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ASSET ALLOCATION REVIEW

SAN BERNARDINO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

JUNE 12, 2025

Sam Austin, Partner

NEPC

TODAY'S AGENDA

- Review SBCERA Expected Risk and Return as of March 31, 2025
- Asset Allocation Alternatives
- Asset Allocation Recommendation
- Appendix: Review of Asset Allocation Process

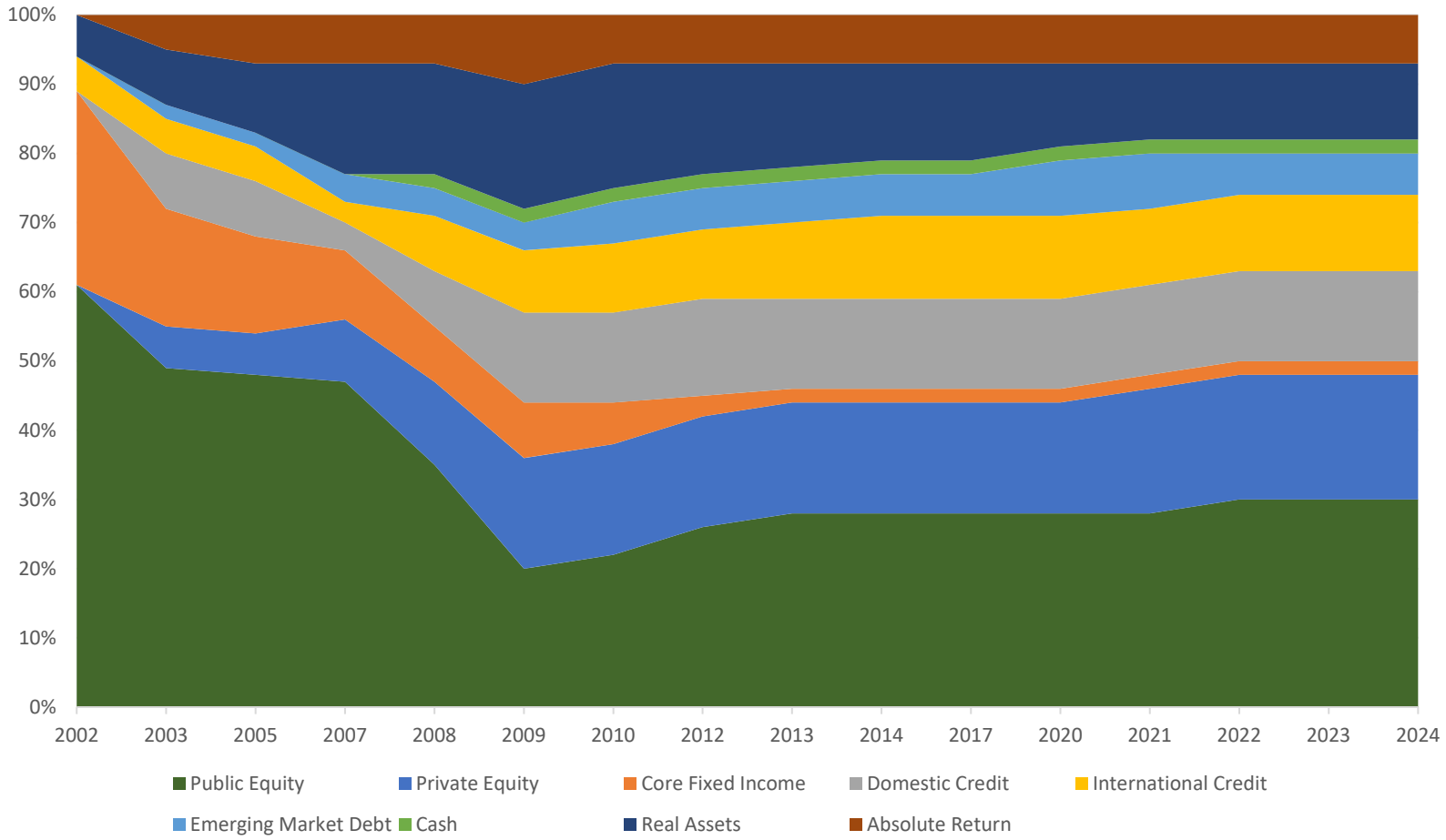
SBCERA CURRENT ASSET ALLOCATION

ASSET ALLOCATION

POLICY TARGETS, RANGES AND INDEXES

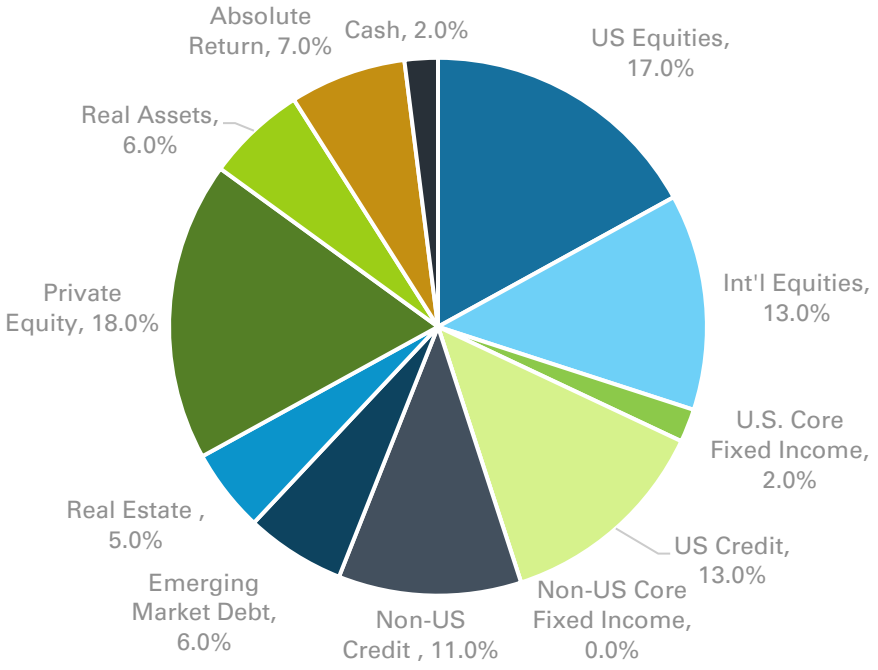
Asset Class	Policy Target	Range	Benchmark
Domestic Equities	**17.00%**	**10% – 27%**	**Russell 3000 Index**
Passive Large Cap	14.50%	0% – 20%	
Passive Small Cap	2.50%	-3% – 7%	
International Equities	**13.00%**	**8% – 18%**	**MSCI ACWI ex USA Index**
Developed Market	7.00%	1% – 12%	
Emerging Market Equity	6.00%	1% – 11%	
US Fixed Income	**15.00%**	**10% – 20%**	**Bloomberg US Aggregate Bond Index**
US Core Fixed Income	2.00%	-3% – 7%	
High Yield/Credit Strategies	13.00%	8% – 18%	
Global Fixed Income	**17.00%**	**11% – 21%**	**Bloomberg Global Aggregate Bond ex US Index**
International Core Fixed Income	0.00%	-5% – 5%	
International Credit	11.00%	6% – 16%	
Emerging Market Debt	6.00%	1% – 10%	
Real Estate	**5.00%**	**0% – 10%**	**NCREIF Property Index**
Core	2.50%	0% – 5%	
Non-Core	2.50%	0% – 5%	
Real Assets	**6.00%**	**0% – 10%**	**67% S&P GSCI + 33% BBG US TIPS Index**
Commodities	4.00%	-1% – 7%	
Infrastructure	2.00%	0% – 6%	
Private Equity	**18.00%**	**6% – 23%**	**Russell 3000 Index**
Absolute Return	**7.00%**	**0% – 12%**	**Bloomberg US Aggregate Bond Index**
Cash	**2.00%**	**0% – 10%**	**91 Day T-Bill Index**

