The Actuarial Profession
making financial sense of the future

Momentum Conference 2011
Crispin Lace

Driving Growth
Across economic scenarios

1 December 2011

Topics for discussion

- The world is changing around us
- Proliferation of the opportunity set
- Improving our growth portfolio
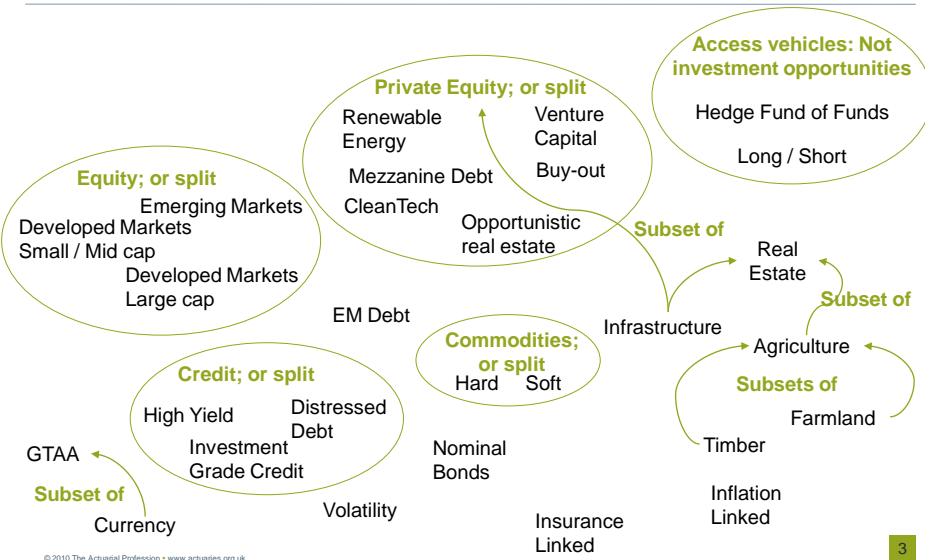- Monitoring the risks and understanding the underlying exposures.

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Reminders from the Global Financial Crisis "when diversification failed"

- Fat tail analysis – accounting for non-normality in distributions
- Dynamic Asset Allocation – capitalising on market extremes
- Behavioural Finance – understanding investors' true risk appetite
- Scenario Analysis – identifying systemic risks not easily quantifiable
- Factor analysis – common 'risk' factors are driving returns.

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Investment ideas are accessed in different ways

Access vehicles: Not investment opportunities
Hedge Fund of Funds
Long / Short

Private Equity; or split
Renewable Energy
Venture Capital
Mezzanine Debt
Buy-out
CleanTech
Opportunistic real estate

Equity; or split
Emerging Markets
Developed Markets Small / Mid cap
Developed Markets Large cap

Subset of
Real Estate

Subset of
Agriculture

EM Debt
Infrastructure

Commodities; or split
Hard   Soft

Subsets of
Farmland
Timber

Credit; or split
High Yield
Distressed Debt
Investment Grade Credit
Nominal Bonds

Inflation Linked

GTAA
Subset of
Currency
Volatility
Insurance Linked

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Creating a diversified portfolio

- Need a robust decision-making framework
- Diversifying equity risk premium is accepted but allocation is to other "asset classes"
- However
  - Different asset classes have similar underlying drivers
  - Return drivers for some asset classes are not obvious
- A factor-based approach provides a robust alternative
  - Identify the factors that drive return
  - Allocate the portfolio among these factors.
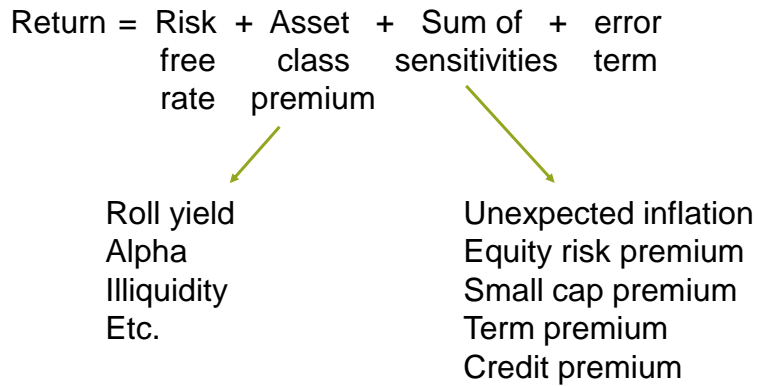
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The philosophical divide

