

Assessing and Mitigating Risks in Today's Market Environment
Impact on Institutional Investors
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Assessing and Mitigating Risks

Agenda:

Current Policy Portfolio Shaped by History

Living with Lower Returns

Identifying Risks that Matter

Redrawing the Policy Roadmap

Current Policy Portfolio Shaped by History

- Over the past several decades pension systems have targeted absolute returns at +/- 8%
- Given declining bond yields, this led to an overweighting of equities...
- ...steadily increasing the absolute risk levels of pension assets...
- ...resulting in policy portfolios that perform well primarily in high growth/low inflation environments [e.g. the 1990s]

Declining Bond Yields Challenge Overall Plan Returns



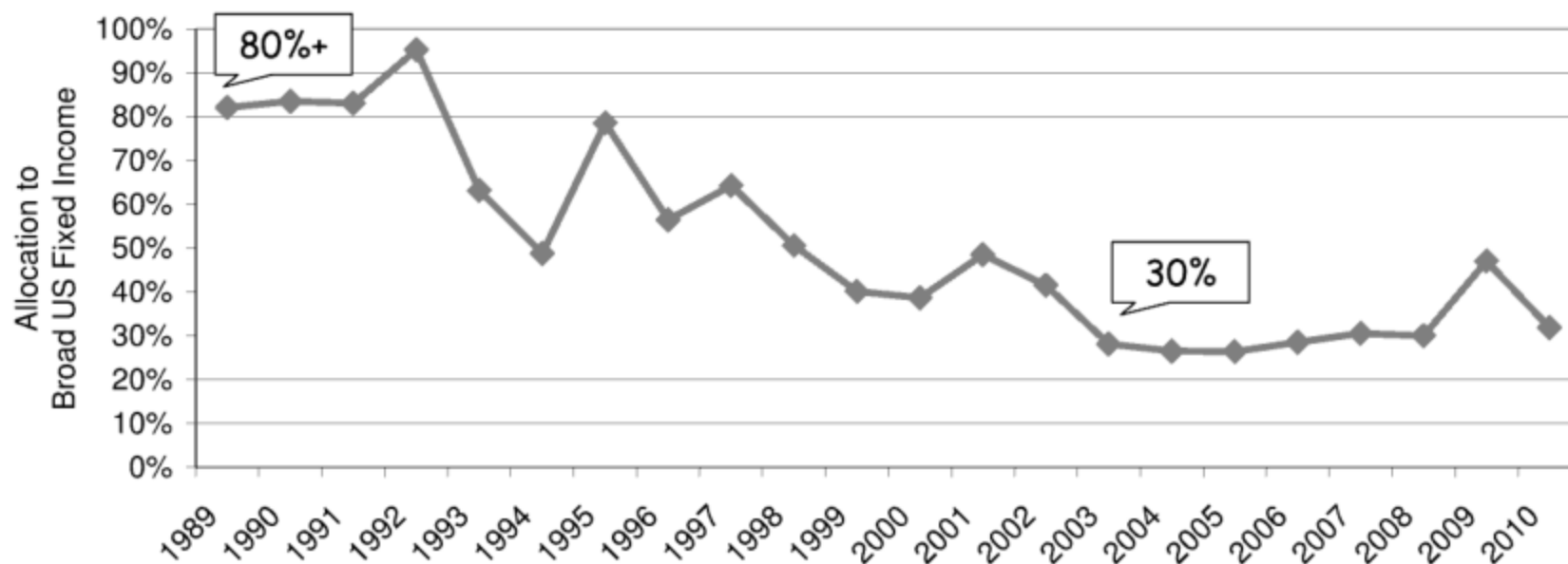
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Source: St. Louis Fed, Ibbotson, Research Affiliates, NEPC, NYC MOPI
*Merrill Lynch US Treasury Master Annualized Total Return

Progressively More Equity Needed to Achieve 8% return

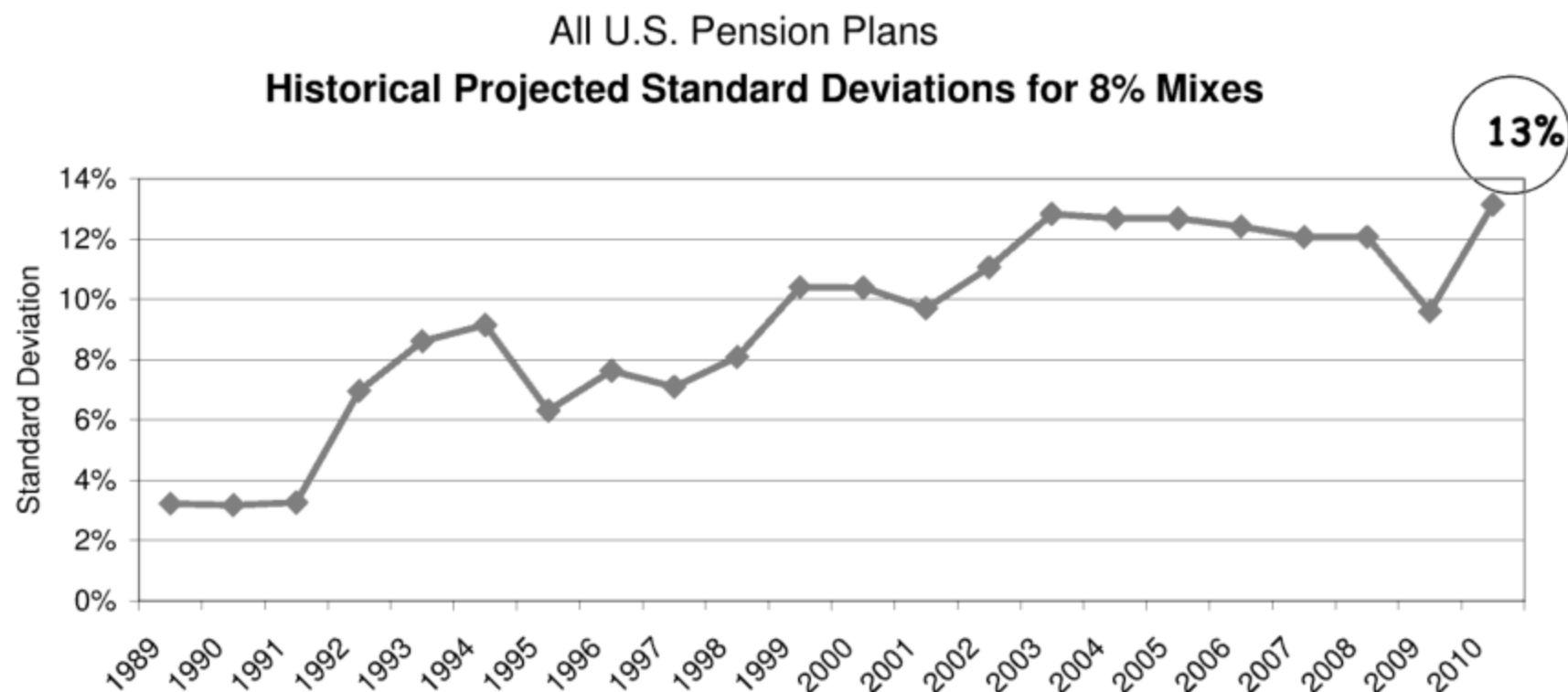
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All U.S. Pension Plans
Historical Fixed Income Allocations for 8% Mixes



