The Bucket List

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Agenda

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- Discuss a framework that utilizes broad macro-asset classes (i.e. “Buckets”)
- Step through the mechanics of creating a sample bucketing structure
- Review important considerations (advantages & disadvantages)
- Provide practical examples
- Conclusions / Q&A

- The objective of asset allocation: Identify an optimal mix of investments at an appropriate risk level

- The challenge: Choosing between a seemingly endless menu of asset classes
  - A generation ago, portfolios largely consisted of plain vanilla U.S. stocks and bonds
  - Today, portfolios include a multitude of market segments and alternative investments

- Diversification is the key to portfolio efficiency
  - However, a greater number of asset classes does not necessarily lead to better diversification

- **We believe…**
  - In constructing broad, well diversified portfolios
- **However…**
  - The complexity of including a large number of asset classes can be counterproductive to the asset-liability process and…
  - Often provides a false sense of diversification
    - Simply adding more asset classes does not always equate to a meaningful improvement in diversification
- **We present …**
  - A general framework to capture the diversification benefits of a broad investment approach without succumbing to the potential pitfalls of including a large menu of asset and sub-asset classes

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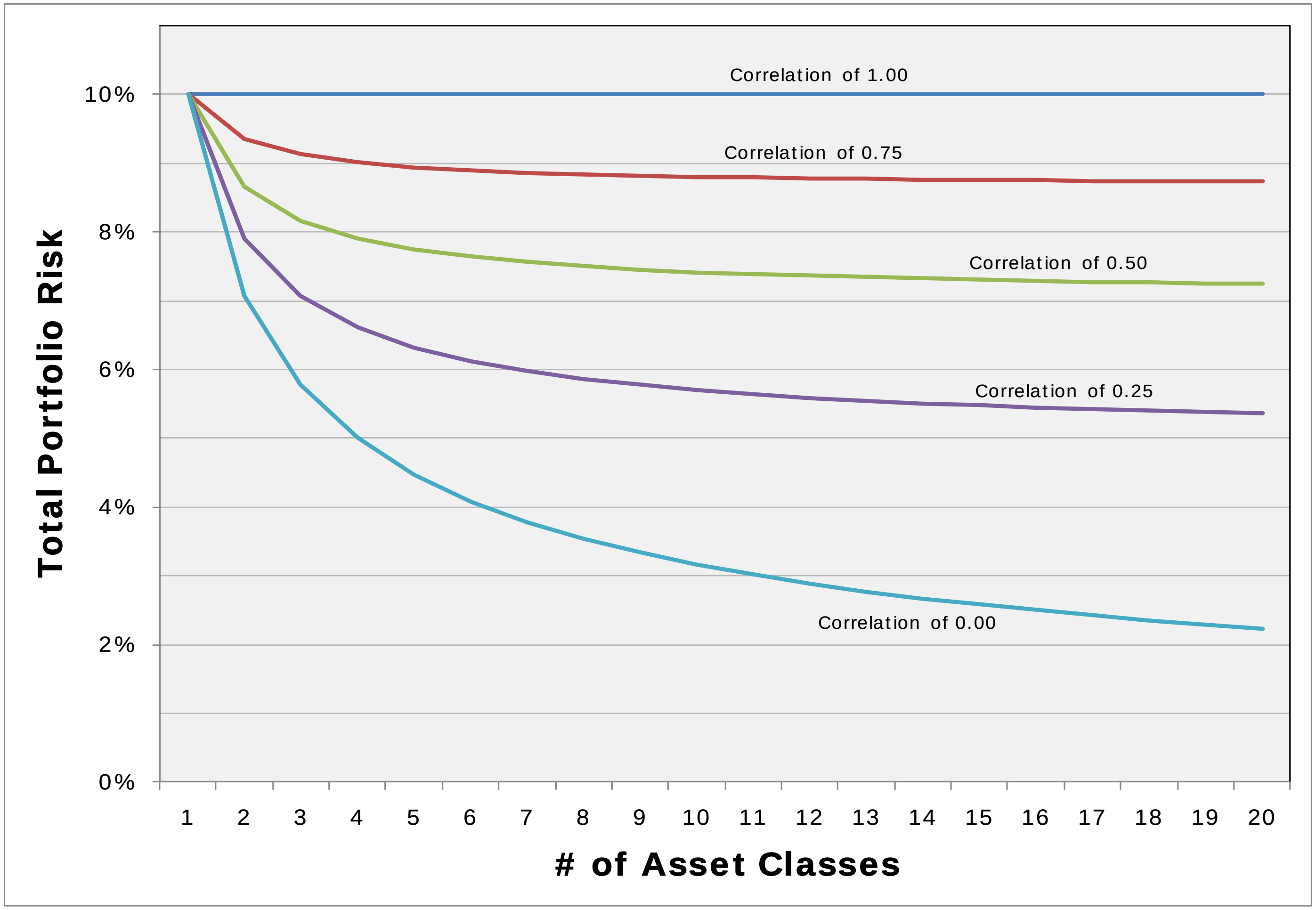
- **Correlations drive diversification**
  - Simply adding more asset classes with high correlations does not provide meaningful risk reduction