HISTORICAL POLICY ALLOCATION



SBCERA RETURN AND RISK EXPECTATIONS

USING MARCH 31, 2025 CAPITAL MARKET ASSUMPTIONS



	10 Year		*30 Year*	
	2024	*2024*	*2024*	*2024*
Expected Return	8.1%	7.7%	9.0%	8.8%
Expected Volatility	10.7%	10.8%	10.7%	10.8%
Sharpe Ratio	0.38	0.34	0.51	0.49

Probabilities using 2025 Assumptions	
Probability of 1-Year Return Under 0.00%	**22.7%**
Probability of 10 Year Return Under 0.00%	**0.9%**
Probability of 10 Year Return Under 7.25%	**40.6%**
Probability of 30-Year Return Under 7.25%	**18.3%**

Note:
Return and risk expectations are based on NEPC capital market assumptions as of 3/31/25 and 3/31/24.
Expected volatility assumptions are based on smoothed volatilities in private markets asset classes.

ASSET ALLOCATION ALTERNATIVES

ASSET ALLOCATION ALTERNATIVES

FOR ILLUSTRATIVE PURPOSES ONLY

	Current Policy	Mix A	Mix B	Mix C	Mix D	Mix E	70/30
Cash	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	0.0%
Total Cash	**2.0%**	**2.0%**	**2.0%**	**2.0%**	**2.0%**	**2.0%**	**0.0%**
US Large-Cap Equity	14.5%	14.5%	12.8%	11.9%	11.9%	14.5%	39.2%
US Small/Mid-Cap Equity	2.5%	2.5%	2.2%	2.1%	2.1%	2.5%	5.1%
Non-US Developed Equity	7.0%	7.0%	7.0%	8.6%	8.1%	7.0%	15.7%
Non-US Developed Small-Cap Equity	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%
Emerging Market Equity	6.0%	6.0%	6.0%	7.4%	6.9%	6.0%	6.5%
Emerging Market Small-Cap Equity	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
Non-US Private Equity	2.0%	4.0%	4.0%	2.0%	3.0%	2.0%	0.0%
Private Equity	16.0%	14.0%	16.0%	16.0%	16.0%	16.0%	0.0%
Total Equity	**48.0%**	**48.0%**	**48.0%**	**48.0%**	**48.0%**	**48.0%**	**70.0%**
US Aggregate Bond	2.0%	2.0%	2.0%	2.0%	2.0%	4.0%	30.0%
Emerging Market External Debt	6.0%	6.0%	6.0%	6.0%	6.0%	4.0%	0.0%
Private Debt	31.0%	31.0%	31.0%	31.0%	31.0%	31.0%	0.0%
Total Fixed Income	**39.0%**	**39.0%**	**39.0%**	**39.0%**	**39.0%**	**39.0%**	**30.0%**
Real Estate - Core	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	0.0%
Real Estate - Non-Core	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	0.0%
Private Real Assets - Natural Resources	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	0.0%
Total Real Assets	**11.0%**	**11.0%**	**11.0%**	**11.0%**	**11.0%**	**11.0%**	**0.0%**
Expected Return 10 yrs	**8.06%**	**8.08%**	**8.13%**	**8.07%**	**8.10%**	**8.03%**	**6.27%**
Expected Return 30 yrs	**9.02%**	**9.04%**	**9.10%**	**9.04%**	**9.07%**	**8.99%**	**7.22%**
Standard Dev	**10.75%**	**10.70%**	**10.63%**	**10.87%**	**10.77%**	**10.56%**	**13.08%**
Sharpe Ratio (10 years)	**0.382**	**0.386**	**0.394**	**0.379**	**0.386**	**0.386**	**0.177**
Sharpe Ratio (30 years)	**0.514**	**0.519**	**0.528**	**0.510**	**0.518**	**0.520**	**0.284**
Probability of 1-Year Return Under 0%	**22.7%**	**22.5%**	**22.2%**	**22.9%**	**22.6%**	**22.4%**	**31.6%**
Probability of 10-Year Return Under 0%	**0.9%**	**0.8%**	**0.8%**	**0.9%**	**0.9%**	**0.8%**	**6.5%**
Probability of 10-Year Return Under 7.25%	**40.6%**	**40.3%**	**39.6%**	**40.6%**	**40.1%**	**40.8%**	**59.4%**
Probability of 30-Year Return Under 7.25%	**18.3%**	**17.9%**	**17.0%**	**18.3%**	**17.7%**	**18.4%**	**50.6%**

Mix A:
More Non-US Private Equity

Mix B:
US Equity to Private Equity

Mix C:
US Equity to Non-US Equity

Mix D:
B and C combined

Mix E:
EMD to US Agg

70/30:
ACWI mix at 70%

Green shading denotes increase

Orange shading denotes decrease

Note:
Return and risk expectations are based on NEPC capital market assumptions as of 3/31/25.
Expected volatility assumptions are based on smoothed volatilities in private markets asset classes.