Source: Callan

Equity Concentration Sharply Increased Total Risk

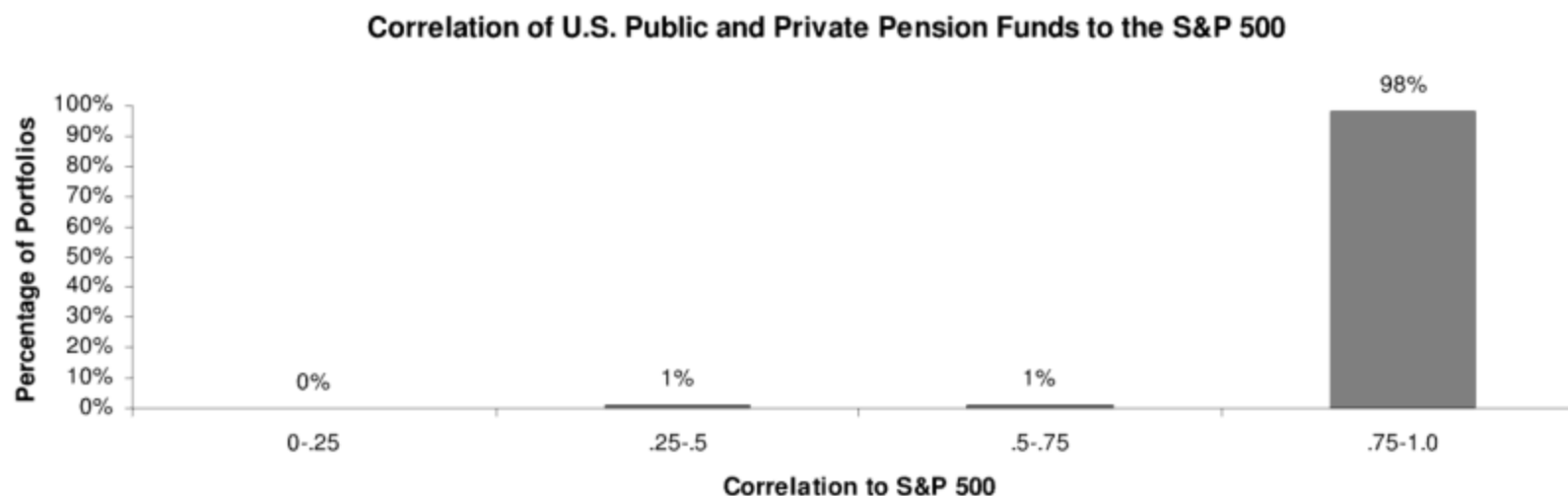


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Source: Callan

Equity Concentration Means Plan Returns Track Equities

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Source: Pensions & Investments and Bridgewater analysis. WHERE SHOWN, HYPOTHETICAL OR SIMULATED PERFORMANCE RESULTS HAVE CERTAIN INHERENT LIMITATIONS. UNLIKE AN ACTUAL PERFORMANCE RECORD, SIMULATED RESULTS DO NOT REPRESENT ACTUAL TRADING OR THE COSTS OF MANAGING THE PORTFOLIO. ALSO, SINCE THE TRADES HAVE NOT ACTUALLY BEEN EXECUTED, THE RESULTS MAY HAVE UNDER OR OVER COMPENSATED FOR THE IMPACT OF ANY OF CERTAIN MARKET FACTORS, SUCH AS LACK OF LIQUIDITY. SIMULATED TRADING PROGRAMS IN GENERAL ARE ALSO SUBJECT TO THE FACT THAT THEY ARE DESIGNED WITH THE BENEFIT OF HINDSIGHT. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN.

Source: Bridgewater

Redrawing the Policy Roadmap

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Living with Lower Returns

Significant downward revisions to next 5-10 year return assumptions*

Cash 2.5%
Inflation Forecast 2.5%

Growth Assets

US Large/Small Cap Eq. 7.7%
Non US Developed Eq. 7.7%
Emerging Markets Eq. 8.7%
Private Eq. 9.6%
Convertibles 7.1%
Non Core Real Estate 7.9%
REITs 7.6%

Diversifying Assets

US Fixed Inc 3.4%
International Fixed Inc 3.6%
High Yield 6.1%
Opportunistic Fixed Inc
[Bank Loans, Distressed] 7.3%
EM Debt 5.5%
Absolute Return 6.6%

Inflation Hedging Assets

TIPS 3.2%
Core Real Estate 6.4%
Commodities 4.3%

Living with Lower Returns

- Actuarial investment rates of 8% unachievable with current policy portfolio, at least *for next 5+ year period*
- We must also understand 'normal' portfolio returns in 30 year period [long term] independent of cyclical valuation anomalies
- Long term balanced policy portfolio should be built using normal returns
- Short term policy portfolio must begin transition towards long term portfolio, adjusted for cyclical valuation opportunities

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Identifying Risks that Matter

Identifying Risks that Matter

- In the last decade, **asset diversification failed** - just when it was most needed
- Failure of markets or **failure of assumptions?**
- **Model risk:** Over-reliance on **mean-variance** analysis as the primary tool to model potential outcomes:
 - Volatility higher than forecasted
 - Downside risk in 'tail' events underestimated
 - Markets failed to realize 'mean return expectations'
 - Amid stress, 'normal' correlations among assets soared

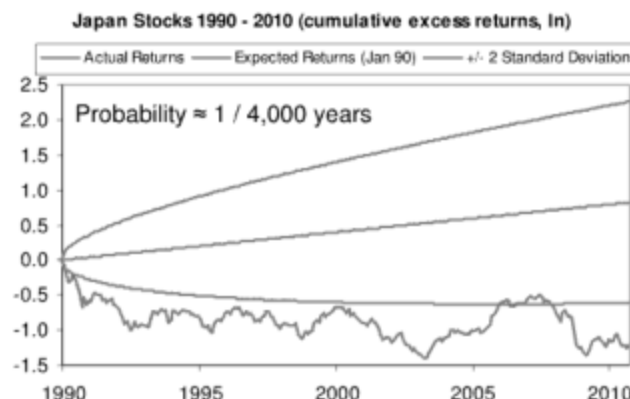
Limits to the Use of Mean-Variance Analysis

Mean Returns May Not be Realized For Long Periods of Time

US Stocks (2000 - 2009)



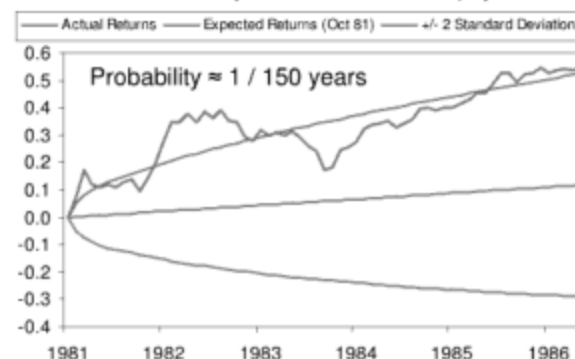
Japan Stocks (1990 - 2010)



