The Actuarial Profession
making financial sense of the future

Alternative investments

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6 June 2005

Agenda

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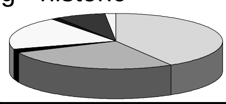
UK pension fund investing - historic

- Traditionally UK pension funds focused on four key asset classes:
  - UK equities
  - Overseas equities
  - Government bonds
  - Property
- Over time, UK pension funds have diversified ……. up to a point
- However, the majority of the risk and the added return is still derived from equities (equity risk premium)



		30/12/94 %	30/12/04 %
Growth assets			
UK equities		56.0	39.0
Overseas equities		23.0	27.5
Property		2.5	2.0
Matching assets			
UK Bonds		6.1	21.2
Global Bonds		4.6	0.7
Index-linked		3.8	7.5
Cash/other		4.0	2.1

Source: Russell/Mellon CAPS

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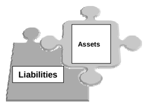
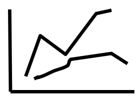
Timeline of UK pension fund investing

- **1960s** – UK pension fund asset allocation focuses on four key asset classes
- **1970s** – Pension funds start investing overseas
- **1980s** – Introduction of index-linked gilts to meet inflation linked liabilities
- **1990s** – UK pension funds make strategic asset allocation into corporate bonds
- **2000s** – Diversity
  - UK pension funds increasing bond allocations
  - Pension funds seeking alpha
  - Absolute return strategies
  - Hedge funds

WW investment philosophy

- Strategic asset allocation has become more complex and consists of more than just quoted equities and bonds
- We divide potential investment opportunities into two types shown below. Larger risk budgets would lead investors to hold a greater proportion in growth assets





Matching assets
- Assets that most closely match the fund's liabilities
- Typically a portfolio of bonds, but bond or inflation derivatives may be necessary to achieve a closer match

Growth assets
- All other investment opportunities are held to increase the long-term expected return of the investor's portfolio
- By diversifying this portfolio of assets by source of outperformance, it is possible to minimise the amount of additional risk that must be taken in order to increase the expected return

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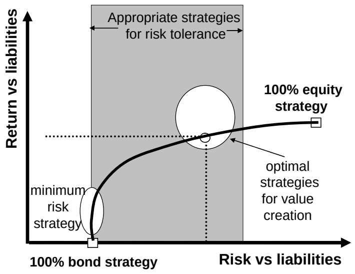
Are equities the only growth asset?

Risk budgeting: constructing the most efficient portfolio

Risk budgeting

- Risk budgeting assesses risk and return relative to a liability proxy
- Minimum risk strategy may contain some equities depending on liabilities
- Risk tolerance factors define a wide range of appropriate strategies
- Value creation factors get you up the curve rather than staying at the minimum risk position



Equities vs bonds is not an efficient frontier – use other assets and mandates to get above the line

Classic risk budgeting (1)

Agree ***liability proxy*** and ***risk measure***

↓

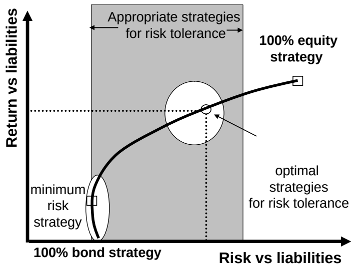
Apply ***asset model*** to different strategies

↓

Calculate return and risk of strategies

↓

Determine optimal strategy



Classic risk budgeting (2) Incorporating manager skill

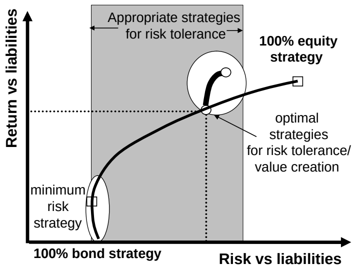
Determine optimal policy

↓

Determine optimal implementation enhancements

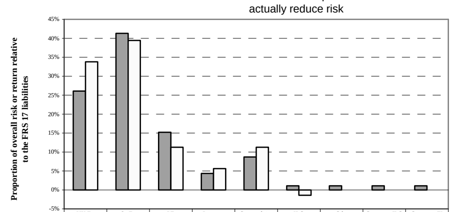
↓

Combine



Risk budgeting – typical UK fund

- We attribute the tracking error and expected return for between different asset classes
- Majority of risk is still seen to come from exposure to the ERP. A pension fund's bond assets may actually reduce risk