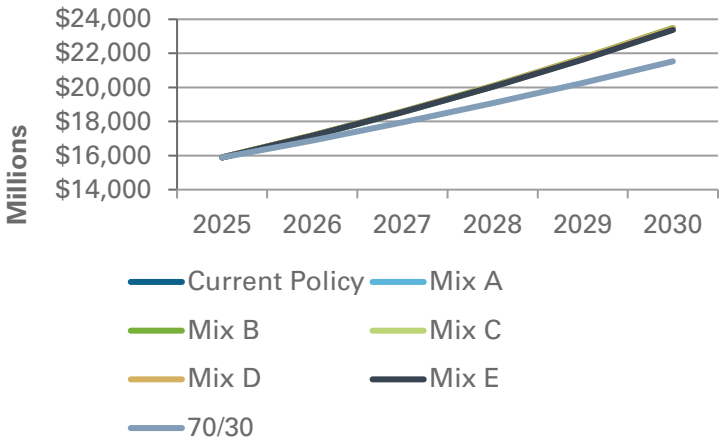
ASSET ALLOCATION ALTERNATIVES

RATIONALE

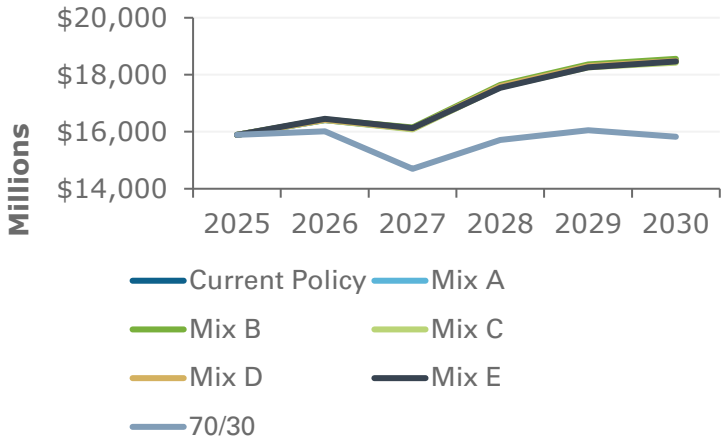
- Mix A – Non-US Private Equity continues to provide a return premium over the broad Private Equity bucket, with lower expected volatility, resulting in marginally improved Sharpe ratios
- Mix B – Although return expectations for US Equity (public) have increased compared to the previous year's analysis, Private Equity, in general, and Non-US Private Equity, in particular, continue to provide return premiums over public equities at lower expected volatilities, resulting in marginally improved Sharpe ratios
- Mix C – Re-allocating from US Equity to Non-US Equity (public) resulted in slightly higher expected returns, with slightly higher volatility, resulting in a small decrease to the Sharpe ratios
- Mix D – Combined Mixes B and C for marginally improved Sharpe ratios
- Mix E – Increased Core Bonds for lower volatility, resulting in marginally improved Sharpe ratios