Why are Correlations So Important?

- **Asset class correlations are a reflection of common responses of certain investments to macro-economic conditions**

- **Correlations are simply statistical representations of the role that asset class pairings can play within a total fund and are linked to the economic factors that impact investment returns**
  - Some investments, such as publically traded stocks, are highly sensitive to GDP growth
    - rising in value when growth prospects are strong and falling during periods of GDP contraction
  - Other investments may have less sensitivity to growth, but respond more directly to changes in interest rates or inflation

- **True diversification is achieved when combining asset classes that respond differently to various economic environments**

- **Group asset classes with high correlation to one another into a broad macro-asset class buckets**
  - Measure their aggregate contribution to the overall portfolio

- **Flexible framework**
  - Identify groupings based on the role each asset plays in a broader portfolio
  - Can be determined quantitatively or qualitatively
  - From historical relationships or forward-looking expectations

- **Which risks should be managed?**

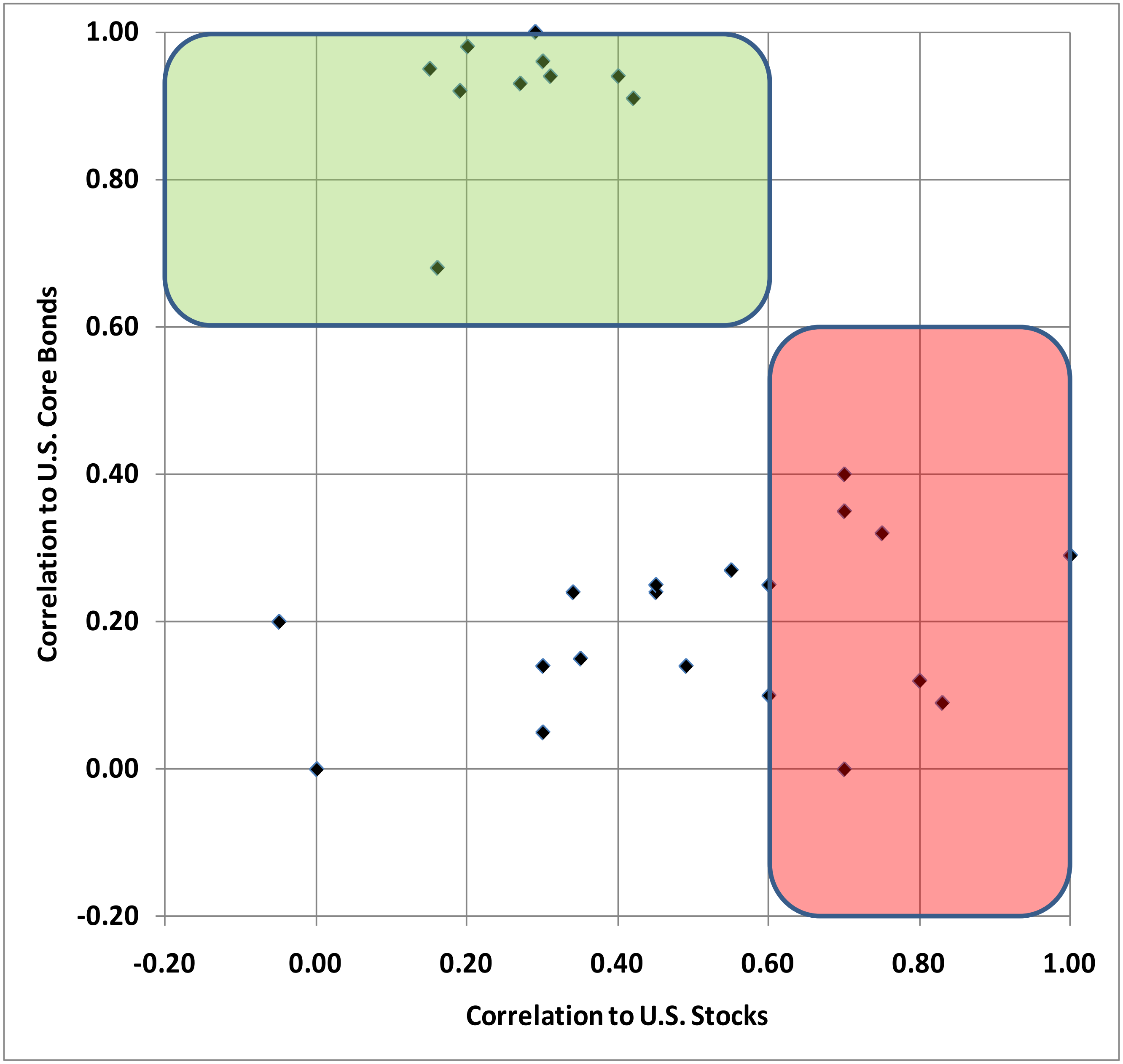
- **Return volatility is not the only risk that investors face**
  - Risk of permanent loss
  - Inflation / Deflation impacts
  - Liquidity / Cash flow needs
  - Interest rate & credit risk
  - Funding requirements