	UK Eq	Os Eq	PE	Property	Commodities	ILG	Gilts	Corporate ILG	Corporate FI
Contributions to risk	26%	41%	15%	4%	9%	1%	1%	1%	1%
Contribution to return	34%	39%	11%	6%	11%	-1%	0%	0%	0%
Overall risk	2.4%	3.8%	1.4%	0.4%	0.8%	0.1%	0.1%	0.1%	0.1%
Overall return	1.2%	1.4%	0.4%	0.2%	0.4%	-0.1%	0.0%	0.0%	0.0%

Equity risk premium **Illiquidity premium** **Credit risk premium**

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Growth assets

- When considering which growth assets we believe it is best to consider why these assets should outperform the matching assets and to diversify across different sources
- Most growth assets are exposed to multiple 'Risk Premium Factors'. The four main examples are as follows:

Equity risk premium	The future earnings from companies are uncertain leading investors to demand higher returns in compensation **Examples: Quoted equities, private equity**
Credit risk premium	Bond issuers may default on their obligations and not make repayments of capital or interest and so must offer spreads over government bonds. **Examples: corporate bonds, high yield bonds, emerging market debt**
Illiquidity premium	Investors should demand a higher return to compensate them for an illiquid investment or for providing liquidity to a market **Examples: property, private equity, commodity futures**
Skill premium	Skilled investment managers should be able to outperform the average and generate 'alpha' **Examples: funds of hedge funds, long-short funds, long-term absolute return mandates, GTAA/currency funds, traditional active management**

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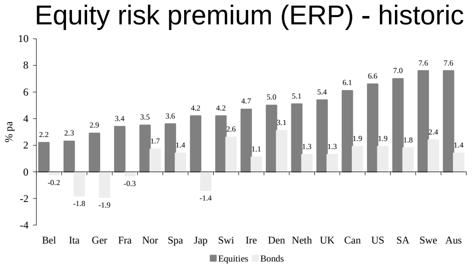
Equity risk premium (ERP) - historic



- The ERP varies over time with changing mean and variance
- A significant cause of this change is sentiment based
- Sentiment tends to overshoot causing a short-term trending and longer-term mean reversion effect

Source: Dimson, Marsh and Staunton (ABN AMRO/LBS)

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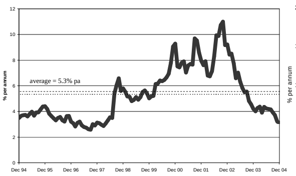
Credit risk premium

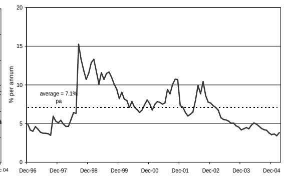
- Credit spreads for all types of bonds have fallen considerably in the past few years
- This partly reflects lower default risk with high yield defaults being at record levels in 2001, but declining significantly in 2003
- The reduction in spreads may also reflect a reduction in the potential risk premium available to investors
- This would suggest allowing investment in emerging market debt and high yield on a tactical or opportunistic basis

High yield spreads



(Source: Lehman Brothers)

Emerging market debt spreads



(Source: JP Morgan)

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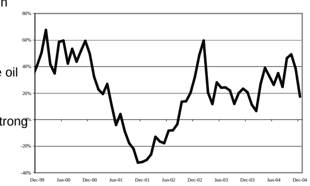
Liquidity risk premium

- Commodity futures returns have been very strong over the past few years
- This has been driven by:
  - A falling dollar
  - Middle East events affecting the oil price
  - Limited investment in supply in previous years combined with strong demand growth as the global economy recovers (particularly China)
- The assumed correlation between commodity returns and equities has marginally increased reducing the potential diversification benefits

Commodity futures returns



(Source: Goldman Sachs)