SCENARIO ANALYSIS

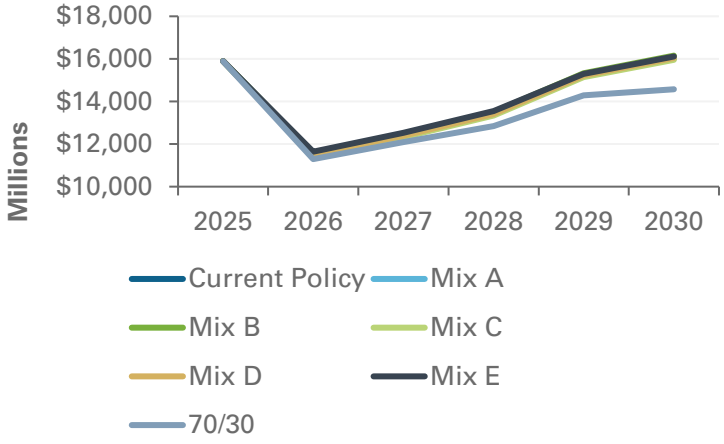
BASE CASE



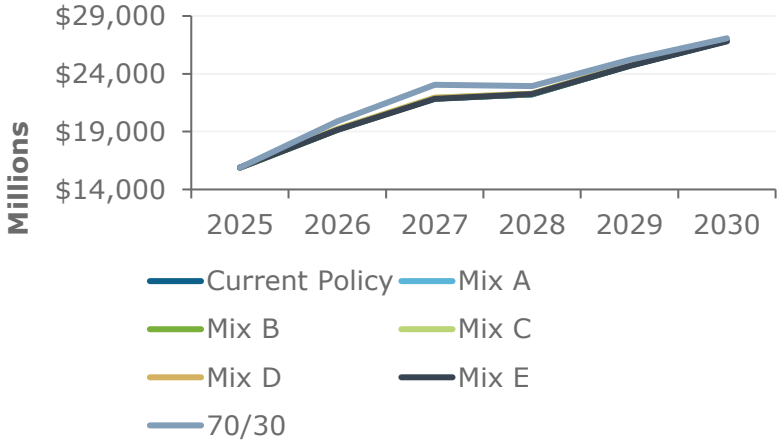
STAGFLATION



RECESSION

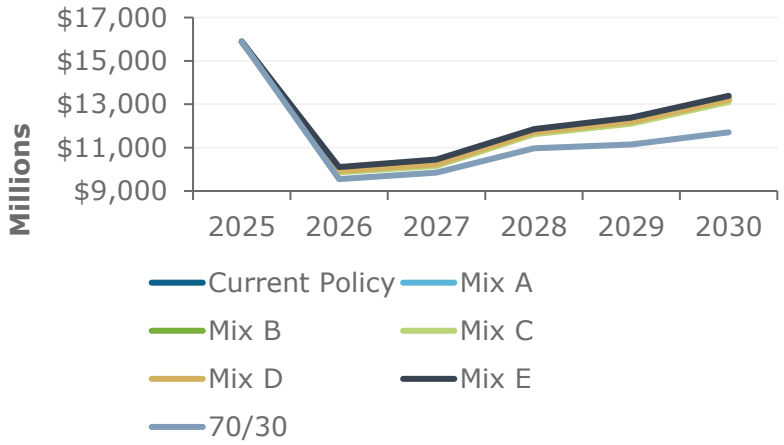


EXPANSION

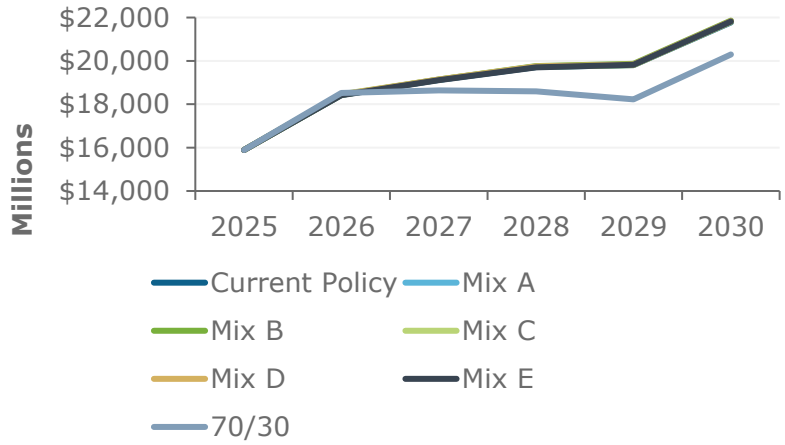


SCENARIO ANALYSIS

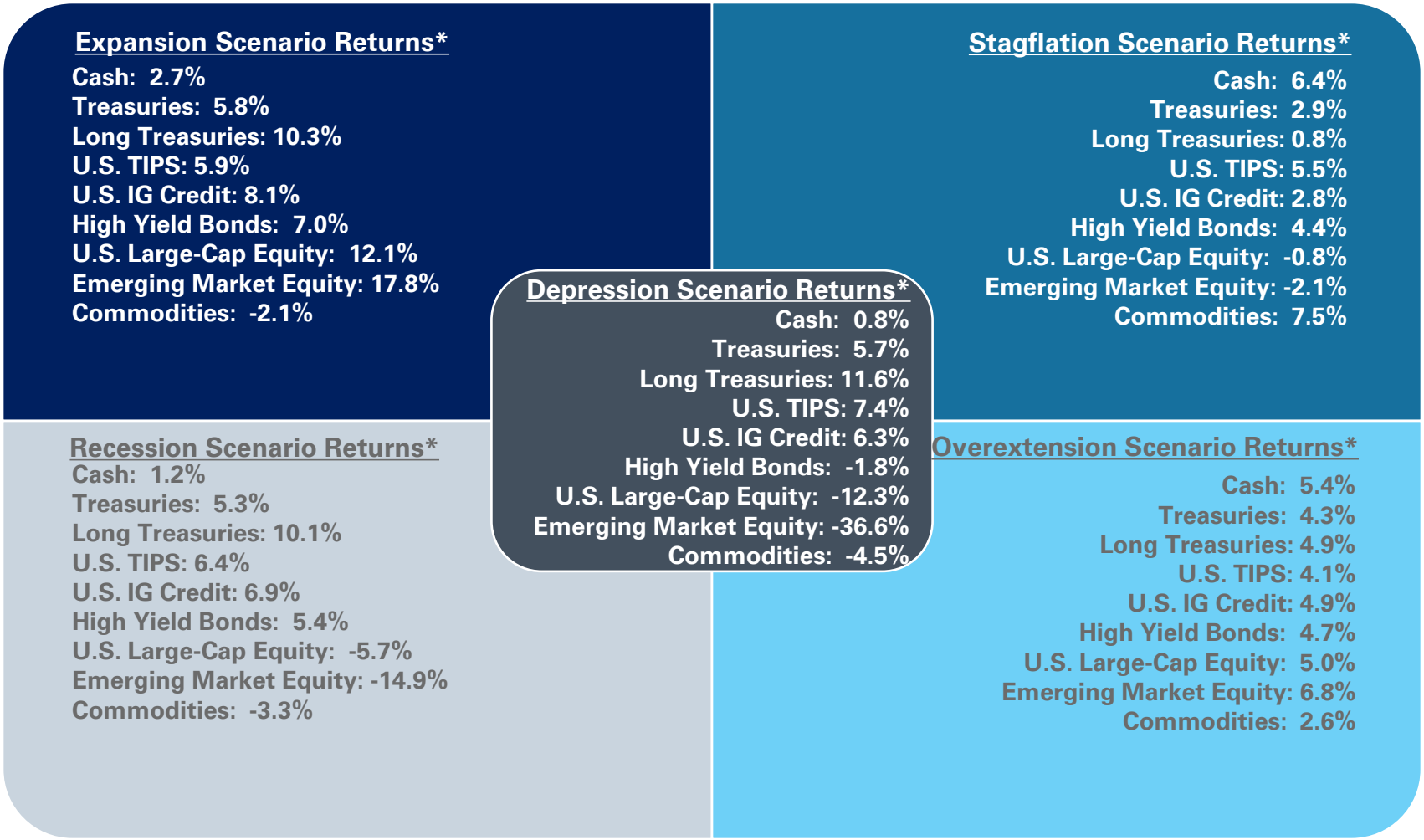
DEPRESSION



OVEREXTENSION



SCENARIO ANALYSIS: REGIME RETURNS



Notes: *Scenario returns are 5-year annualized returns, as of 3/31/2025

LIQUIDITY PROFILES

Note: Liquidity is assigned at the asset class level.

RECOMMENDATION

RECOMMENDATION

	Current Policy / Recommended Allocation	70/30
Cash	2.0%	0.0%
Total Cash	**2.0%**	**0.0%**
US Large-Cap Equity	14.5%	39.2%
US Small/Mid-Cap Equity	2.5%	5.1%
Non-US Developed Equity	7.0%	15.7%
Non-US Developed Small-Cap Equity	0.0%	2.5%
Emerging Market Equity	6.0%	6.5%
Emerging Market Small-Cap Equity	0.0%	1.0%
Non-US Private Equity	2.0%	0.0%
Private Equity	16.0%	0.0%
Total Equity	**48.0%**	**70.0%**
US Aggregate Bond	2.0%	30.0%
Emerging Market External Debt	6.0%	0.0%
Private Debt	31.0%	0.0%
Total Fixed Income	**39.0%**	**30.0%**
Real Estate - Core	2.5%	0.0%
Real Estate - Non-Core	2.5%	0.0%
Private Real Assets - Natural Resources	6.0%	0.0%
Total Real Assets	**11.0%**	**0.0%**
Expected Return 10 yrs	**8.06%**	**6.27%**
Expected Return 30 yrs	**9.02%**	**7.22%**
Standard Dev	**10.75%**	**13.08%**
Sharpe Ratio (10 years)	**0.382**	**0.177**
Sharpe Ratio (30 years)	**0.514**	**0.284**
Probability of 1-Year Return Under 0%	**22.7%**	**31.6%**
Probability of 10-Year Return Under 0%	**0.9%**	**6.5%**
Probability of 10-Year Return Under 7.25%	**40.6%**	**59.4%**
Probability of 30-Year Return Under 7.25%	**18.3%**	**50.6%**

NEPC recommends staying with the current strategic asset allocation mix for the following reasons:

a) Current CMAs provide limited opportunities to improve upon the existing policy without dramatic shifts in allocations

b) Alternative mixes result in higher expected returns and/or Sharpe ratios compared to the Current Policy, but very marginally

c) NEPC believes improvements in implementation are the best source of potential improvement in portfolio risk-adjusted return.

APPENDIX: ASSET ALLOCATION OVERVIEW & EDUCATION

ASSET ALLOCATION DEFINED

- **The process of allocating assets across a spectrum of investments to achieve an expected return at an expected level of risk**
  - "Expected" is a statistics term, which is different from the common use of the word.
  - Expected return is the weighted average of all possible returns, where the weights are the probabilities that each return will occur.

- **Asset allocation decisions include, but are not limited to a choice between:**
  - Higher risk versus higher return
    - Equity/Bonds/Cash/RE/PE/HF/Commodities etc…
  - Domestic/International/Global
  - Liquid vs. illiquid or public vs. private assets
  - Ease of implementation (Simplicity vs. Complexity)

ASSET ALLOCATION CONSIDERATIONS

- **An appropriate asset mix will consider a Plan's**
  - Actuarial Return Assumption
  - Liability Awareness
  - Funded Status
  - Liquidity Needs
  - Time Horizon
  - Risk Tolerance
  - Peer Risk
  - Plan Provisions and Specifics
  - Staff Size and Expertise

ASSET ALLOCATION PROCESS

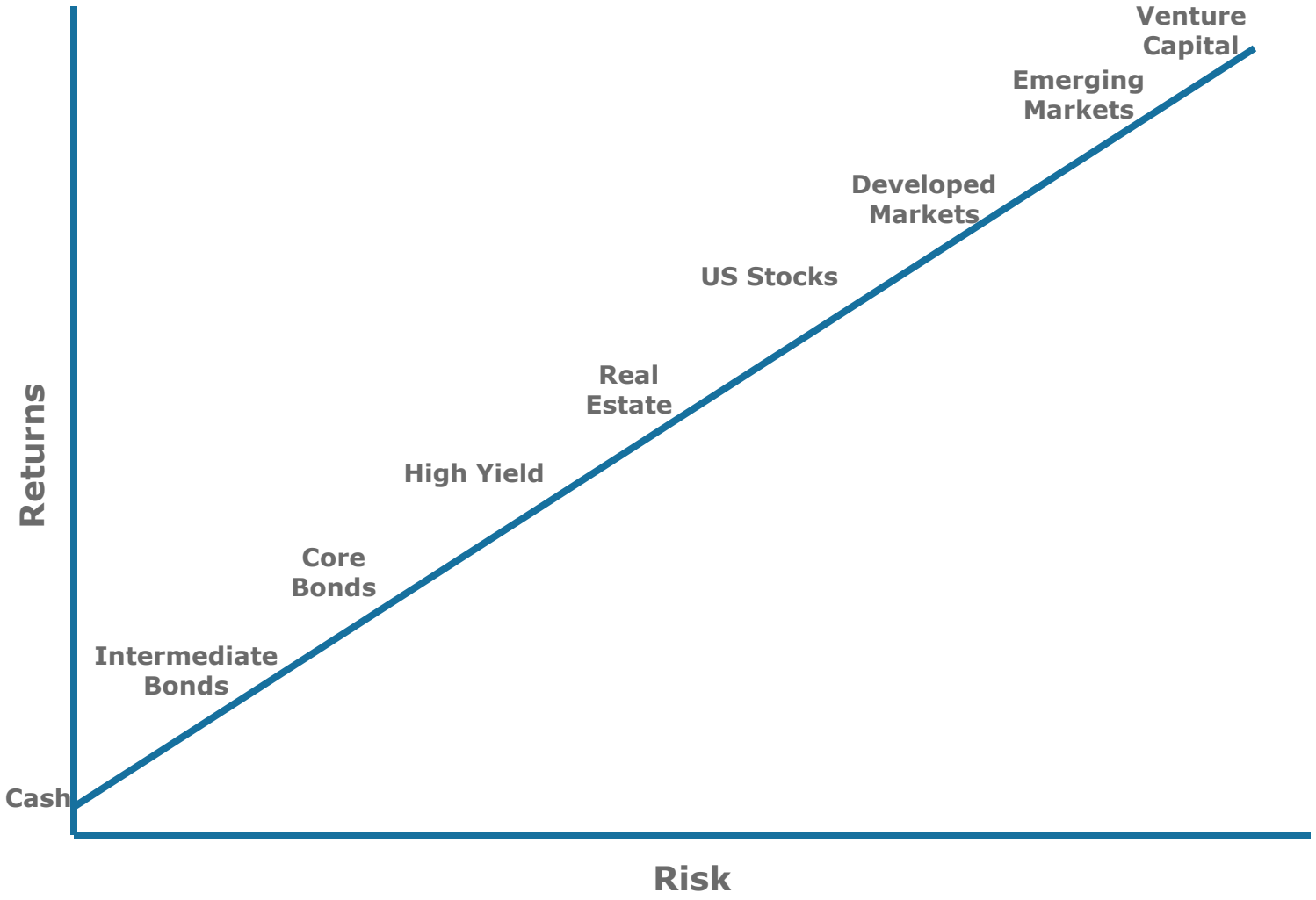
MEETING YOUR OBJECTIVES

- **Capital markets assumption**
  - Expected Return
  - Expected Risk (Volatility, Standard Deviation)
  - Expected Correlation
- **Project cash flow needs (Contributions – Expenses & Benefits)**
- **Integrate assets and liabilities/spending**
- **Risk Budgeting**
- **Scenario Analysis**
- **Liquidity Analysis**
- **Compare allocation to other programs**

ASSET ALLOCATION IMPLEMENTATION

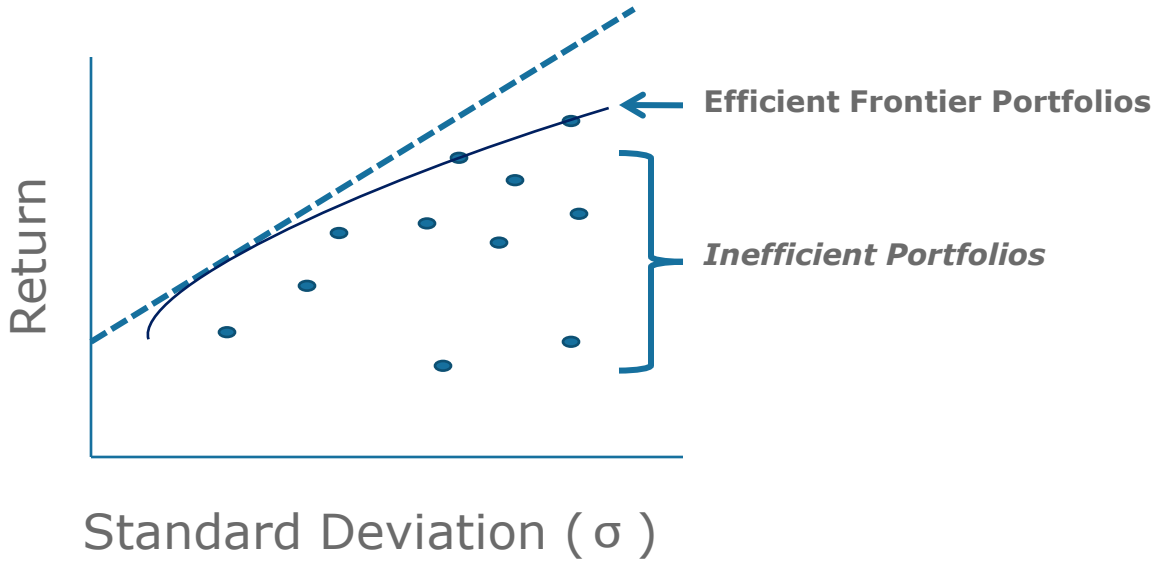
- **Establish Targets and Ranges**
  - Ranges should trigger rebalancing
  - Helps plans sell high (expensive assets) and buy low (cheap assets)
- **Establish Active versus Passive Mix**
  - Should reflect net of fee return contribution
  - Inefficient asset classes should be managed actively
- **Style Bias:** ***Should generally be avoided in efficient markets***
  - Efficient Market Example: Large Cap US Stocks

CAPITAL MARKET LINE



ASSET ALLOCATION MODEL: MEAN-VARIANCE OPTIMIZATION

- **Mean-Variance Optimization: Asset allocation model based on Nobel-Prize winning theory**
- **Mathematical solution to determine the "best" mix of assets that will create an efficient frontier**
  - Highest return for expected risk (volatility), or
  - Lowest expected risk (volatility) for expected return
  - Stated another way, it builds portfolios with the highest expected risk-adjusted returns – Efficient Frontier:



ASSET ALLOCATION – ASSET LIABILITY MATCHING

- **Asset Liability Matching versus the "Horse Race"**
  - Many Pension Funds spend a lot of time comparing their performance to their peers'
    - Almost always ignores liabilities
    - Disaggregates returns from risk
    - Assumes everyone should be getting the highest possible return
    - Should instead be focused on the ability to meet liability needs
  - Diversification makes it harder to be the best performing fund in certain bull market periods

MODEL INPUTS

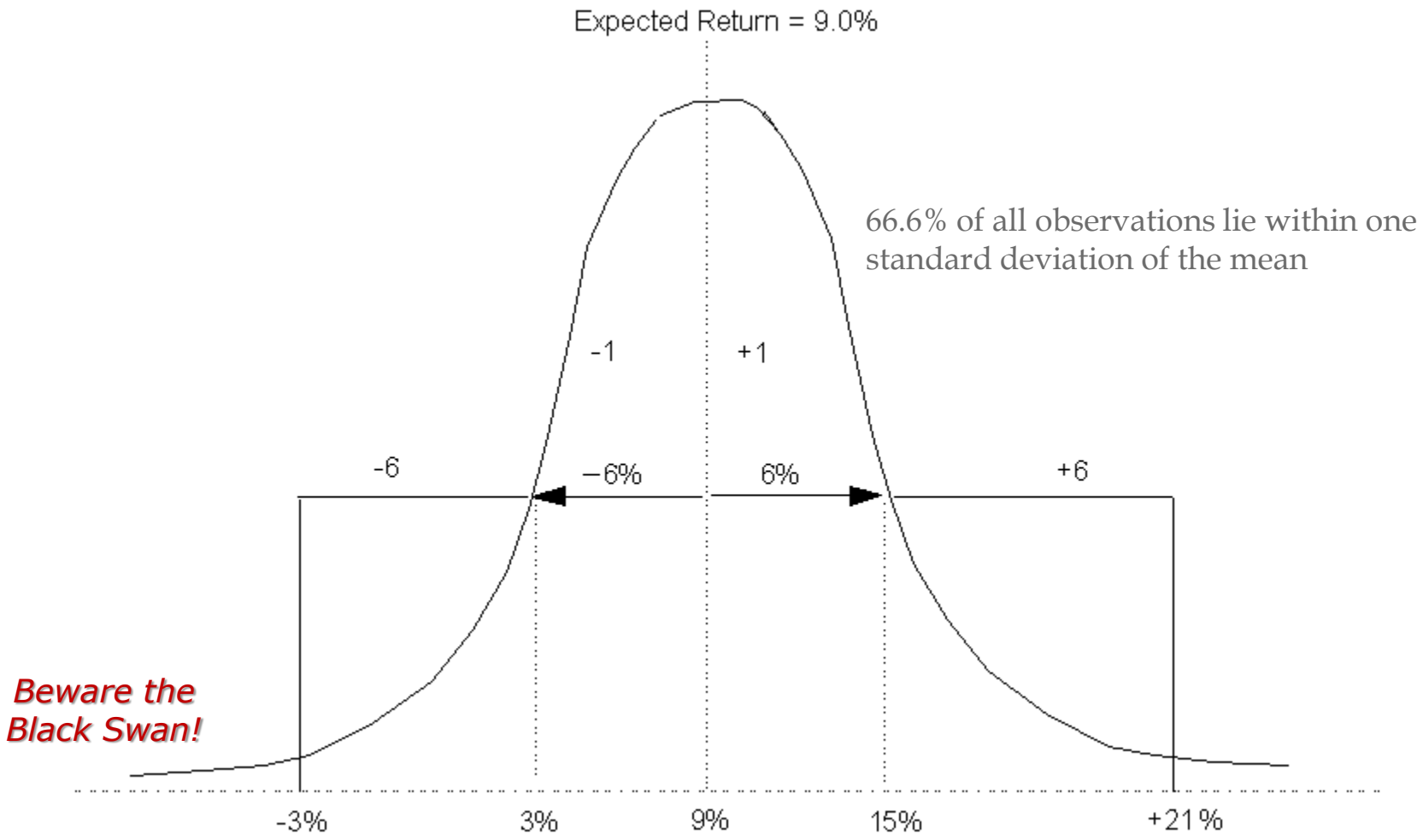
- **Permissible Asset Classes and Weighting Constraints**
  - Constraints reflect liquidity, time horizon and marginal benefit analyses
    - Example: RE is constrained to 5-15%
  - Not all asset classes may be permissible by some plans
    (e.g. Private Equity, Peruvian Llama Futures)
- **Return and Risk Assumptions**
  - Based on historic data, academic theory, and NEPC's assessment of current and future market conditions
  - Risk measured by Standard Deviation (volatility)
- **Correlation Assumptions**
  - Measure of similarity/dissimilarity between asset class returns
  - Based on historic data

RETURNS (ARITHMETIC & GEOMETRIC)

- **Arithmetic – simple average of annual returns**
  - Example
    - Year 1: 10%
    - Year 2: -4%
    - Year 3: 15%
    - Average (arithmetic) return is 7% (21% cumulative divided by 3 years)
- **Geometric – Our reports reflect compounding of annual returns**
  - Example
    - Year 1: 10%
    - Year 2: -4%
    - Year 3: 15%
    - Compounded annualized (geometric) return is 6.69%
- **Geometric returns are <u>always</u> less than arithmetic returns**
  - Reflects the fact that a given loss (say 10%) is worse than its equivalent gain
    - For example, you start with $100 and lose 50%. You now have $50. To get back to $100, you will need to earn 100%

VOLATILITY

THE BELL CURVE - ONE STANDARD DEVIATION

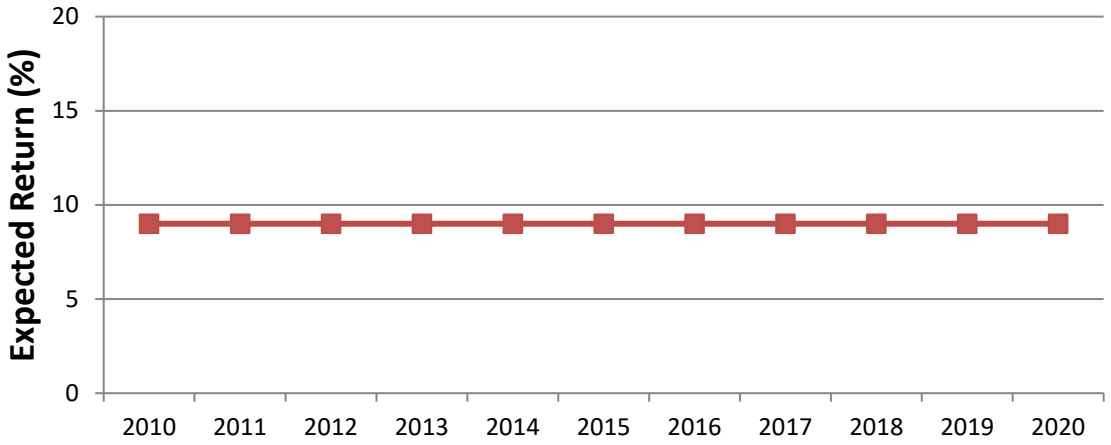


Beware the Black Swan!

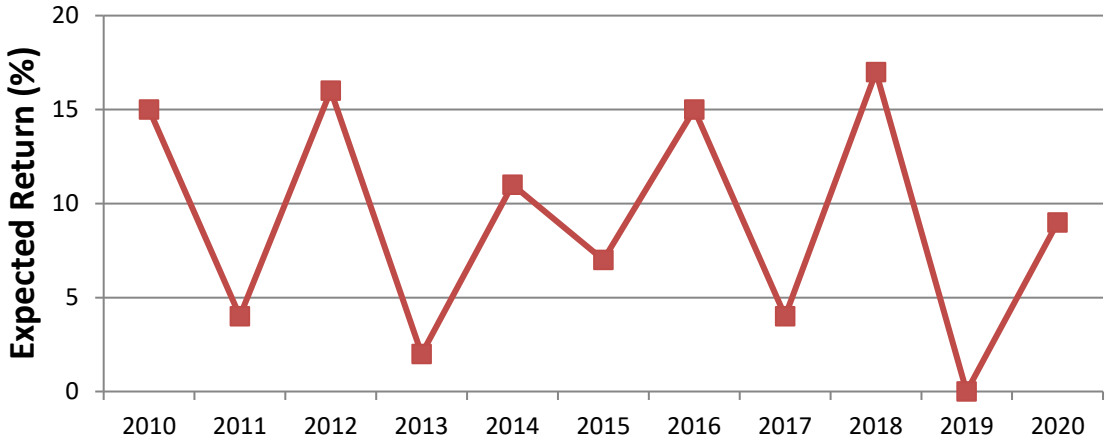
Standard Deviation (Risk, Volatility)

VOLATILITY (RISK) Exhibit A: Page 27

WHICH PATTERN WOULD YOU CHOOSE?



Average Return = 9.0%
Standard Deviation = 0%



Average Return = 9.0%
Standard Deviation = 6.0%

STANDARD DEVIATION NOTES

- **Concept: Average deviation from the mean**
- **Standard Deviation is not <u>all</u> risk**
- **Most asset class returns approximate a Bell Curve (normal distribution)**
  - But not a perfect fit.
  - Expected Pension Returns (Q2 2020 Assumptions)

Return = 6.5%

Volatility = 12.4%

1StDev: 68% of the observations will be between -5.6% and 19.6%

2StDev: 95% of the observations will be between -18.2% and 32.2%

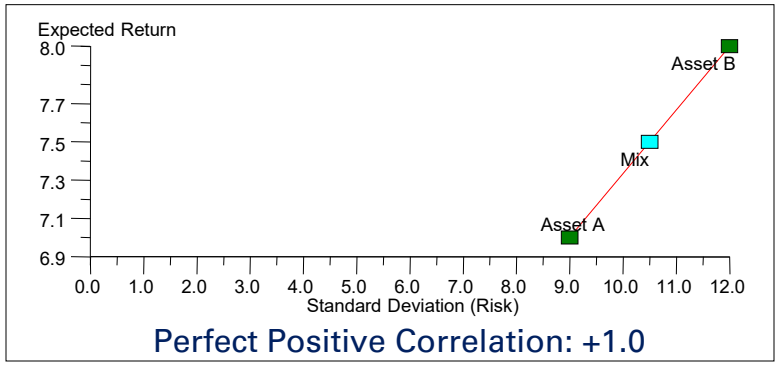
3StDev: 99% of the observations will be between -30.8% and 44.8%

CORRELATION

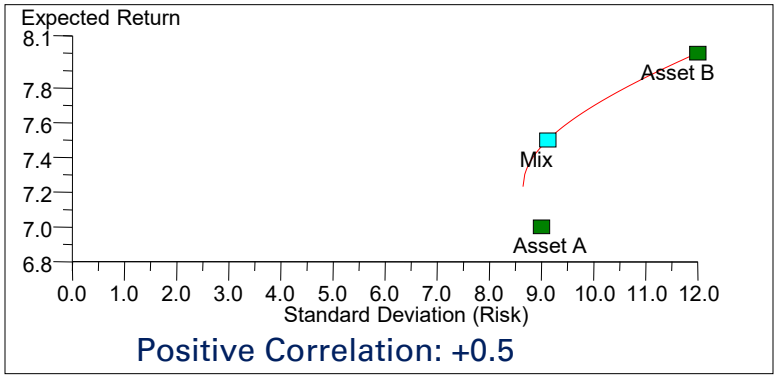
- **Measures how two things vary relative to each other**
- **Scale is from –1.0 to 1.0**
  - **+1.0** is perfect correlation
    - The two things behave exactly alike
  - **0.0** indicates no correlation
  - **–1.0** is perfect negative correlation
    - The two things behave exactly opposite of each other
      - One goes up while the other goes down
- **Partial Correlation is common**
- **Correlations between assets are very important in the asset allocation process**
    - Combining unlike assets lessens portfolio volatility