US Bonds (1965 - 1981)



US Bonds (1981 - 1987)



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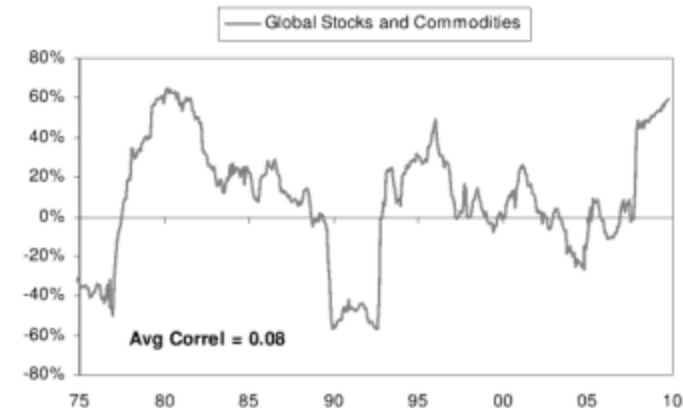
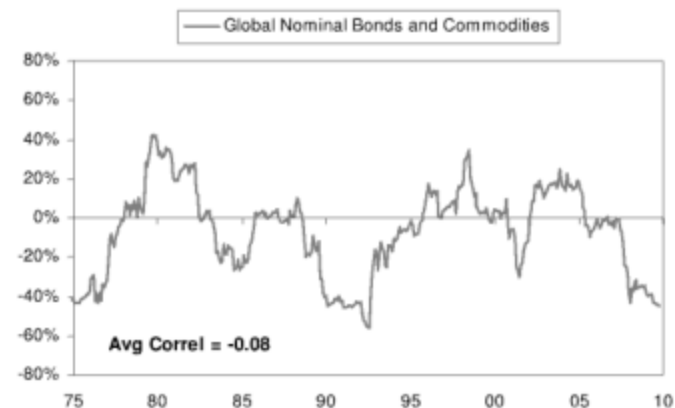
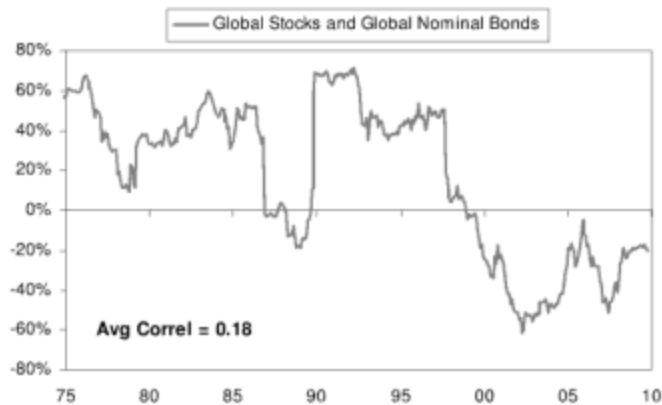
Return expectations are based on previous 10 year volatility multiplied by a 0.25 Sharpe ratio. Expectations are based on Bridgewater Associates' understanding of global markets. There is no guarantee that the results shown can or will be achieved. Source: Global Financial Data Inc. and Bridgewater Analysis.

Source: Bridgewater

Limits to the Use of Mean-Variance Analysis

Correlations: Unstable and Environmentally Dependent

Rolling 3-yr Correlation of Monthly Excess Returns



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Source: Bridgewater



Identifying Risks that Matter [continued]

- **Model Risk** - failure of mean-variance assumptions
- **Environmental risk** concentration in high growth/low inflation sensitive asset classes
- **Risk Budgeting**: a necessary complement to Capital Budgeting

Economic Environments Change...

	Environment*	
	Eco Growth [Real GDP]	Inflation [CPI]
1930-2009	3.3%	3.2%

1950s	4.1	2.2
1960s	4.4	2.5
1970s	3.2	7.4
1980s	3.0	5.1
1990s	3.2	2.9
2000s	1.8	2.6

 Positive Economic Indicator
 Negative Economic Indicator

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*Source: Bureau of Economic Analysis, Federal Reserve Bank of Minneapolis, Ibbotson SBBI, Deutsche Bank

... Driving Asset Returns

	Environment*		Capital Markets Returns*		
	Eco Growth [Real GDP]	Inflation [CPI]	Equity	Long Treasury	Crude Oil
1930-2009	3.3%	3.2%	9.6%	5.7%	n/a
1950s	4.1	2.2	19.3	0.4	1.5
1960s	4.4	2.5	7.8	2.8	0.8
1970s	3.2	7.4	5.9	6.1	28.0
1980s	3.0	5.1	17.6	12.8	-5.4
1990s	3.2	2.9	18.2	8.0	1.7
2000s	1.8	2.6	-0.95	6.6	11.9

Positive Economic Indicator
 Negative Economic Indicator

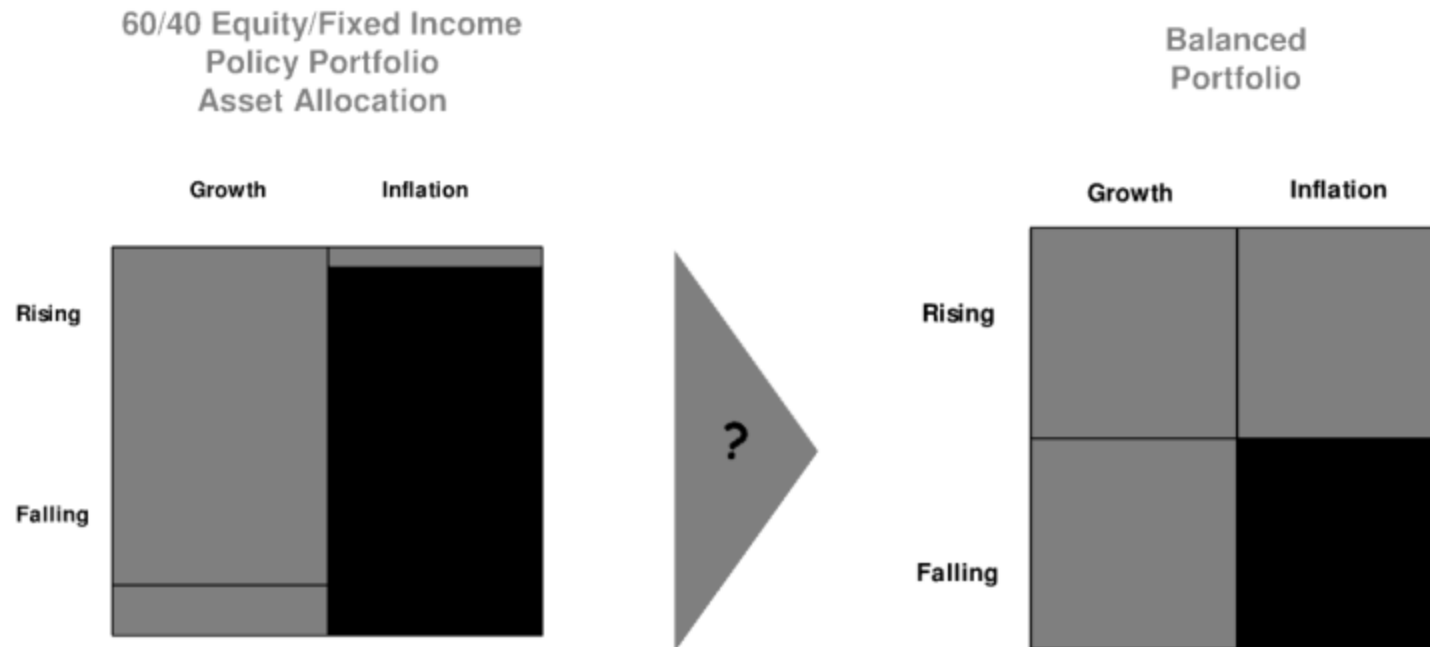
Highest Return Asset Class in decade
 Lowest Return Asset Class in decade