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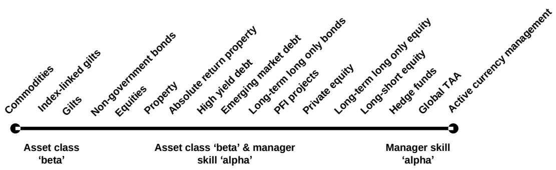
Skill premium

- The spectrum below shows to what extent each asset class strategy replicates the returns of a particular assets class, captures the skill of an investment manager or represents a combination of both



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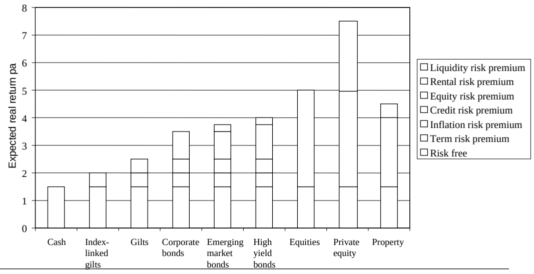
Asset class risk premium factors – building blocks

- ‘Risk premium factors’ (RPFs) – these are risk/return ‘drivers’ or building blocks across asset classes



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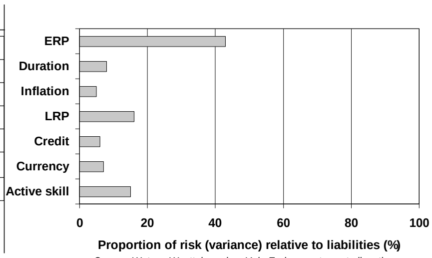
A new framework for looking at risk

Assets

Equity risk premium
Duration
Inflation
Liquidity risk premium
Credit
Currency
Active skill



Source: Watson Wyatt, based on Yale Endowment asset allocation

Current approach has ERP as dominant risk factor.
This approach enables us to improve diversity

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Diversification, diversity, uncertainty

- Diversification
  - Dictionary definition: the spreading of investments over several assets to guard against loss
  - Technical definition: the reduction of idiosyncratic risk within an asset class, typically using mean-variance optimisation
- Technical diversification assumes ‘price model certainty’ – if we knew the news we would know the consequent price
- Diversity is about hedging our bets against price model uncertainty. It is a more qualitative approach to spreading risk, and is closer to the dictionary definition

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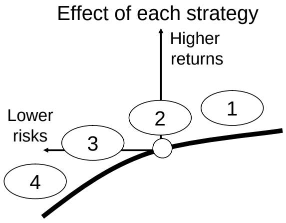
Some examples of diversity - XYZ case example

1. Aggressive bonds
   EMD/High yield taken from straight bonds

2. Long-short equity
   Added to passive equities

3. Long-term equity
   Absolute return taken from active equities

4. Fund of hedge funds
   Taken from active equities



…and combinations of strategies are more efficient than any single strategy

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Are equities the only growth asset?

Which alternatives should also be considered?

Why consider alternatives?

Improving financial efficiency

The key reason is to **improve the expected financial efficiency of a pension scheme's assets.** This allows a greater expected overall return for the level of expected overall risk taken.

Exploiting manager skill

Mandates are designed to take advantage of manager skill and are not constrained in the same way traditional equity and bond mandates are.

Increased diversification

Alternatives aim to exploit the four main risk premia identified earlier in order to deliver a strong long-run return:

- **Equity risk premium**
- **Credit risk premium**
- **Liquidity premium**
- **Skill premium**

The asset allocation strategy of many pension schemes focus on the equity risk premium alone.

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Framework for investigating alternatives

- There are three key factors and two secondary factors that should be considered for all approaches.