- **Mitigating risk is like buying insurance**

A Sample Bucketing Framework

- **We present an example using Wilshire's long-term asset class assumptions**
  - A "Growth" bucket with US Stocks as anchor asset class
  - An "Income / Safety" bucket with US Core FI as anchor asset class

The Bucket List: Picking Classes & Taking Names



Income/Safety Macro-Asset Class	
Asset Class	Correlation
U.S. Core Bonds (anchor)	1.00
U.S. Gov't-Rel. Bonds	0.98
Securitized Bonds	0.96
U.S. Treasury Bonds	0.95
U.S. Invs't Grade Corp. Bonds	0.94
U.S. LT Core Bonds	0.94
U.S. LT Gov't-Rel. Bonds	0.93
U.S. LT Treasury Bonds	0.92
U.S. LT Invs't Grade Corp. Bonds	0.91
Non-U.S. Bonds (Hdg)	0.68

Growth Macro-Asset Class	
Asset Class	Correlation
U.S. Stocks (anchor)	1.00
Global ex-U.S. Stocks	0.83
Developed ex-U.S. Stocks	0.80
Private Market Portfolio	0.75
Emerging Stocks	0.70
U.S. Buyouts	0.70
Mezzanine Debt	0.70
Venture Capital	0.60
Non-U.S. Buyouts	0.60

- **Remaining asset classes can be segmented by other characteristics**
  - Each asset's sensitivity to inflation can be used to aggregate investments into a "Real Assets" bucket

- **Could include TIPS, Real Estate (public and private), Commodities, Timberland and Oil & Gas Partnerships**

- **Cash can be set aside to serve in a stand-alone "Liquidity" bucket**

- **Leaves investments such as High Yield, Distressed Debt and Emerging Debt, which can be combined into a "Credit" bucket**
  - Behave like higher quality bonds during tranquil environments and closer to stocks during times of stress

- **General framework results in the following buckets:**
  - Growth
  - Income / Safety
  - Real Assets
  - Credit
  - Liquidity / Cash Equivalents

- **Plenty of flexibility in the framework**
  - Some may choose to split the "Income / Safety" bucket
  - Some may find a "Liability Sensitive" bucket useful in an asset-liability approach
  - Still others may find it helpful to combine multi-asset strategies into a "Diversified" or "Absolute Return" bucket
    - i.e. hedge funds, tactical asset allocation (TAA) and risk parity strategies

Considerations & Advantages

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- **Macro-asset class buckets properly inform the asset allocation process**
  - Grouping assets that play a similar role in a portfolio imposes discipline on our understanding of risk and diversification

- **Buckets can be used in a variety of ways**
  - Components in an optimization routine
  - Parameter constraints to control the aggregate allocation of a subset of asset classes
  - Reporting/monitoring tool to communicate overall exposures at macro-asset class level