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*Source: Bureau of Economic Analysis, Federal Reserve Bank of Minneapolis, Ibbotson SBBI, Deutsche Bank

Environmental Risk: Asset Allocation Viewed Through Another Lens

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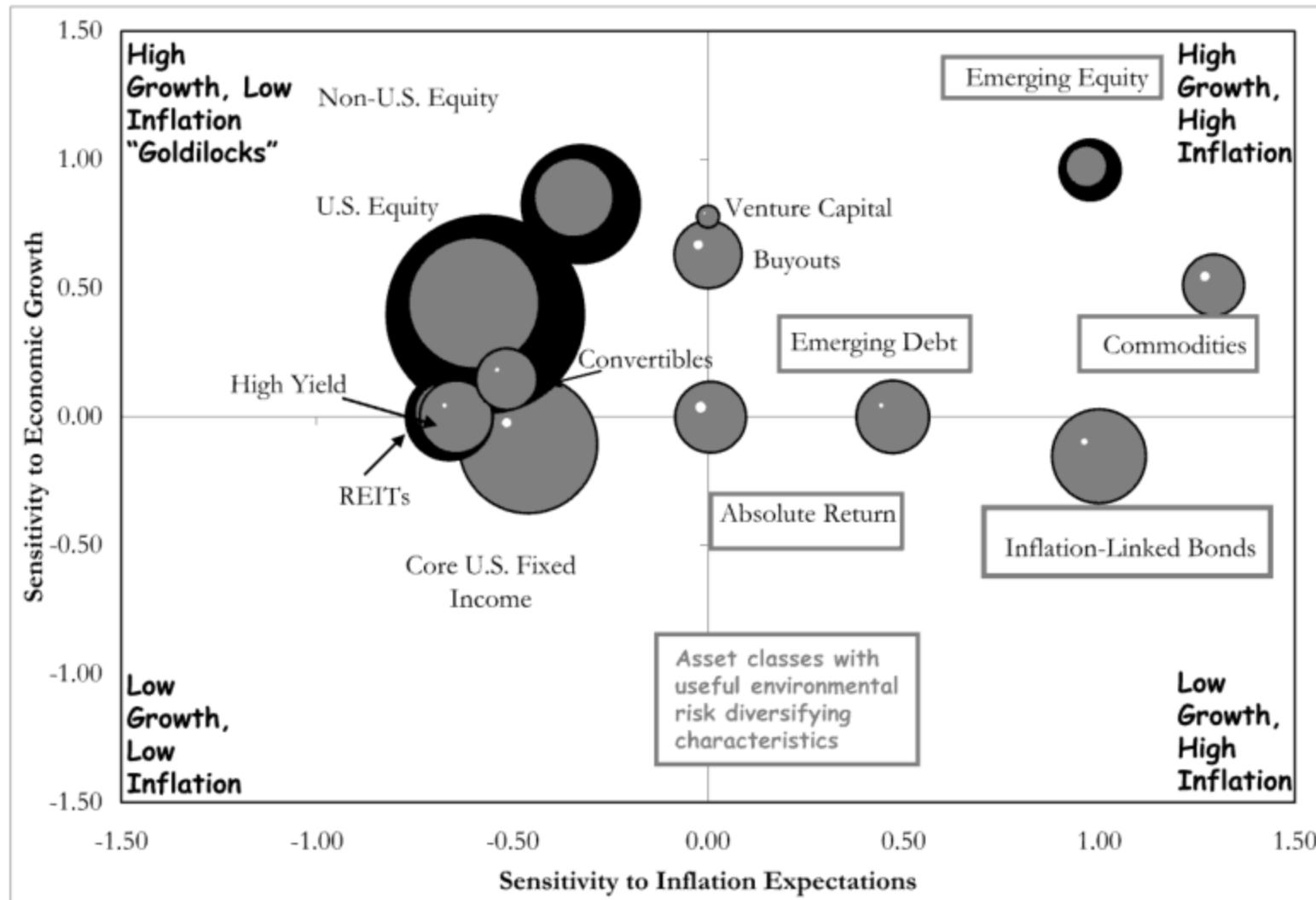
Please refer to Note 4 for relevant disclosures.

Source: Bridgewater

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Environmental Risk: Asset Allocation Viewed Through Another Lens

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Note: bubble size represents relative assets allocation weights for alternative #2 (with Absolute Return) and should be used for illustrative purposes only.

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Source: Rocaton

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Risk Budgeting a Necessary Complement to Capital Budgeting

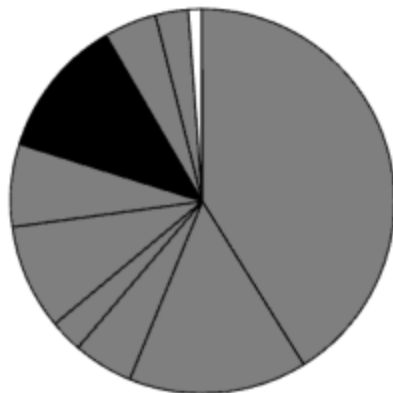
■ Risk Budgeting

- Consider the portfolio from a total risk perspective rather than total return
- An attempt to determine the contribution to risk by each asset class in the portfolio, based on
 - Asset class volatility assumptions
 - Correlations between asset classes
- Shows the benefit of diversification
 - But also the risk exposures in relation to allocation size
- Especially useful if asset classes are bucketed by:
 - Role they play in total portfolio
 - Risk similarity

Risk Budgeting a Necessary Complement to Capital Budgeting

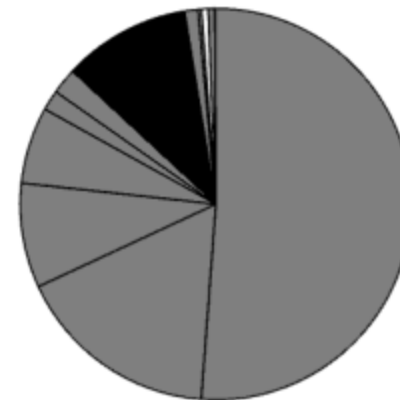
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Capital [\$] Weights