Three primary factors

- **Return benefit –** to increase the expected overall level of return net of fees
- **Risk benefit –** to reduce the overall risk of a pension scheme's assets, particularly over the shorter-term
- **Governance complexity –** reflects complexity of the technical characteristics of the asset class/strategy and thus whether implementation requires a greater level of expertise

The main reasons to consider alternatives

Two secondary factors

- **Liquidity –** the ability to sell an asset quickly without having to make a substantial price concession
- **Manager selection risk –** the risk of picking an unskilled manager who will generate poor returns. This relates partly to the dispersion of active manager returns

The key drawbacks of alternatives

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Alternatives -Issues to consider

Governance

High fees

Low liquidity

Strategy selection

Implementation-manager selection risk

Regulatory risk

- Alternatives can be difficult to monitor
- Many alternative strategies employ significant leverage and have high management costs
- The universe of alternative strategies is wide and varied
- Expected risk and return benefits are not certain
- 'Regret risk' from acting differently to most other UK pension funds
- Some approaches are not strongly regulated or controlled

Significant amount of effort needed to consider the range of alternatives and to become fully comfortable with preferred approach

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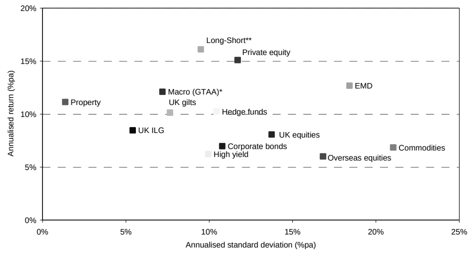
Risk and return history
10 years ending 31 December 2004



Sources: FTSE, SB, ML, Venture Economics, HFR, JPM, IPD.

* Data used is specific to "Macro hedge funds". We expect GTAA to have similar performance although it must be noted that GTAA funds are far more constrained. Macro hedge funds, for example, use leverage, whilst GTAA funds do not.

** We have used the data available for "Equity hedge funds"

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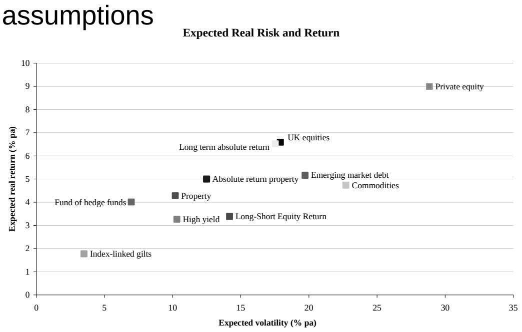
Forward looking risk and return assumptions



Source: Watson Wyatt Global Asset Model March 2005

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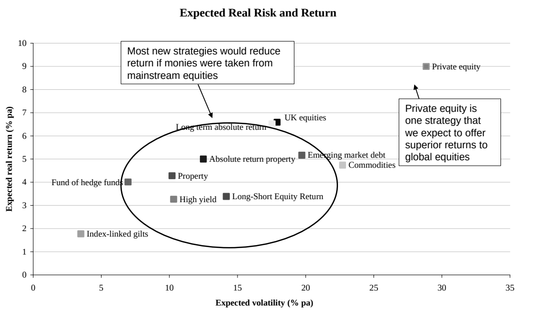
Return benefit



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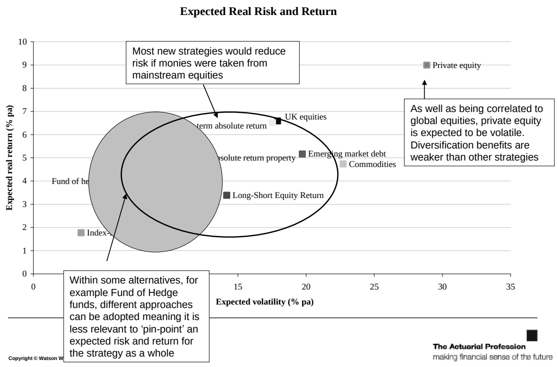
Volatility benefit analysis



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Correlation benefit – matrix analysis