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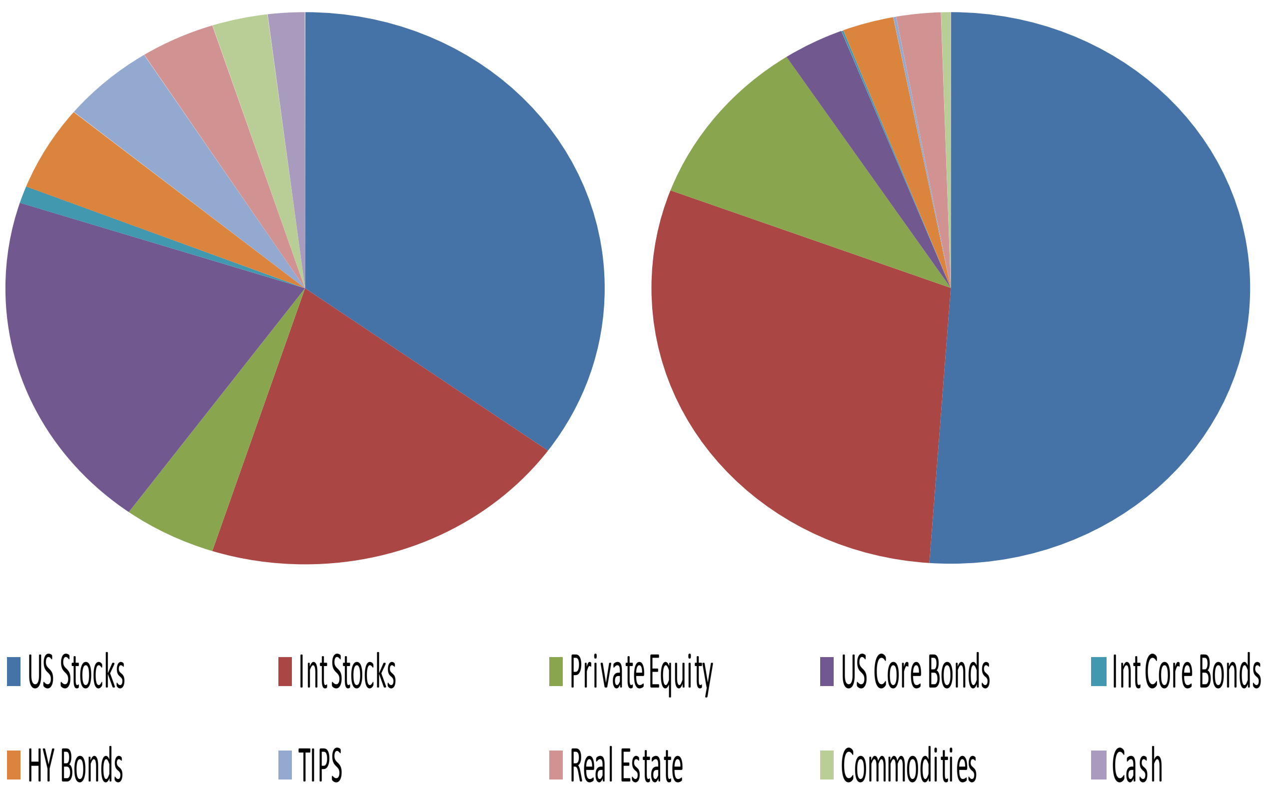
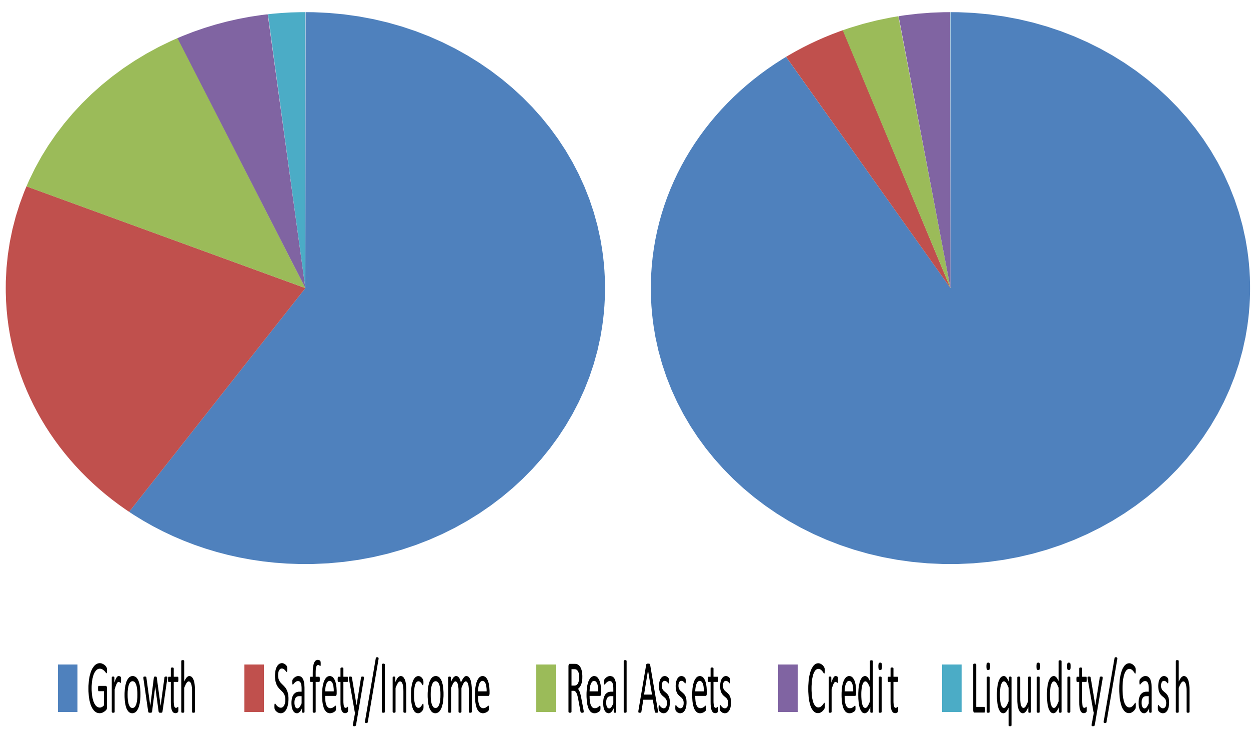
- **Methods to determine asset class component weights within a bucket**
  - Market / Capitalization weighting
  - Equal weighting
  - Risk weighting
  - Optimization weighting
  - Practical & qualitative considerations
    - Cash flow / liquidity issues between public & private markets