Equities - Large Cap - 41%	High Yield - 6%
Equities - Intl. - 15%	Real Estate - 6%
Equities - Private Eq. - 5%	Nominal Govt Bonds - 4%
Equities - E.M. - 3%	IL Bonds - 3%
Mortgages - 9%	Convert. Bonds - 1%
Nominal Bond Agg - 7%	

Risk Weights



Equities - Large Cap - 51%	High Yield - 4%
Equities - Intl. - 17%	Real Estate - 6%
Equities - Private Eq. - 9%	Nominal Govt Bonds - 1%
Equities - E.M. - 7%	IL Bonds - 0%
Mortgages - 2%	Convert. Bonds - 1%
Nominal Bond Agg - 2%	Currency - 0%

Equities: 64%

Equities: 84%

Source: Bridgewater

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Risk Budgeting: Specifies the True Role/Risk of Asset Classes

Traditional Classification

- Equities
- Fixed Income
 - Aggregate
 - High Yield
- Alternatives
 - Private Equity
 - Real Estate
 - Hedge Funds

----- Alternative Buckets * -----

Risk Budgeting Classification [Based on Volatility, Correlations and Environmental Risk]**

- Growth Assets
 - Public Equities
 - Private Equity
 - Non Core Real Estate
 - REITs?
 - Combine Equities and Credit as Company Risk?
- Diversifying Assets
 - Treasuries [Interest Rates]
 - Credit
 - IG Corp + HY + Distressed + EM Debt
 - Hedge Funds
 - REITs?
- Inflation Hedging Assets
 - Inflation Linked Bonds
 - Core Real Estate
 - Commodities/Energy
 - Timber/Farmland

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*Many variations possible. All subjective!

** Risk Buckets as defined by SIS, MOPI estimate of asset class membership within buckets

Risk Budgeting: Risk Allocation, Not \$ Allocation Matters

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Classifying Asset Classes by Risk Characteristics/Role in Asset Allocation	Capital [\$] Weights	Risk Weights
	100%	100%
% Growth Risk	66%	90%
% Diversifying Risk	26%	5%
% Inflation Risk	8%	5%

*Long term balanced policy portfolio should be
designed to optimize **risk** weights*

Identifying Risks That Matter

Accidents happen!

Speed limits, road signs and seat belts don't prevent them..

.. but they foster discipline,
reducing the instances of a really
bad outcome!



Redrawing the Policy Roadmap

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- Significant downward revisions to next 5-10 year return assumptions
- Risk/decision making tools must be broadened

...But...

- Near term, *meaningful* de-risking not possible/advisable
 - Equity markets not recovered to pre-credit crisis levels
 - Bonds unattractive
 - Sponsor contributions already pressured

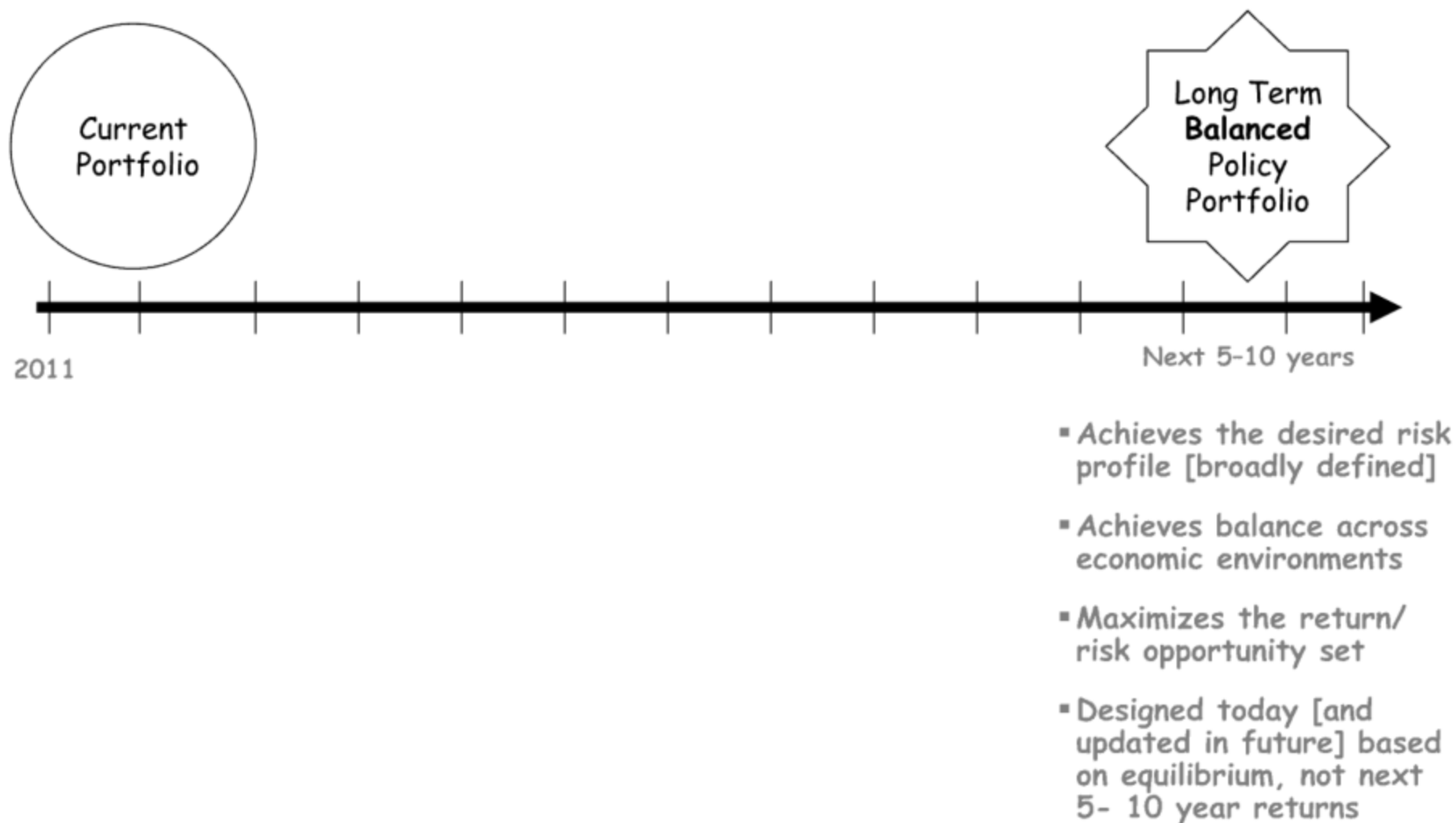
Redrawing the Policy Roadmap

...Hence...

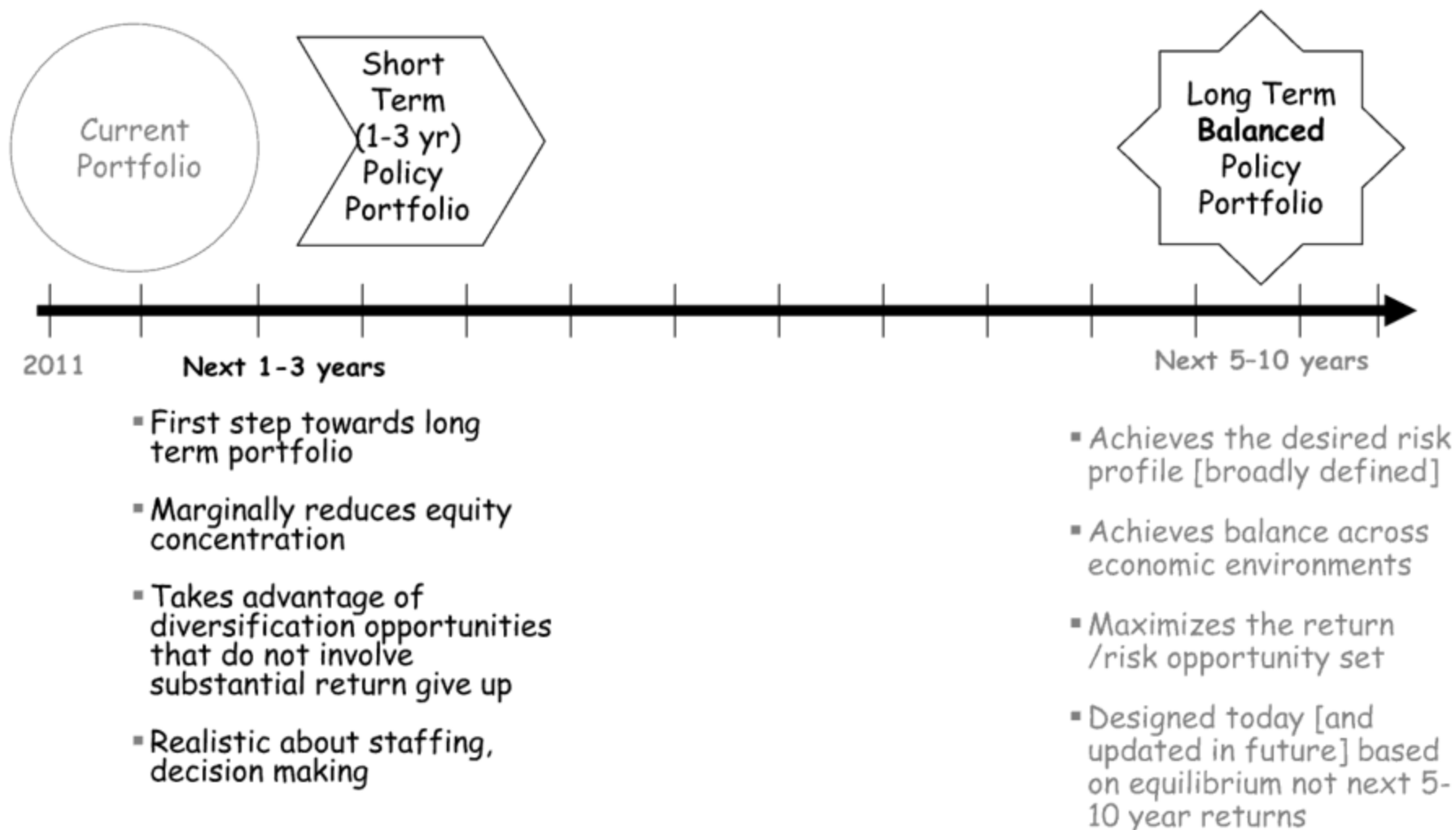
- Explicitly distinguish between short term and long term policy portfolios
- Long term policy portfolio must be designed to achieved the desired risk profile and balance across environments
- Short term policy portfolio managed for valuation opportunities and cash flow needs - always with a strong directional view to long term policy goals
- *We have our current location, we need a roadmap and a destination!*



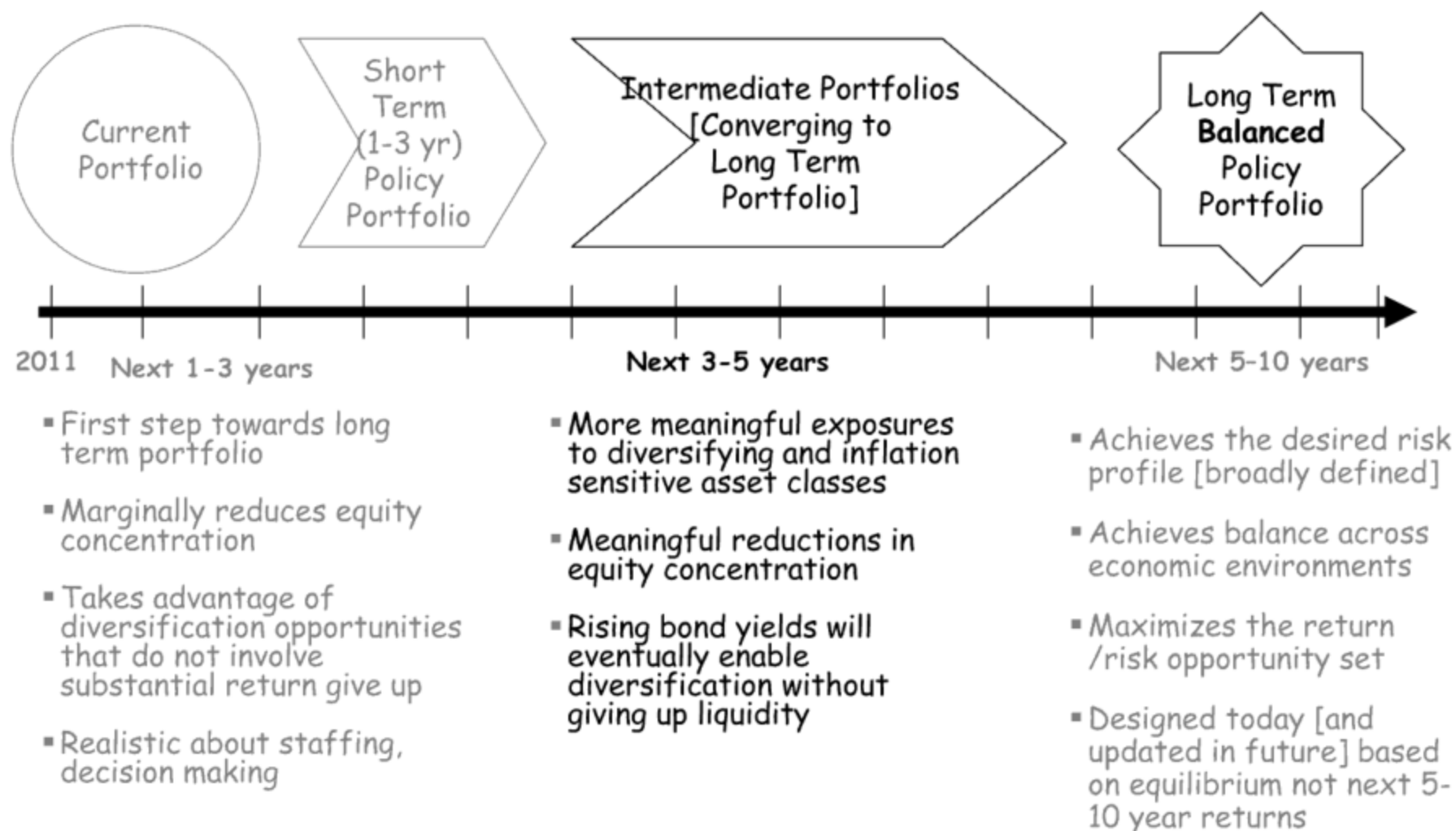
Asset Allocation Policy Roadmap



Asset Allocation Policy Roadmap



Asset Allocation Policy Roadmap



Asset Allocation Policy Roadmap

Risk Buckets	Current	Short Term	Intermediate Term	Long Term Balanced Policy Portfolio
Growth	90%	80-85%	60-75%	50-70%
Diversifying	5%	5-10%	10-20%	20-30%
Inflation Sensitive	5%	5-10%	5-15%	10-25%
Overall Risk/ Downside Risk	Std. Dev.: 12 - 13% Max Loss: 40% [Credit crisis]	Std. Dev.: 11 - 12% Max Loss: 35 - 40% [Very little change]	Std. Dev.: 10 - 12% Max Loss: 20 - 35%	Std. Dev.: <10% Max Loss: 15 - 20% ?

Redrawing the Policy Roadmap

- Significantly improve balance between policy portfolio target returns and risk level/ risk diversification

- Expand decision making tools:
 - Risk budgeting
 - Downside risk
 - Environmental scenarios
 - Liquidity
 - Liability sensitivity

- Define long term balanced policy portfolio based on:
 - 'Normal' return expectations
 - Downside risk mitigation
 - Environmental balance
 - Broadest investment opportunity set

- Valuation, board governance and staffing should drive pace of change towards long term balanced policy portfolio

Redrawing the Policy Roadmap

Future issues:

- Building tactical flexibility to changes in valuation
- Deciding the optimal allocation to risk sourced from active management
- Stress testing returns in various market/economic scenarios
- Reducing/managing downside risk
- Managing liquidity as alternative allocations increase
- Understanding liability sensitivity to economic environments
- Staffing and governance

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Impact on Institutional Investors
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Appendix

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*"It's the Asset Allocation Policy, *&%\$#@!"**

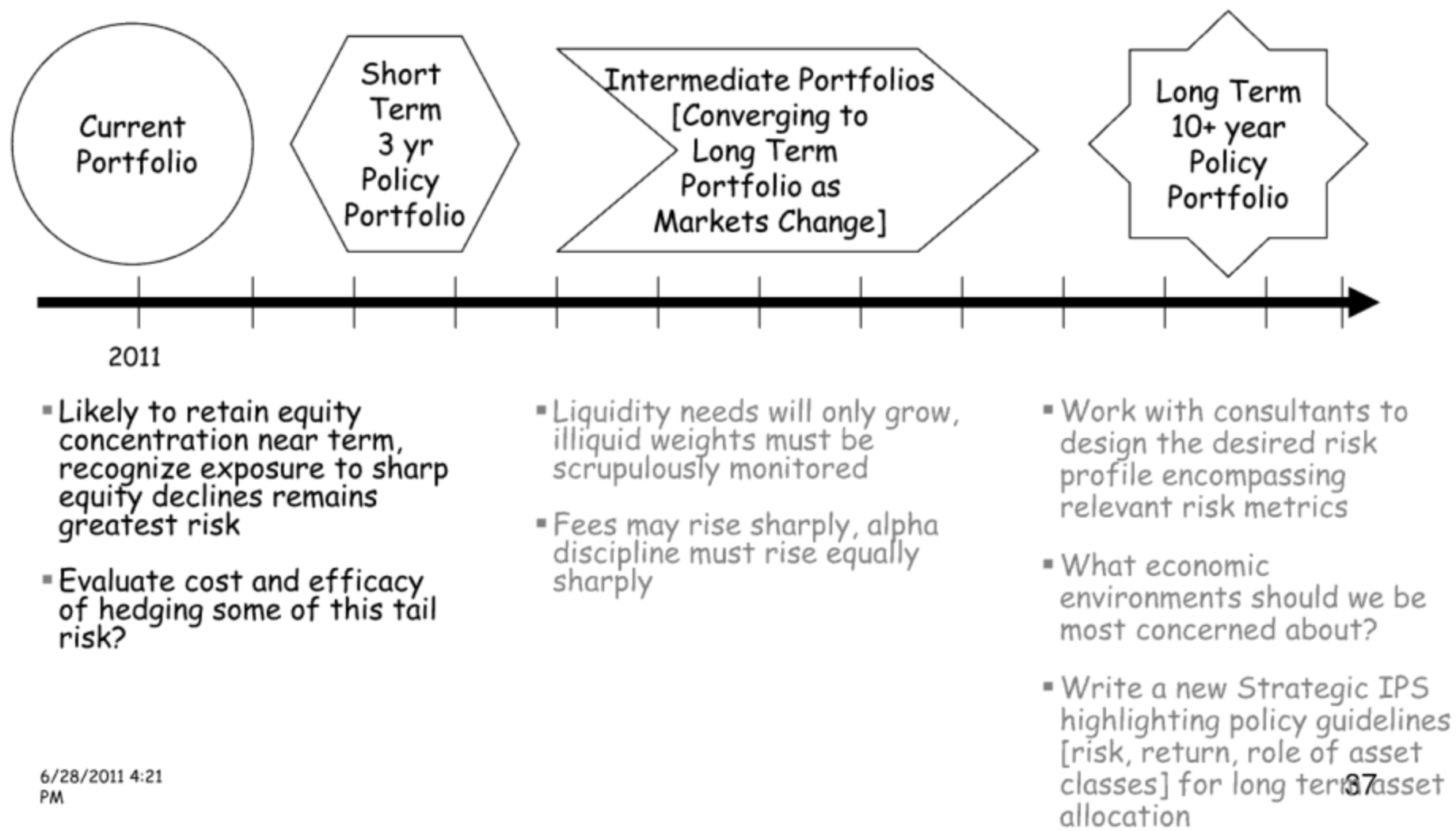
- Asset Allocation Policy explains about **100%** of the **level** of return across funds (*Ibbotson*)
- Asset Allocation Policy explains **90%** of the **variability** of actual returns of a fund over time (*Brinson; Ibbotson*)
- Asset Allocation Policy explains about **40%** of the return **difference** among funds (*Ibbotson*)

Sources:

Gary P. Brinson; Brian D. Singer; and Gilbert L. Beebower; "Determinants of Portfolio Performance: An Update"; Financial Analysts Journal May-June 1991.
Ibbotson and Kaplan, Does Asset Allocation Policy Explain 40, 90, or 100 Percent Performance?; Financial Analyst's Journal January/February 2007

Initial Conclusions: Open Questions/Issues

Policy Roadmap



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Risky 'Tail Events' More Likely

