



Russ Bowdrey FIA

Key messages

- Pairing illiquid assets and liabilities has benefits for life insurers.
- Solvency II may cap those benefits, but simplify calculations.
- Correlation estimation requires a lot of data, likely errors need to be communicated better.



Contents

Topic	Slides
Framing our questions – context and nomenclature	5-8
Solvency II considerations	9-10
Alternative fixed income assets	11-14
Measuring the illiquidity premium	15-18
Factors for selection of assets	19
Correlation – parameter error and communicating relationships	20-28
Related thoughts and alternative portfolio optimisation	29-31
Theory versus practice – some thoughts	32-33
The bottom line	34
Acknowledgements	35
Appendix - Alternative fixed income assets	37-51

Context

- In a low interest rate environment the pressure to maintain consistent and competitive profits leads the whole market on a quest for assets with higher yield.
 - But ideally without taking extra credit risk. No such thing as a free lunch?
- Large life insurance company with significant annuity liabilities.
 - Back illiquid liabilities (cannot be surrendered) with illiquid assets (held to maturity)
 - Illiquid assets are those which:
 - Can take significant time to buy/sell.
 - The spread of their yield over “risk free” arguably includes an **illiquidity risk premium (IRP)**. This compensates a speculative purchaser ***for risk they won't realise an asset in a timely manner with some certainty on price.***
 - A buy and hold investor should therefore be able to accept some illiquidity risk and some capture IRP as a return.

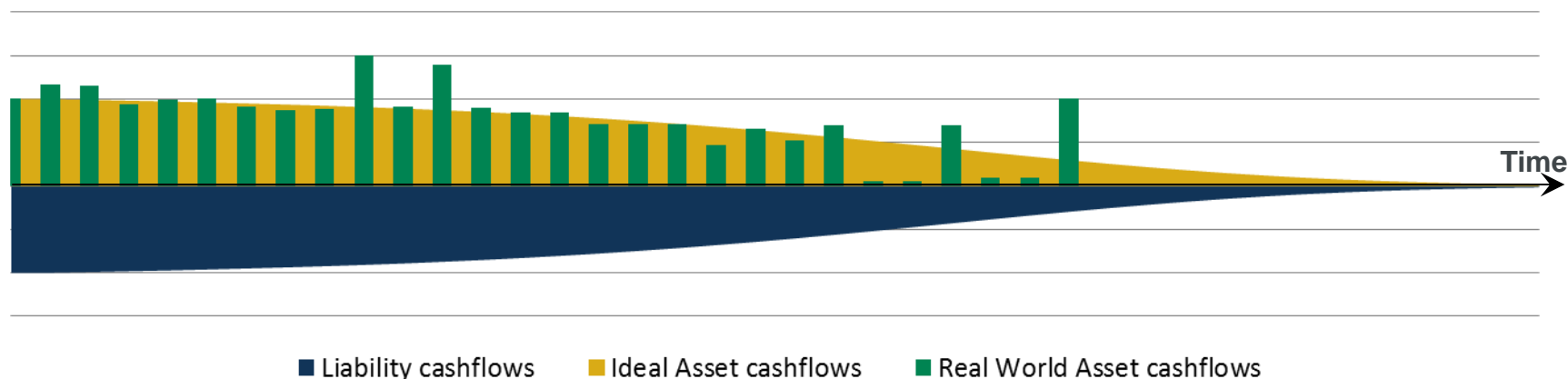
Insurers have dropped down in ratings quality in the search of yield

Life Insurer's Investment Objectives (1)

- Investment Management (IM) should **maximise return** subject to:
 - **Matching liabilities.**
 - Cashflow | duration | nature.
 - Taking an **appropriate degree of risk**. Required capital < Available capital.
 - Regulatory reporting measures.
 - Economic capital measures.
 - Appropriate governance and processes.
- Realistic expected return **should** feed into pricing & update regularly.
 - How much of the spread is passed on to customers via pricing yield?
 - Spread minus expected defaults?
 - Other factors: competitive position | Treating Customers Fairly | expenses
 - Otherwise there is a danger of locking in an expected investment loss.
 - IM performance is then about managing default experience.

Life Insurer's Investment Objectives (2)

- Bonds and other fixed income are preferable to assets with less certain cashflows. They enable us to match expected cashflows.

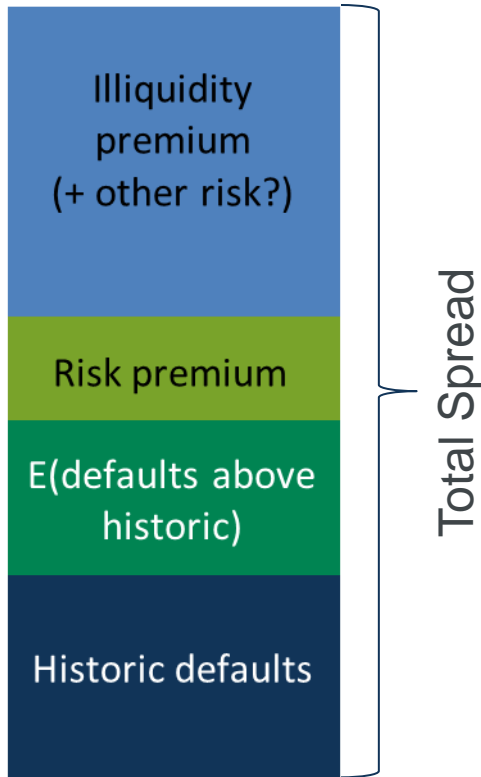


- Annuity writers have an advantage over a typical investor. Once matched to liabilities, the main concern is defaults. Asset and liability values should (roughly) move together.
- Not needing to trade, the insurer can be (mainly) indifferent to bond illiquidity.
- Derivative overlays can be used to manage any cashflow / duration mismatches.
 - However, these increase liquidity requirements!

Insurers are now exploring illiquid fixed income and shadow banking

Components of spread

What portion of the spread we can take credit for when discounting liabilities?



Illiquidity risk premium (IRP):

- Not directly observable as a tradable instrument, but it is real.
- