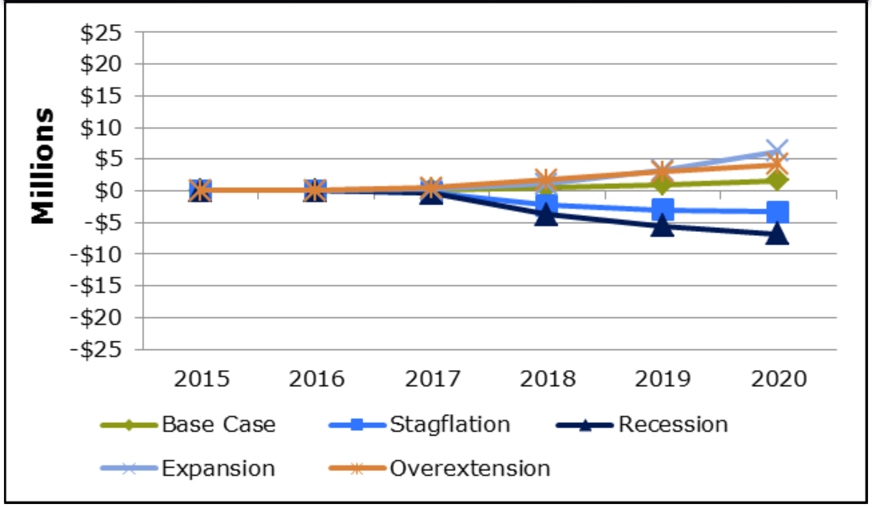


Current Target

Funded Ratio vs. Current Allocation

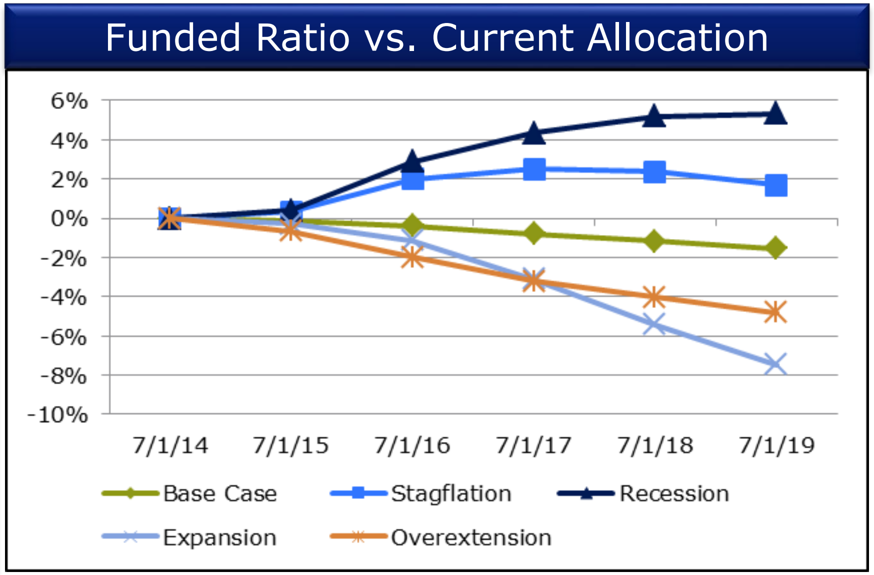


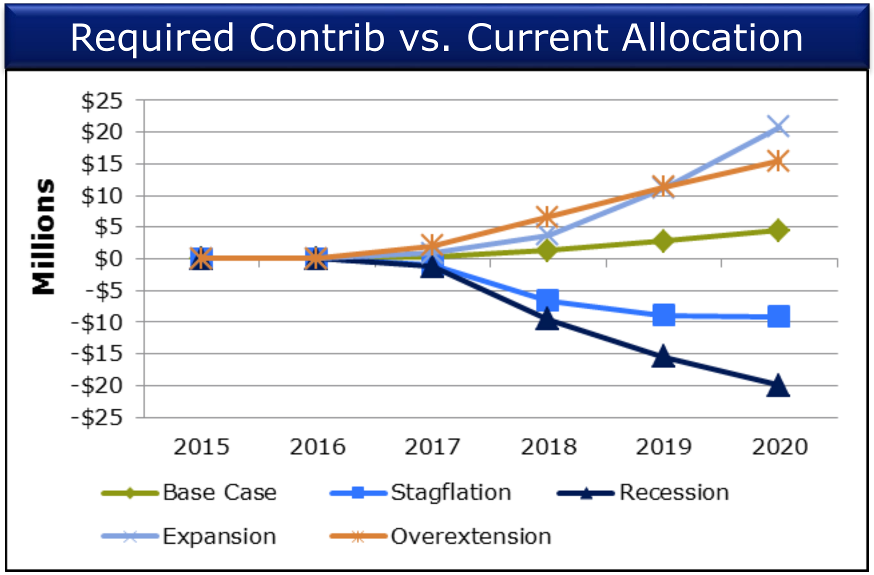
Required Contrib vs. Current Allocation



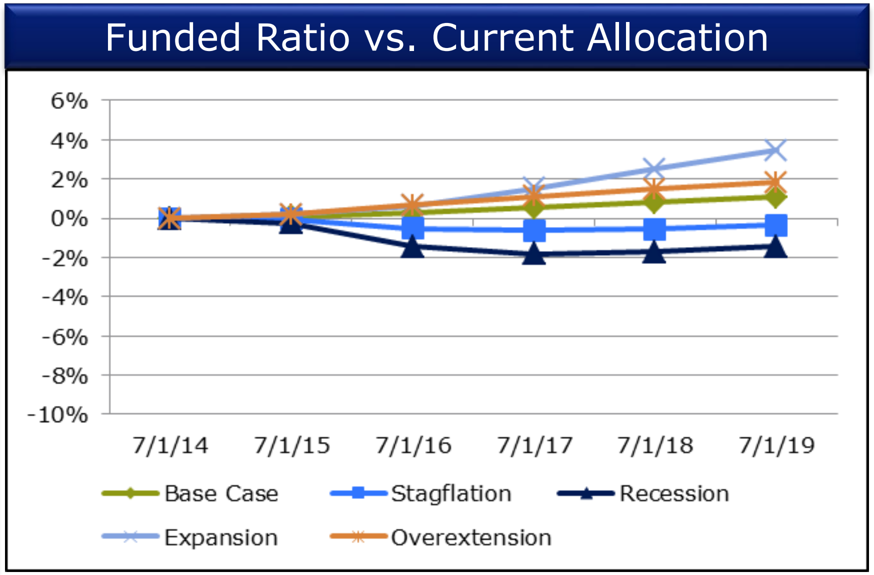
Scenario Analysis: Current Target Allocation

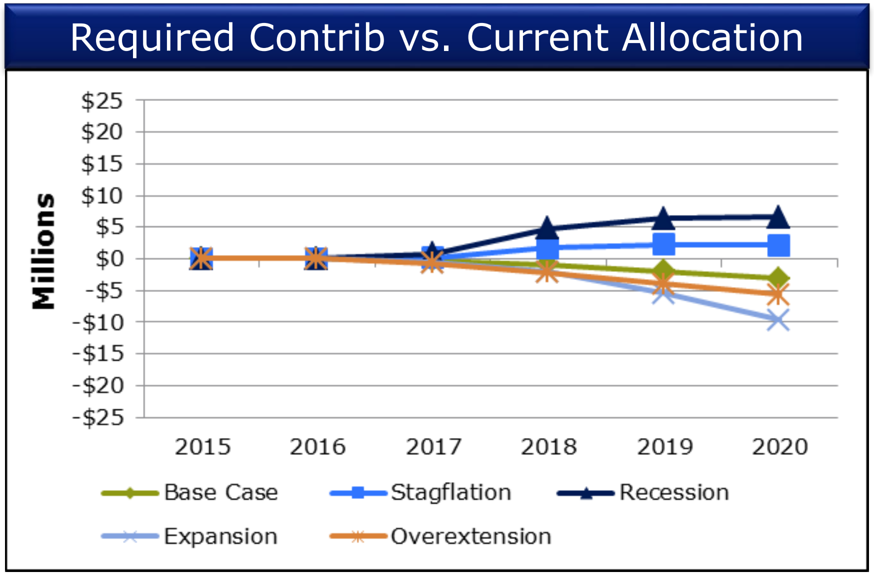
Lower Vol Mix





7.75% Mix

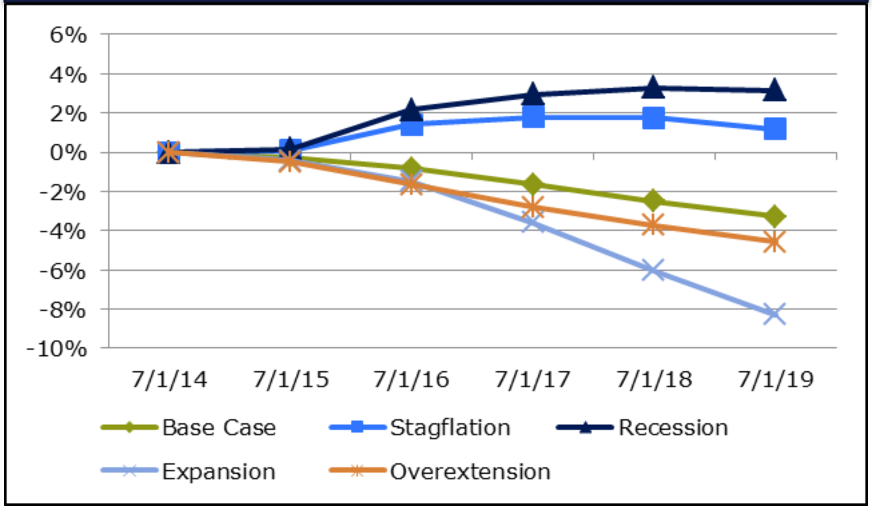




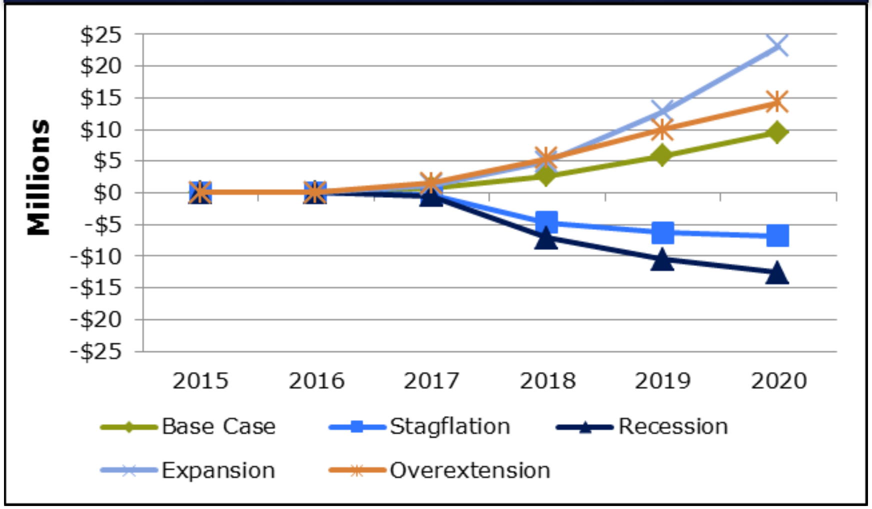
Scenario Analysis: Current Target Allocation