- Should factors be "measurable" (quantitative), based on historical relationships or should they be qualitative and perhaps more intuitive
- There is a wide difference of opinion between the various proponents of the factor-based approach
- Any approach should combine rigour (where this is possible) with some qualitative risks/considerations

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Review of the five factor model

For the "quantitative return drivers" create a matrix using a factor model similar to Fung and Hsieh (2002)

Return = Risk + Asset + Sum of + error
        free   class   sensitivities   term
        rate   premium

Roll yield
Alpha
Illiquidity
Etc.

Unexpected inflation
Equity risk premium
Small cap premium
Term premium
Credit premium

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Building factor models – 'commodities'

- Risk free rate = Cash (interest rate on the collateral)
  - Risk free rate also captures expected inflation (Fama and Schwert, 1977)
- Asset class premium = the roll yield (futures) and depends on backwardation or contango
- Key sensitivities are:
  - <u>Unexpected</u> inflation
  - Economic growth.

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Underlying return drivers

Asset Class	Return Drivers								
	Equity Risk Premium	Small Cap Premium	Emerging Mkt Premium	Credit Risk Premium	Un-expected Inflation	Term Premium	Illiquidity Premium	Non-Corporate GDP Growth	Alpha / Other
Developed Large Cap	High								High
Low volatility	High	Moderate							High
Emerging Markets	High		High					Some	High
Developed Small Cap	High	High							High
Private Equity	High	Moderate					High		High
Cash					Some	Some			
Sovereign Fixed Income						High			
Inflation-Linked					High	High			
Investment Grade Credit	Some			High		Moderate			
Emerging Market Debt	Moderate		Some			High	Moderate		Some
Infrastucture	Moderate				High	High	Moderate		
Real Estate - Direct				Moderate	High		High	High	
Timberland							High		High
GTAA	Some	Some	Some	Some		Some	Some	Some	High
Merger Arbitrage		Some		Moderate		Some	Some		High
Event Driven	Some	Some		Some			Some		High
Multi-Strategy	Some	Some	Some	Some		Some	Moderate		Moderate
Commodities					High				
ILS - Catastrophe Bonds							Moderate		High

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Factor analysis is a growing trend

- ATP Fund (Denmark) – five factor model (interest, credit, equities, inflation and commodities)
- Alaska Permanent Fund (six factor model)
- CalPERS (six factor model)

"CalPERS is now running a parallel process with portfolio models built on the standard tools of mean variance portfolio optimization, but also on an alternative factor model to try and get a better grip on risk."
- Joe Dear, CIO CalPERS, June 2010, in an interview with top1000funds.com

Factor analysis supplements traditional SAA work

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Benefits of factor analysis

- Intuitive
- Risk on a look through basis

  "A conventional 60/40 portfolio has close to 100% of risk from equities, and even well diversified endowment type portfolios find risk related to the default asset permeating all the investments"

- Dimension reduction – forecast risk premia not asset classes
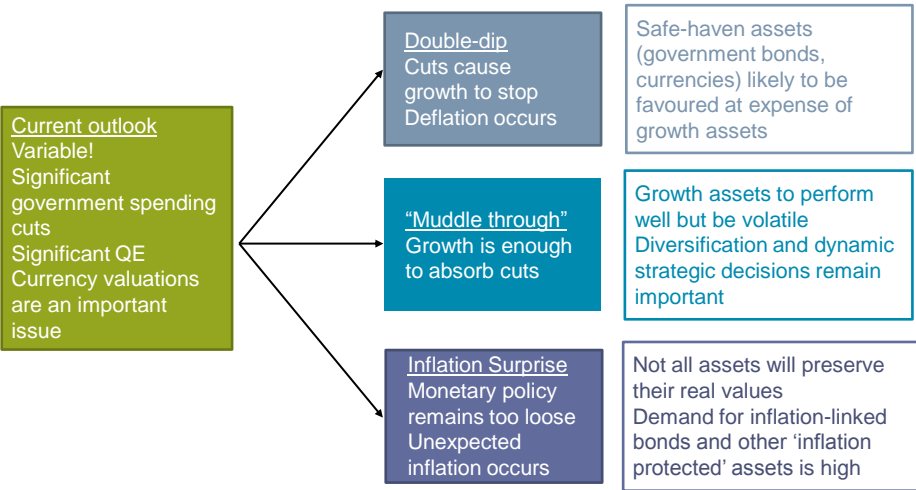- Hedging possibilities