- **Is optimality sacrificed to predetermine bucket component weightings?**
  - Yes, but importance of determining appropriate bucket weights trumps the underlying mix of asset classes in driving return/risk

- **Capital (left) & Risk (right) Allocations by Asset Class**
  - Looks diversified (even in risk-allocation space)



- **Capital (left) & Risk (right) Allocations by Bucket**
  - Same portfolio, but doesn't look as diversified



The Bucket List: Other Advantages

- **Can help limit the complexity of the optimization process by reducing the number of model inputs**
  - Decrease possibility of spurious outcomes from extreme sensitivity to correlation estimates between large number of classes

- **Provides guidance in managing private market portfolios**
  - Unpredictable capital calls & distributions make it difficult to maintain target allocations to private market investments
  - Bucketing framework can help identify which public market asset classes can serve as proxy investments to counter-balance private market over-/under-weights
    - Growth: Public equities for private equities
    - Real Assets: REITS for private RE; Commodities for Timber and Oil & Gas Partnerships

Practical Bucketing Examples

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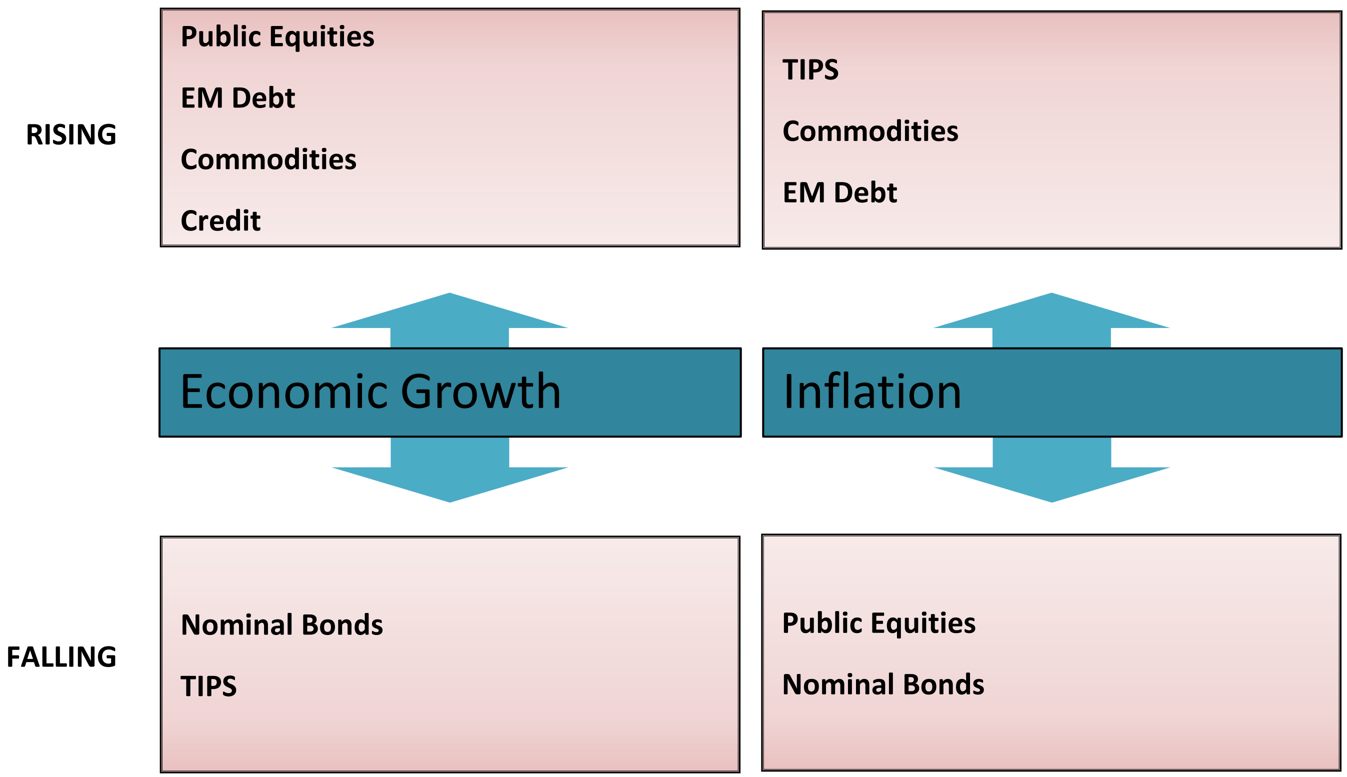
- **Multi-asset risk parity product approach**
  - Focus is on economic growth and inflation



Source: Bridgewater "Risk Balanced Portfolios"

- **Defined benefit approach**
  - Contains “Liability Hedge” and “Absolute Return” buckets

Proposed Buckets
Economic Growth
Income
Liability Hedge
Liquidity
Inflation Protection
Absolute Return

Economic Growth
Public Equities
Private Equity
REITs
Value Add and Opportunistic Real Estate

Income
Core Fixed Income
High Yield Bonds
Core Real Estate
Bank Loans

Liability Hedge
Long Government Bonds
Long TIPS