Strategy	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Passive index-linked gilts (1)	**1**													
Commodities (2)	**M**	1												
Property (inc. absolute return) (3)	**L**	L	1											
Emerging market debt (4)	L	M	L	1										
High yield (5)	L	L	M	L	1									
Long-term long only bonds (6)	**M**	L	M	L	M	1								
PFI projects (7)	**M**	L	M	L	M	M	1							
Global equity (8)	**L**	**L**	**M**	**M**	**M**	**L**	**M**	**1**						
Fund of Private equity funds (9)	**L**	L	M	M	M	L	M	**H**	1					
long-term long only equity (10)	**L**	L	M	M	M	L	M	**H**	H	1				
Long/short equity (11)	**L**	L	L	L	L	L	L	**H**	M	H	1			
Fund of Hedge funds (12)	**L**	L	L	L	L	L	L	**M**	M	M	M	1		
Currency management (13)	**L**	L	L	L	L	L	L	**L**	L	L	L	L		
Global TAA (14)	**L**	L	L	L	L	L	L	**L**	L	L	L	L	M	1

Commodities have a low correlation with most other strategies

Global equities are a very rough proxy for a pension scheme's overall assets. Strategies that have a *low* correlation with global equities will offer the greatest potential risk reduction benefit

Equity market 'beta' is typically a key risk component of many investment strategies

Manager skill 'alpha' based strategies typically have low correlations with other manager skill based strategies and also strategies focusing on a particular asset class 'beta'

Alternative assets have a lower correlation to traditional equity assets held by pension schemes

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Alternatives

Hedge funds - overview

'A vehicle for the unconstrained exercise of investment management skill'

- Encompasses a wide range of investment strategies
- Use of short selling, derivatives and leverage
- Focus on positive returns regardless of market direction
- Makes full use of investment manager's skill to provide potentially high absolute returns
- Relatively low volatility and low correlation with other asset classes

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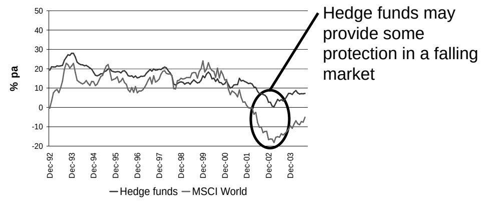
Hedge funds



- There is quite a high level of correlation between hedge funds and equities. This is due to the fact that there are a large number of long/short hedge funds that have some equity exposure

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High yield debt – overview

- Acts like a hybrid between bonds and equities
- Higher yield is offered to compensate for increased risk of default
- Use of specialist investment managers is recommended - skilled active managers can add value
- Fees can be high
- Duration is relatively short (average is 4.5 years)
- Limited universe - just under 90% (by market value) is US dollar denominated and sterling and euro high yield markets are relatively immature

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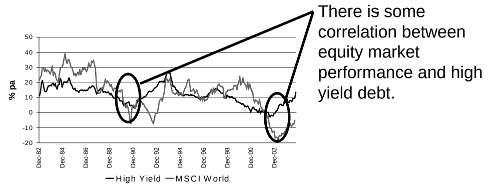
High yield debt



- Defaults tend to increase during poor economic conditions

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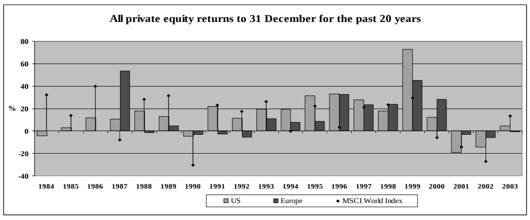
Private equity – overview

- Investment in unquoted and/or unitised companies
- Potentially higher returns than quoted equities due to lack of information, barriers to investment, illiquidity and greater shareholder activism
- Lower correlation of returns with traditional asset classes
- Fees can be high
- High volatility of individual manager performance means diversification across managers is important – therefore use fund of funds?

Private equity - attractive historical returns

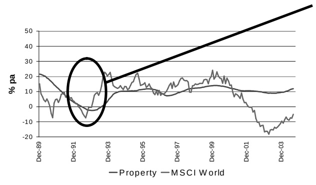


Source: Venture Economics

Property - overview

- Over the longer-term, rents are expected to increases in line with inflation, hence a reasonable hedge against inflation
- Over the shorter-term, rent is fixed at a certain level (until next rent review) and the fixed level of rent will be in place until next review, hence bond-like
- Illiquid compared to quoted equities and bonds
- No 'quoted market' - price of a property only known when it is actually sold
- Return is affected by letting voids, refurbishment costs, obsolescence and management costs