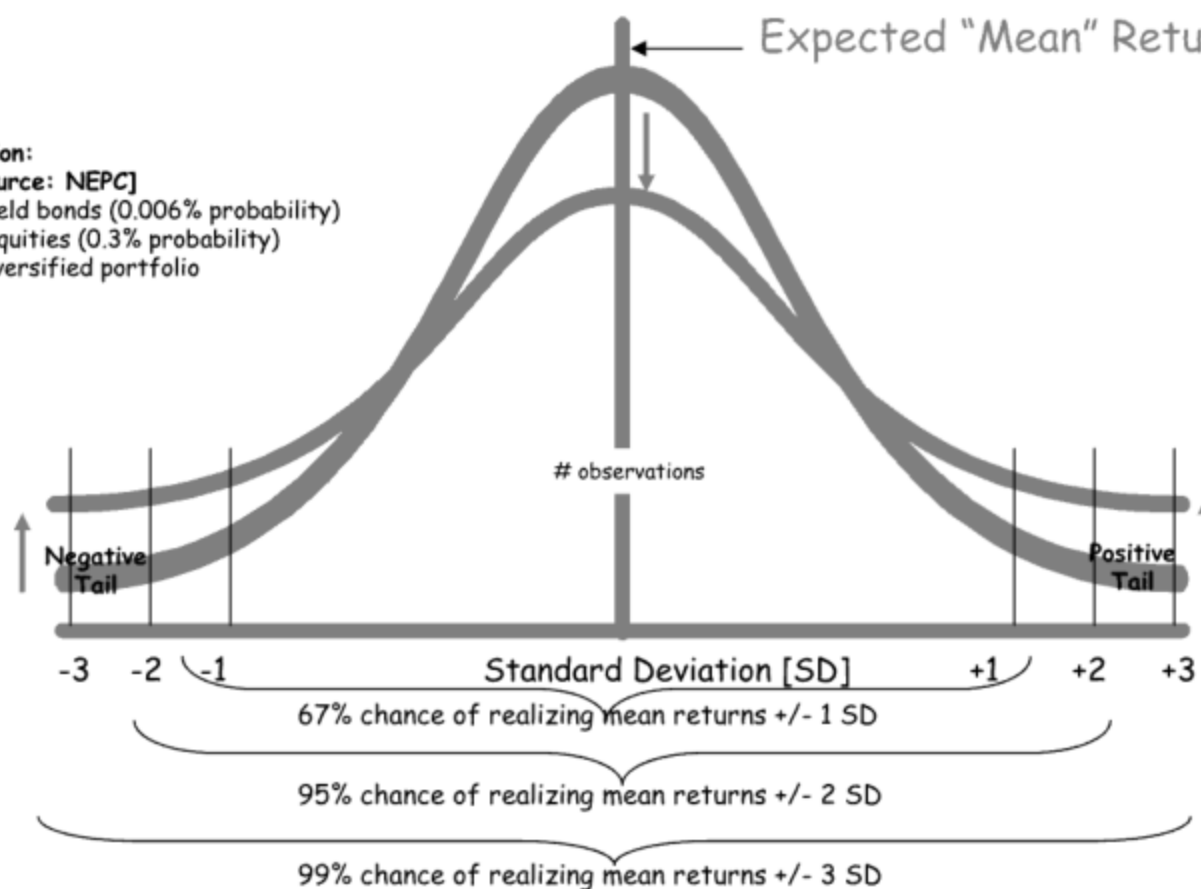
Tail-Risk Underestimation:

12/1/07-11/30/08 [Source: NEPC]

4 SD event for high yield bonds (0.006% probability)

3 SD event for most equities (0.3% probability)

3 SD event for well diversified portfolio



Volatility
"Tails"
[Chance of
"Rare"
Events]:
Rising

Asset Allocation Tools: Mean-Variance Analysis

Limits to the use of mean/variance analysis

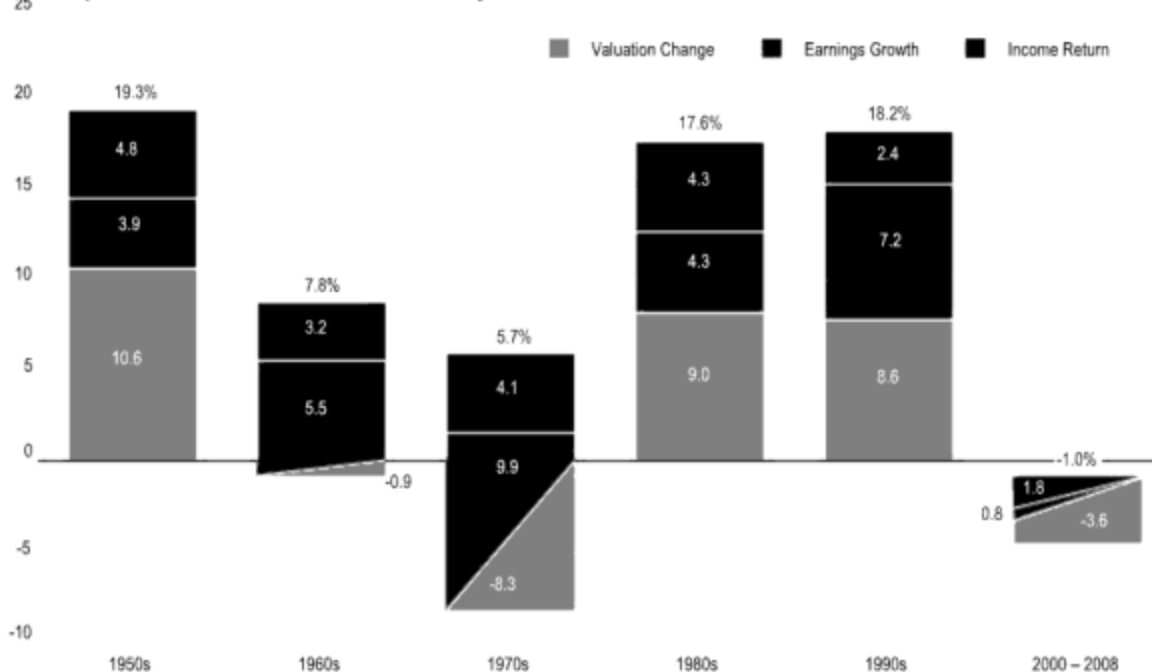
- **Expected return, standard deviation and correlation are critical estimates but notoriously unreliable**
 - Recent markets have violated fundamental assumptions behind this investment tool
 - Mean/variance analysis works best for liquid assets in liquid markets
 - Expected return is expected to be optimistic (too high) 50% of the time
 - One standard deviation around expected return covers only 2/3 of the estimate, and two standard deviations is not a great measure of how bad things can get
 - Correlations are inherently unstable and in down markets soar to 1.0 for similar risk assets
 - Correlations can show diversification benefits of alternative investments, but is not precise enough to determine sizing

Valuation [P/E Multiple] Change a Significant Driver of Historical Returns

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US Equity Market Fundamental Drivers of Return

Components of S&P 500 Annualized Returns by Decade



Note: Earnings growth based on operating earnings

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