Liquidity
Cash Equivalents
Short, High Quality Fixed Income

Inflation Protection
Timberland
Farmland
MLPs
Commodities
Infrastructure

Absolute Return
Hedge Funds

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- **Endowment approach**
  - Focus is on three high level buckets with constraints

Public Markets	Fixed Income	Private Markets
Global Public Equity High Yield Commodities Global REITS Emerg Mkt Debt	Core Fixed Income Global IL Bonds Cash	Venture Capital Buyouts Dist and Mezz Debt Oil & Gas Private Real Estate

Bucketing Framework Example

- **Endowment approach**
  - Including a risk parity bucket

Equity	Income	Public Real Assets	Private Real Assets	Risk Parity
Global Public Equity Private Markets	Core Fixed Income Investment Grade Credit High Yield	Global IL Bonds Global REITS Commodities	Timber Oil & Gas Infrastructure	Diversified Strategies

Bucketing Framework Example

- **Endowment approach**
  - Similar to case study approach, but utilizing client's sub-asset class components

Growth	Income/Safety	Real Assets	Credit	Liquidity/Cash
Global Public Equity Venture Capital Buyouts Dist and Mezz Debt	Core Fixed Income	Global IL Bonds Global REITS Private Real Estate Commodities Oil & Gas	High Yield	Cash

Conclusion

- **A bucket list can help …**
  – Focus asset allocation decisions on the trade-offs that matter most
  – Avoid a false sense of diversification by identifying investment concentration that goes across asset classes
  – Provide an ideal implementation structure (i.e. managing private markets allocations)

- **Capitalizes on concept of "less is more" by simplifying (not oversimplifying) complex issues**

- **Bucketing framework is open to a virtually limitless amount of flexibility and customization in dealing with the unique circumstances of any institution**

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