60/40 Mix

Funded Ratio vs. Current Allocation

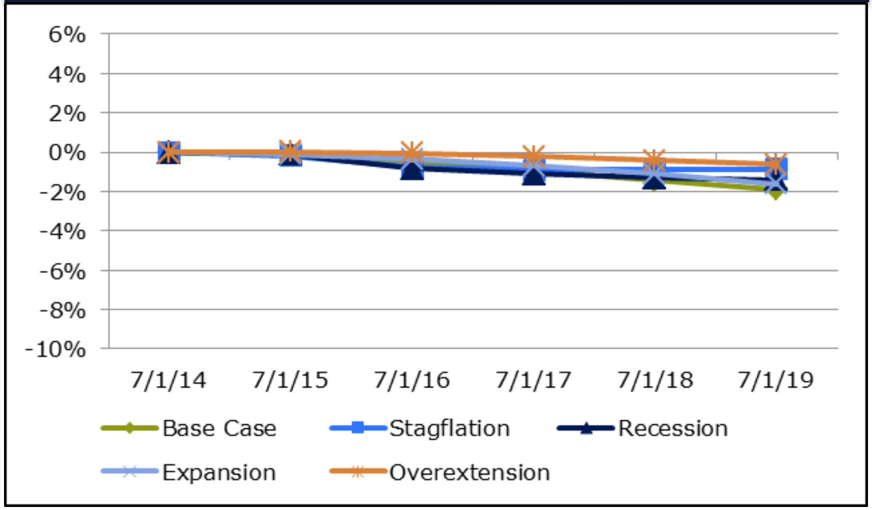


Required Contrib vs. Current Allocation

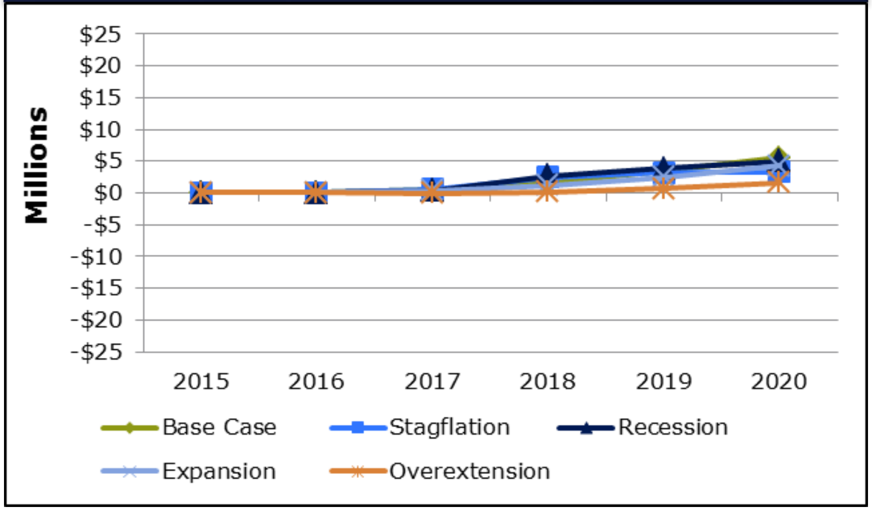


75/25 Mix

Funded Ratio vs. Current Allocation



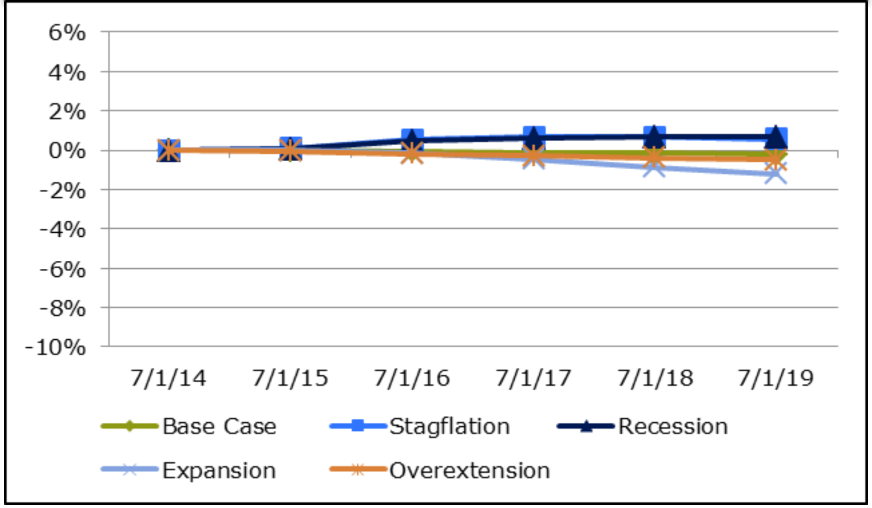
Required Contrib vs. Current Allocation



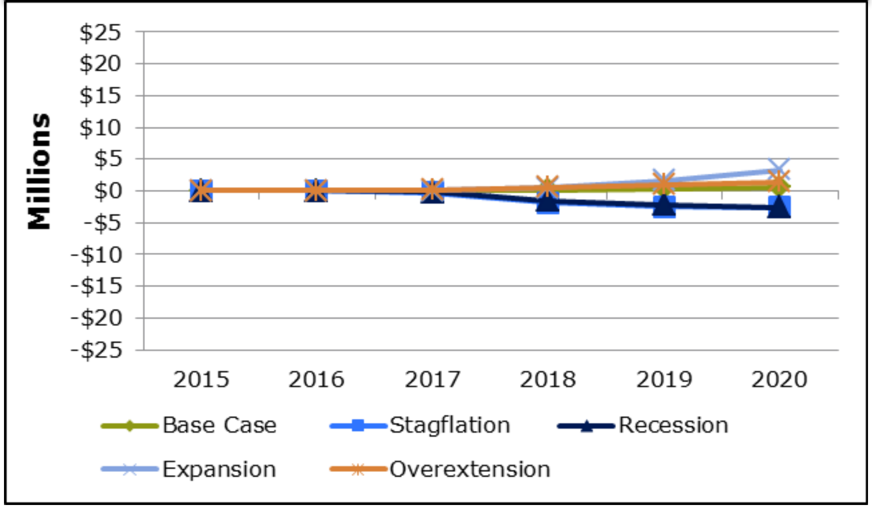
Scenario Analysis: Current Target Allocation

Tactical Target

Funded Ratio vs. Current Allocation



Required Contrib vs. Current Allocation



Conclusions

- **Funded ratio projected to grow from 49% to 68% over 10 years**
  - Projected asset returns in line with long-term expected return on assets/discount rate
  - In a recessionary environment, funded status could quickly deteriorate; maintaining the required contributions plays a more critical role to the continued health of the plan
- **The plan's liquidity is healthy enough to support the current allocations to alternative investments**
  - Investment gains + contributions offset outflows, leading to growth of asset base
  - However the illiquid allocation should be monitored as existing commitments are funded and new commitments are considered
    - CIO periodically conducts a liquidity study in conjunction with NEPC
    - NEPC provides yearly strategic investment plans for each asset class which includes pacing models
- **We believe the current target allocation is still appropriate for this plan**
  - However small tactical re-allocations within the target may be warranted given current market opportunities (see "Tactical Target Allocation" on page 16)
    - Relative to target policy…overweight private debt and private real assets, underweight hedge funds

- **Current target allocation is well diversified but largely exposed to growth risk factors**
  - 46% allocation to public/private equities accounts for 68% of the risk
  - A potential deviation away from the current structure (reliance on growth risk factors) could be the implementation of a risk balanced portfolio/approach
    - NEPC and Staff presented the pro's/con's of risk parity to the Board earlier in the 2014
      - It was determined by the Board not to implement such a strategy at the total portfolio level, however the Board was open to implementing risk parity as a piece of the overall allocation
    - Staff and NEPC will continue to evaluate the merits of risk parity and implement if warranted

Appendix

- **Liability calculations based on GRS 2014 draft actuarial valuation report, and benefit payment and payroll projections**
  - NEPC projected liability and normal cost in accordance with plan methodology
  - Annual trust expenses assumed to be 1.06% of payroll
  - Disability Insurance assumed to 0.53% of payroll
  - Employee contributions assumed to 0.41% of payroll
  - Cost of living adjustment (COLA) of 2.4% per year
  - Required contributions are assumed to be made in all future years

- **Actual asset returns through June 30, 2014 were used, with NEPC 2014 assumptions used for expected return after that date**
  - Gains/losses smoothed over 3 years for Actuarial Value of Assets methodology

- **Discount rate/Expected ROA is assumed to be 7.75%**

- **No future benefit or plan changes are assumed**

- **Capital calls and distributions based on standard industry averages, with underlying assumptions from *Thomson Reuters Venture Economics* for private equity and typical patterns for real estate and real assets**

- **Assumption for new commitment schedule**
  - Private Equity: $60m/yr 2014; $50m/yr 2015; $60m/yr 2016; $70m/yr 2017-19
  - Opportunistic Debt: $20m/yr 2014; $10m/yr 2015; $45m/yr 2016-17; $30m/yr 2018-19
  - Real Estate: $20m/yr 2014-15; $25m/yr 2016-17; $20m/yr 2018; $25m/yr 2019
  - Real Assets: $20m/yr 2014-15; $15m/yr 2016; $25m/yr 2017-18; $20m/yr 2019

- **Risk budgeting considers the portfolio from a total risk perspective rather than total return**

- **A way to determine the contribution to overall portfolio risk by each asset class in the portfolio, based on**
  - Asset class volatility assumptions
  - Correlations between asset classes

- **Shows the benefit of diversification within a portfolio**
  - Risk exposures in relation to allocation size

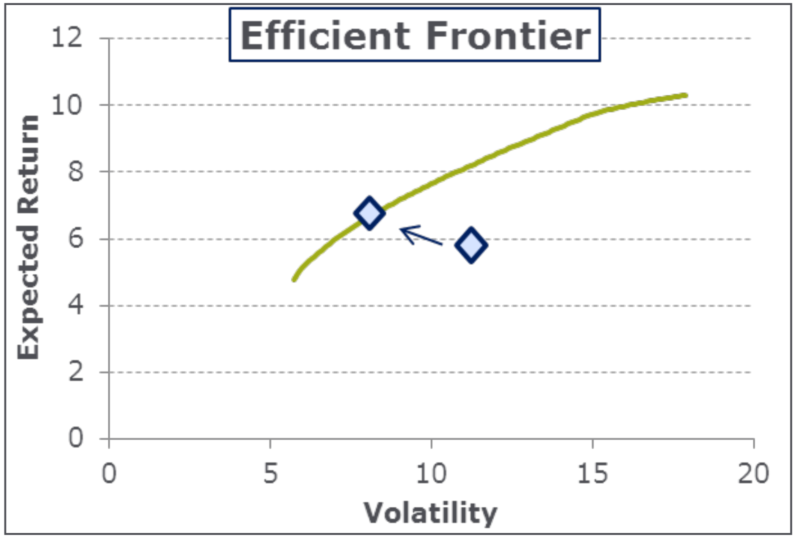
Foundations of Asset-Liability Study

- **Understand and define objectives**
  - Fund long-term benefit obligations
  - Define liquidity requirements
  - Incorporate other investment constraints

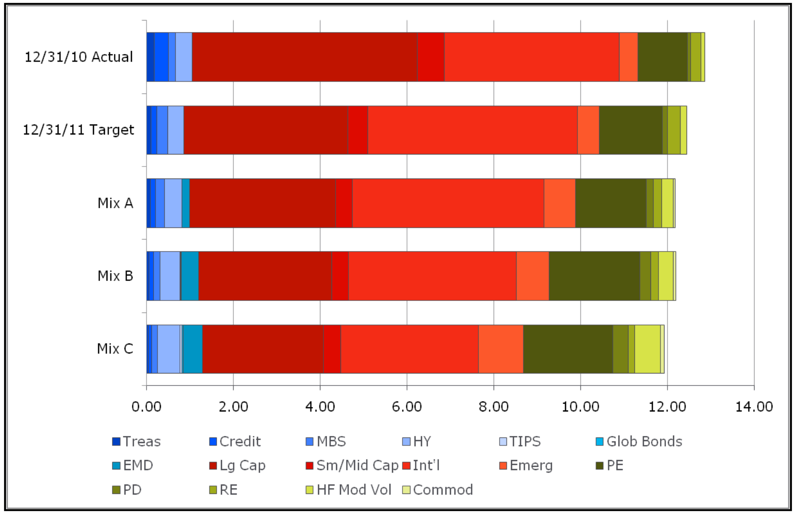
- **Use forward-looking, fundamental based assumptions for all forecasting**
  - Realistic outlook for plan changes over intermediate and long-term
  - Identify opportunities for enhancing portfolio structure

- **Apply multiple perspectives/tools to build robust, objective driven asset allocation solutions**
  - Mean-variance optimization
  - Risk budgeting
  - Deterministic forecasting
  - Scenario analysis

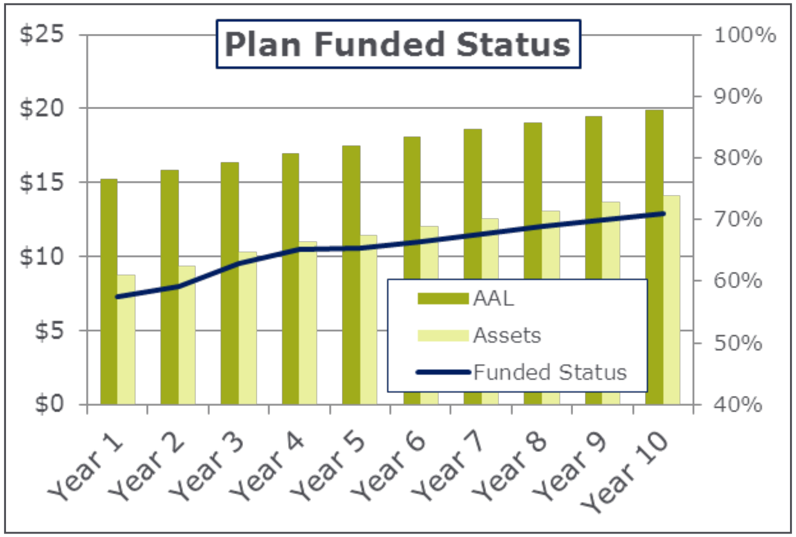
- **Risk-return Analysis**
  - Seeking highest possible expected return for each given level of volatility
  - Model inputs are static
    - Expected return, volatility, correlation, constraints
  - A useful but limited tool for asset allocation
  - Risk-return plots are useful snapshot comparisons of various alternative mixes



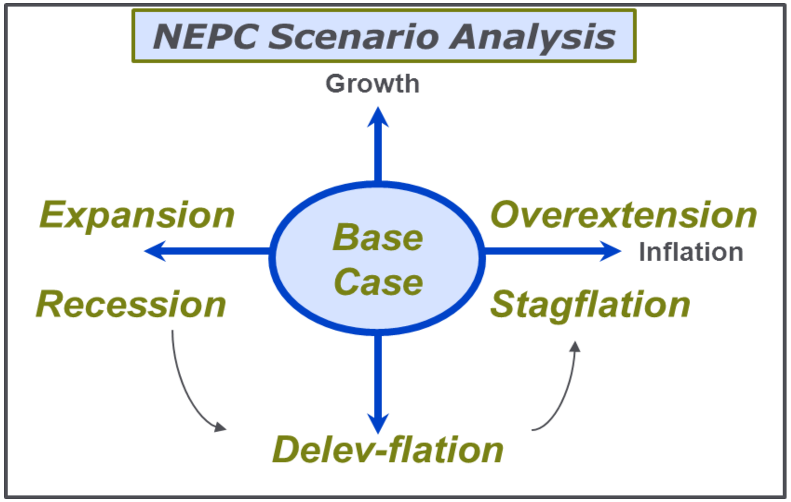
- **Risk Budgeting**
  - Considers the portfolio from a total risk perspective rather than total return
  - Determines the contribution to risk from each asset class based on:
    - Standard deviation (volatility)
    - Correlations
  - Highlights benefits of diversification and risk balance
  - Both total risk and distribution of risk across asset classes can be compared across mixes



- **Deterministic Forecasting**
  - Provides baseline projections of assets and liabilities
  - Assumes all economic and population assumptions are realized at expectations
    - Expected portfolio returns
    - Expected liability growth
    - Expected contributions
  - Useful for planning but does not capture variability of outcomes or risk of not reaching objectives

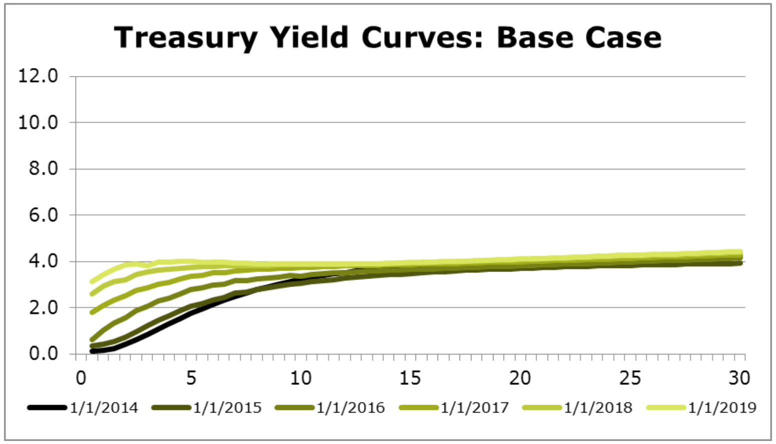


- **Scenario Analysis**
  - Tests the viability of alternative asset mixes under multiple economic scenarios
  - Allows better understanding of risk exposures under contrasting inflation and economic growth regimes
  - Can understand the effect on both assets and liabilities
  - Can reveals risk tolerance under various economic environments

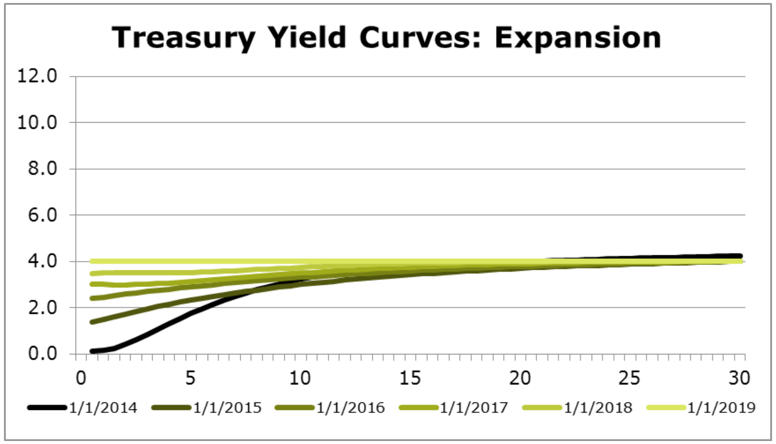


Scenarios Considered

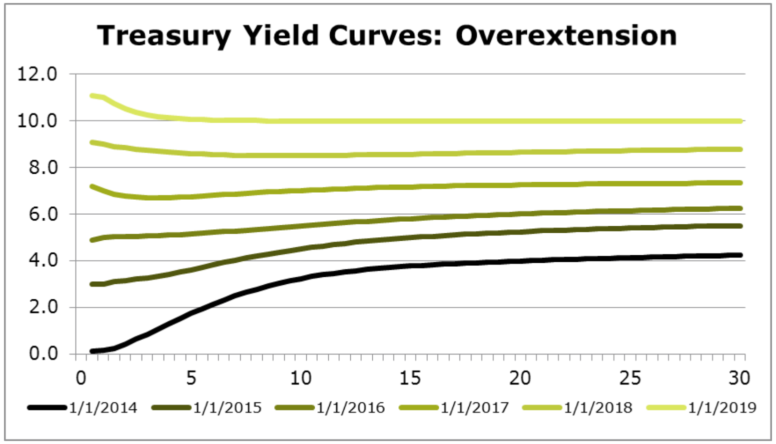
- **Base Case**
  - No volatility
  - Asset returns over 5-year period in line with NEPC 2014 5-7 Year Assumptions



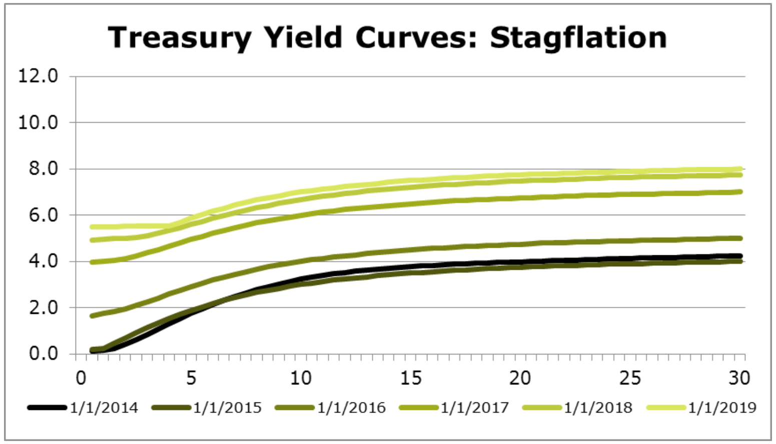
- **Expansion**
  - Economy is growing by a strong, but seemingly sustainable level
  - Bond yields are stable, inflation is manageable, equities and other high volatility asset classes perform quite well in this environment
  - Historical example: 2004-2006
  - *Large cap equities time-series: 10%, 17%, 28%, 12%, 10%*



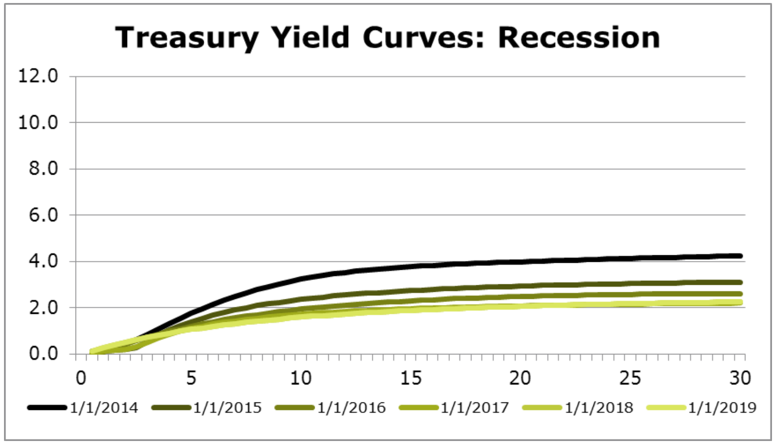
- **Overextension**
  - Economy is growing at a rapid pace, inflation increases significantly – booming times but at the cost of future growth
  - Bond yields move higher as a result of inflation; high yield does well with confidence in the economy
  - Equities, real estate, and commodities fuel rapid expansion
  - Historical example: Vietnam War era (1967-1971)
  - *Large cap equities time-series: 12%, 16%, 0%, 12%, 16%*



- **Stagflation**
  - Two problems – (1) the economy is not growing, (2) inflation has skyrocketed
    - Inflation is sticky – once it gets high, it stays high for several years
    - Fed has limited options to kick-start economy because easing only promotes further inflation
  - Equities sag; bonds lose real value; real assets such as TIPS perform well on a relative basis because they are linked to inflation
  - Historical example: flat stock market and double digit inflation of the mid-1970s
  - *Large cap equities time-series: -8%, -15%, 0%, 9%, 12%*



- **Recession**
  - Economy stalls – there is a flight to quality as investors lose confidence
    - Equity markets fall
    - Bond yields fall
  - Interest-sensitive securities (bonds, especially long duration bonds) will perform well in this environment
  - Historical example: early 1990s
  - *Large cap equities time-series: -8%, -18%, -8%, 4%, -10%*



NEPC 2014 Assumptions

5-7 Year Returns			
Asset Class	**2013**	**2014**	**Change**
Cash	0.75%	1.50%	0.75%
Treasuries	1.00%	2.00%	1.00%
IG Corp Credit	3.00%	3.50%	0.50%
MBS	2.50%	2.25%	-0.25%
*Core Bonds**	*2.04%*	*2.53%*	*0.49%*
TIPS	1.50%	2.50%	1.00%
High-Yield Bonds	5.00%	4.50%	-0.50%
Bank Loans	5.00%	5.00%	
Global Bonds (Unhedged)	0.75%	1.25%	0.50%
Global Bonds (Hedged)	0.93%	1.38%	0.45%
EMD External	4.00%	5.00%	1.00%
EMD Local Currency	5.00%	5.75%	0.75%
Large Cap Equities	6.75%	6.25%	-0.50%
Small/Mid Cap Equities	7.00%	6.25%	-0.75%
Int'l Equities (Unhedged)	7.75%	7.25%	-0.50%
Int'l Equities (Hedged)	8.00%	7.50%	-0.50%
Emerging Int'l Equities	9.75%	9.50%	-0.25%
Private Equity	9.00%	8.75%	-0.25%
Private Debt	8.50%	8.00%	-0.50%
Private Real Assets	8.00%	7.75%	-0.25%
Real Estate (Core)	6.00%	6.25%	0.25%
Commodities	5.00%	5.00%	
Hedge Funds	n/a	5.50%	

30 Year Returns			
Asset Class	**2013**	**2014**	**Change**
Cash	3.00%	3.75%	0.75%
Treasuries	3.00%	4.00%	1.00%
Credit	4.25%	5.25%	1.00%
MBS	4.50%	4.25%	-0.25%
*Core Bonds**	*3.84%*	*4.46%*	*0.62%*
TIPS	3.25%	4.50%	1.25%
High-Yield Bonds	5.25%	6.00%	0.75%
Bank Loans	5.50%	6.25%	0.75%
Global Bonds (Unhedged)	2.50%	3.00%	0.50%
Global Bonds (Hedged)	2.67%	3.13%	0.46%
EMD External	6.00%	7.00%	1.00%
EMD Local Currency	6.25%	7.25%	1.00%
Large Cap Equities	8.00%	7.75%	-0.25%
Small/Mid Cap Equities	8.25%	8.00%	-0.25%
Int'l Equities (Unhedged)	8.25%	8.25%	
Int'l Equities (Hedged)	8.50%	8.48%	-0.02%
Emerging Int'l Equities	9.50%	9.50%	
Private Equity	10.00%	9.75%	-0.25%
Private Debt	8.00%	8.25%	0.25%
Private Real Assets	8.00%	7.75%	-0.25%
Real Estate (Core)	6.00%	6.50%	0.50%
Commodities	5.50%	6.00%	0.50%
Hedge Funds	n/a	7.00%	

Return assumptions are geometric.
* Core Bonds assumption based on market weighted blend of components of Aggregate Index (Treasuries, IG Corp Credit, and MBS).

Volatility			
Asset Class	**2013**	**2014**	**Change**
Cash	1.00%	1.00%	
Treasuries	6.00%	6.00%	
IG Corp Credit	7.50%	7.50%	
MBS	7.00%	7.00%	
*Core Bonds**	*6.31%*	*6.32%*	*0.01%*
TIPS	7.50%	7.50%	
High-Yield Bonds	13.00%	13.00%	
Bank Loans	6.50%	8.00%	1.50%
Global Bonds (Unhedged)	9.00%	8.50%	-0.50%
Global Bonds (Hedged)	5.00%	5.00%	
EMD External	12.00%	12.00%	
EMD Local Currency	14.00%	15.00%	1.00%
Large Cap Equities	18.00%	17.50%	-0.50%
Small/Mid Cap Equities	21.00%	21.00%	
Int'l Equities (Unhedged)	21.00%	20.50%	-0.50%
Int'l Equities (Hedged)	19.00%	18.50%	-0.50%
Emerging Int'l Equities	26.00%	26.00%	
Private Equity	27.00%	27.00%	
Private Debt	19.00%	19.00%	
Private Real Assets	24.00%	23.00%	-1.00%
Real Estate (Core)	17.00%	17.00%	
Commodities	18.00%	18.00%	
Hedge Funds	n/a	9.00%	

Volatility defined as standard deviation of investment returns.
* Core Bonds assumption based on market weighted blend of components of Aggregate Index (Treasuries, IG Corp Credit, and MBS).

Correlations

Asset Class	Cash	Treasuries	IG Corp Credit	MBS	TIPS	High-Yield Bonds	Global Bonds (Unhedged)	Global Bonds (Hedged)	EMD (External)	EMD (Local Currency)	Large Cap Equities	Small/Mid Cap Equities	Int'l Equities (Unhedged)	Int'l Equities (Hedged)	Emerging Int'l Equities	Private Equity	Private Debt	Private Real Assets	Real Estate (Core)	Commodities	Hedge Funds
Cash	1.00																				
Treasuries	0.20	1.00																			
IG Corp Credit	0.10	0.75	1.00																		
MBS	0.25	0.90	0.80	1.00																	
TIPS	0.00	0.75	0.60	0.70	1.00																
High-Yield Bonds	-0.05	0.30	0.55	0.30	0.20	1.00															
Global Bonds (Unhedged)	0.10	0.50	0.50	0.45	0.40	0.10	1.00														
Global Bonds (Hedged)	0.10	0.80	0.65	0.70	0.65	0.20	0.60	1.00													
EMD (External)	0.05	0.40	0.65	0.35	0.30	0.65	0.25	0.35	1.00												
EMD (Local Currency)	0.05	0.30	0.60	0.25	0.25	0.60	0.30	0.25	0.80	1.00											
Large Cap Equities	0.05	0.05	0.55	0.15	0.00	0.70	0.10	0.05	0.60	0.65	1.00										
Small/Mid Cap Equities	-0.05	-0.05	0.35	0.05	-0.10	0.70	0.00	-0.05	0.55	0.60	0.90	1.00									
Int'l Equities (Unhedged)	-0.10	0.00	0.30	0.05	-0.05	0.50	0.40	0.25	0.60	0.65	0.70	0.60	1.00								
Int'l Equities (Hedged)	-0.10	0.00	0.30	0.05	-0.05	0.50	0.30	0.40	0.60	0.65	0.75	0.65	0.90	1.00							
Emerging Int'l Equities	-0.10	-0.10	0.25	-0.10	-0.10	0.55	0.05	0.05	0.75	0.80	0.60	0.65	0.70	0.70	1.00						
Private Equity	-0.10	-0.05	0.20	0.00	-0.10	0.60	-0.10	-0.10	0.35	0.40	0.70	0.80	0.60	0.65	0.45	1.00					
Private Debt	0.00	-0.25	0.15	-0.15	-0.10	0.65	-0.10	-0.10	0.55	0.60	0.65	0.75	0.60	0.60	0.65	0.65	1.00				
Private Real Assets	0.15	-0.20	0.05	-0.15	0.00	0.40	-0.05	-0.05	0.40	0.40	0.55	0.60	0.50	0.50	0.50	0.65	0.60	1.00			
Real Estate (Core)	0.25	-0.05	0.05	-0.05	0.00	0.10	0.00	-0.05	0.10	0.10	0.35	0.25	0.30	0.30	0.15	0.35	0.25	0.40	1.00		
Commodities	0.10	-0.10	0.10	-0.10	0.30	0.20	0.10	0.10	0.35	0.45	0.30	0.30	0.35	0.35	0.40	0.25	0.30	0.45	0.30	1.00	
Hedge Funds	0.00	-0.20	0.35	-0.15	0.20	0.60	0.05	-0.30	0.55	0.60	0.60	0.65	0.70	0.65	0.70	0.75	0.80	0.65	0.25	0.50	1.00

- **NEPC, LLC is an investment consulting firm. We provide asset-liability studies for certain clients but we do not provide actuarial services. Any projections of funded status or contributions contained in this report should not be used for budgeting purposes. We recommend contacting the plan's actuary to obtain budgeting estimates.**

- **The goal of this report is to provide a basis for substantiating asset allocation recommendations.**

- **The projection of liabilities in this report uses standard actuarial projection methods and does not rely on actual participant data. Asset and liability information was received from the plan's actuary, and other projection assumptions are stated in the report.**

- **Assets are projected using a methodology chosen by the client. Gains and losses are estimated through investment returns generated by applying NEPC's 5-7 year asset class assumptions and scenario assumptions for the current year.**

- **This report is based on forward-looking assumptions, which are subject to change.**

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