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Building an efficient growth portfolio

Practical Examples

Scenario testing

Current outlook
Variable!
Significant government spending cuts
Significant QE
Currency valuations are an important issue

Double-dip
Cuts cause growth to stop
Deflation occurs

Safe-haven assets (government bonds, currencies) likely to be favoured at expense of growth assets

"Muddle through"
Growth is enough to absorb cuts

Growth assets to perform well but be volatile
Diversification and dynamic strategic decisions remain important

Inflation Surprise
Monetary policy remains too loose
Unexpected inflation occurs

Not all assets will preserve their real values
Demand for inflation-linked bonds and other 'inflation protected' assets is high

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Relative performance of return drivers under different economic scenarios

Scenario	Quantitative Return Drivers								
	Equity Risk Premium	Small Cap Premium	Emerging Mkt Premium	Credit Risk Premium	Unexpected Inflation	Term Premium	Illiquidity Premium	Non-Corporate GDP Growth	Alpha / Other
Double-Dip	Weak	Weak	Weak	Weak	Weak	Strong	Weak	Weak	Moderate
Muddle Through	Strong	Strong	Strong	Moderate	Moderate	Moderate	Strong	Strong	Moderate
Inflation Surprise	Moderate	Strong	Moderate	Strong	Strong	Weak	Moderate	Moderate	Moderate

Strong:- We expect strong performance from this driver
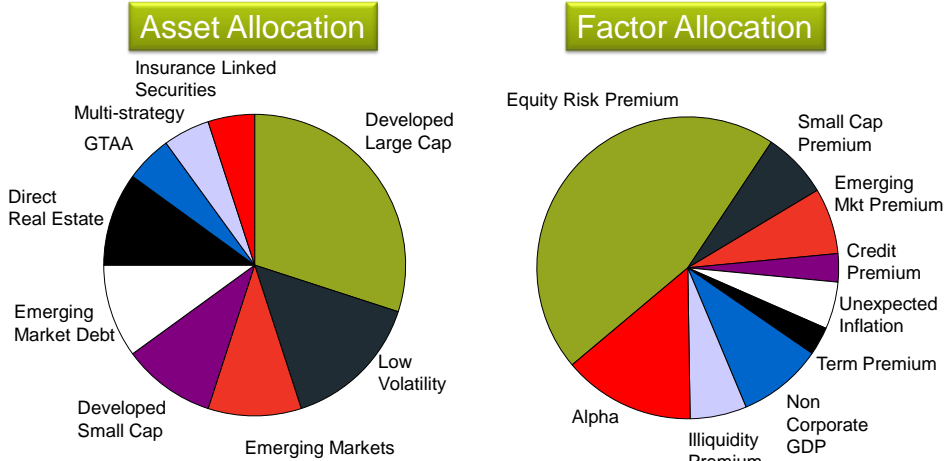**Moderate:-** We expect moderate performance from this driver
Weak:- We expect weak performance from this driver

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Strawman Portfolio

Asset Allocation

- Insurance Linked Securities
- Multi-strategy
- GTAA
- Direct Real Estate
- Emerging Market Debt
- Developed Small Cap
- Emerging Markets
- Developed Large Cap
- Low Volatility

Factor Allocation

- Equity Risk Premium
- Small Cap Premium
- Emerging Mkt Premium
- Credit Premium
- Unexpected Inflation
- Term Premium
- Non Corporate GDP
- Illiquidity Premium
- Alpha

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Implementing Asset Allocation Strategy

- Set your long-term goals with *Strategic Asset Allocation*
- Capture a range of *Factor Risk Premia* via a diversified Growth Portfolio
- *Stress-test* the portfolio for different economic scenarios
- Seize opportunities/take evasive action with *Dynamic Asset Allocation*

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