	Year 1	Year 2	Year 3
A	20%	-5%	0%
B	-10%	15%	10%
Portfolio	10%	10%	10%

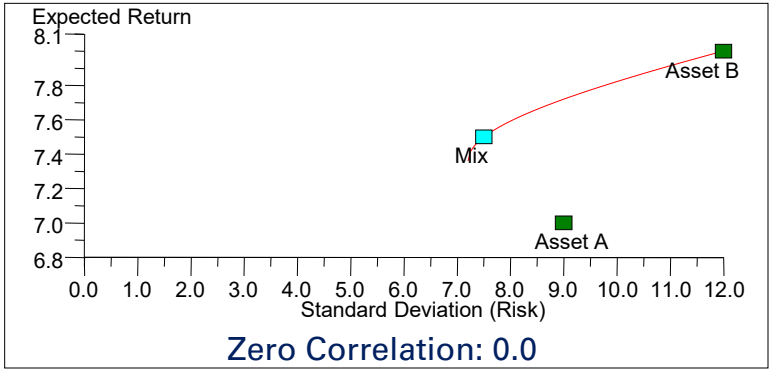
CORRELATION ILLUSTRATIONS



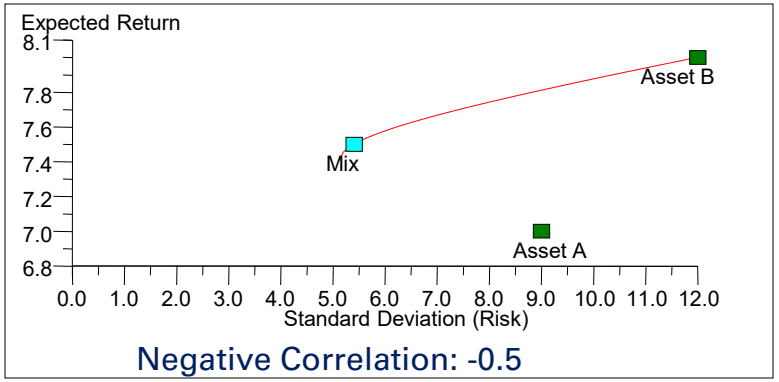
Perfect Positive Correlation: +1.0



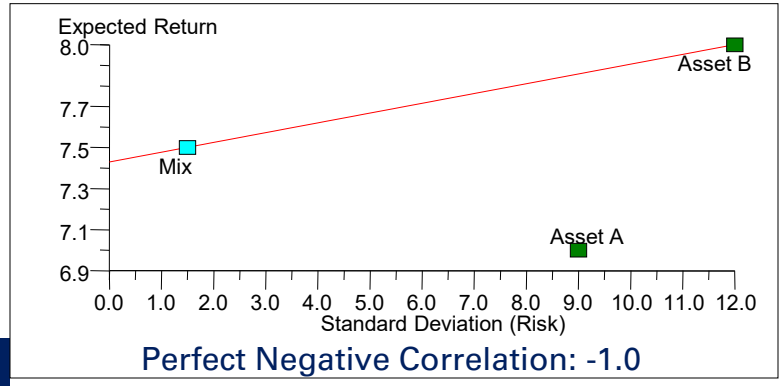
Positive Correlation: +0.5



Zero Correlation: 0.0



Negative Correlation: -0.5



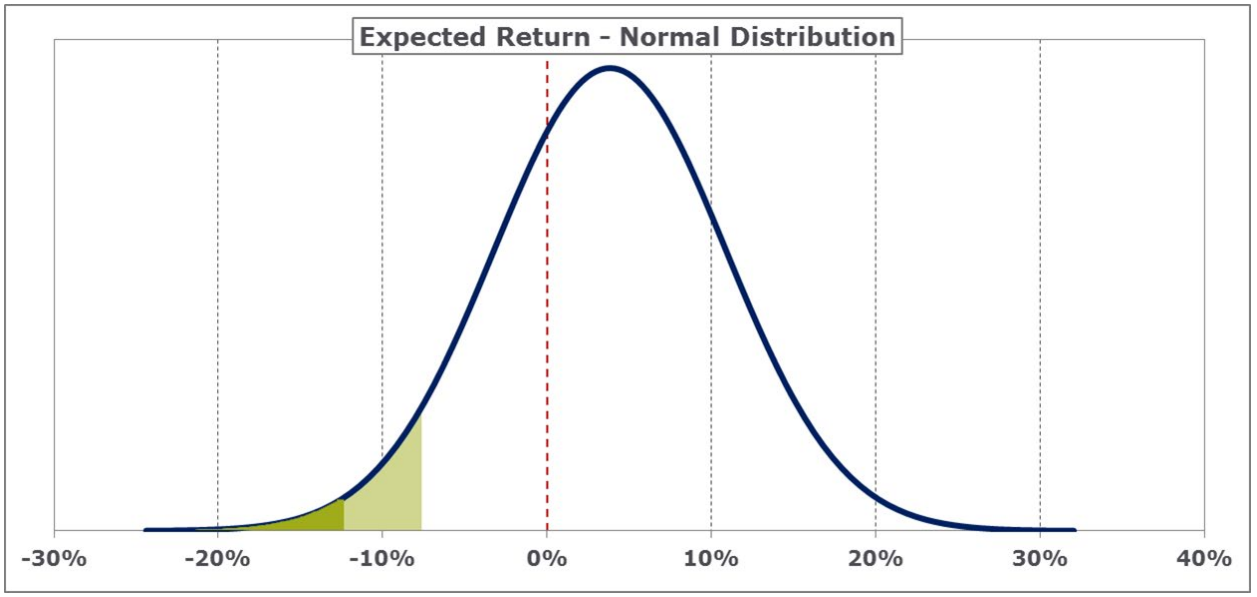
Perfect Negative Correlation: -1.0

- The lower the correlation, the greater the risk reduction

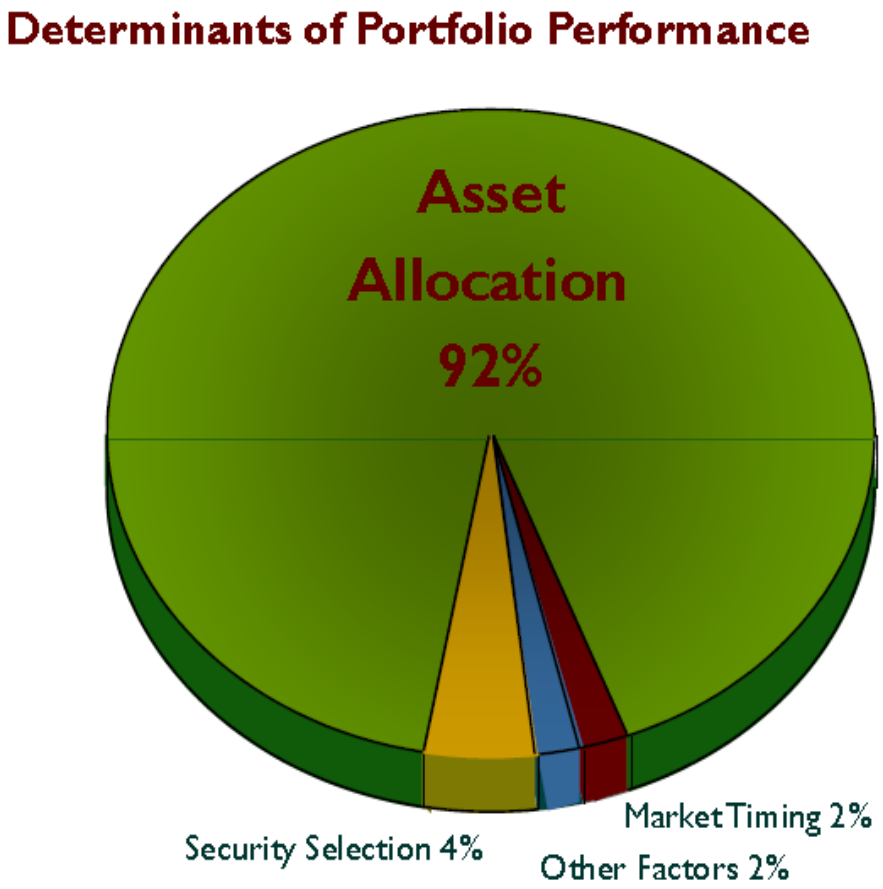
CORRELATION NOTES

- **Correlations are normally fairly stable**

- **Market crisis: Correlations move toward 1**
  - Diversification fails when you need it most; tail risk



ASSET ALLOCATION: THE KEY INVESTMENT DECISION



Source: Determinants of Portfolio Performance II: An Update, Brinson, et al, Financial Analysts Journal, May/June 1991, pp 40-48.

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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