Property



Very poor economic environments can have an effect on both equity and property returns

- Due to the relative infrequency of property valuations, the returns from property appear to be more stable – hence the smoother line

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Commodities - overview

- There are fundamental economic reasons for commodities to have a low correlation with equities (and bonds which is less beneficial for a pension scheme)
- Investors get paid for taking on commodity price risk (“roll returns”)
- Spot returns from commodities may provide a hedge against (unanticipated) inflation and economic shocks
- High dependence on oil
- Given the high volatility, there are likely to be quarters when commodities produce large negative returns and equities produce large positive returns
- Tactical arguments for investing in commodities include falling US dollar, rising Chinese demand and long-term expectations of supply shortages

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Commodities – historic returns

Annualised risk and return 1970 to 2004

	GSCI$ %pa	S&P 500$ %pa
Return	12.0	11.3
Absolute standard deviation	18.5	15.5

Attribution of returns 1970 to 2004

	%
Cash	6.8
Roll	1.8
Spot	3.4
Total	12.0

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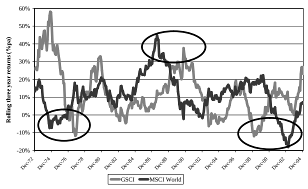
Commodities - diversification benefits

- Commodities are costly to store, so spot price of a commodity reflects current demand
- By contrast the price of equities reflects expectations of future profits and therefore future economic demand
- Commodity futures returns have low correlations with equities
- Historical chart on the right suggests this with the peaks and troughs of equity returns preceding those from commodities
- Historical correlation of monthly returns over five year periods has varied between +40% and -40%, with the lower correlations occurring over periods where there are turning points



Source: Watson Wyatt

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Tactical asset allocation (TAA) - overview

- Opportunistic re-allocation of assets in order to profit from return differentials
- Includes: stocks, bonds, cash (and increasingly currency)
- Two sorts of decisions
  - asset class timing
  - cross-sectional selection within asset classes
- Opportunity for pure application of manager’s skill
- Governance is challenging
- May not do well in trending markets

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Active currency management – overview

- Various studies since the mid-1980s have identified an exploitable (i.e. predictable and profitable after costs) anomaly - forward rate bias
- Currencies exhibit a tendency to trend over extended periods of time
- Active management of hedge ratios via these and other anomalies is believed to generate excess returns
- Empirical evidence supports active management

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Are currency markets efficient?

- Most liquid market with over $1.9 trillion in currency traded daily
- Differences in objectives of various agents
  - governments
  - corporate treasurers
  - exporters/importers
  - core fund managers
  - tourists
  - currency managers

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Absolute return mandates - overview

- The target return is not linked to a conventional benchmark. Managers are asked to beat an 'absolute' target, eg RPI or a fixed return
- A target could be determined that will be higher than the actuary's investment growth assumption
- Possible strategies:
  - invest in "safe" assets with no or very little risk
  - insist on being judged over long-term (10 years, say) and invest in assets with good long-term growth prospects
  - use of derivatives to avoid being exposed to the ups and downs of markets whilst still aiming to capture added value from individual investments

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Examples of absolute return mandates: long-term equity return mandates

- Wider investment freedom over longer time periods than 'mainstream' managers
- Not focused on short-term performance
- Different skill set from mainstream managers
- Different types of benchmark eg RPI +
- Low correlations with equity index returns
- Low turnover
- Limited risk controls

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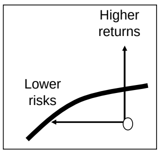
Are equities the only growth assets? Summary

Definition	Growth assets are all investment opportunities that increase the long-term expected return of an investor's portfolio relative to its liabilities
Diversity	Diversifying a portfolio of assets by source of outperformance (Risk Factor Premium), can reduce the level of portfolio risk
Improving financial efficiency	Investors should not rely on the Equity Risk Premium alone for their source of return



- Investors should consider alpha as well as beta bets within a portfolio
- Assets behave differently in different economic scenarios – they possess different risk and return attributes
- Alternatives can improve the expected financial efficiency of a portfolio of assets. This allows a greater expected overall return for the level of expected overall risk taken

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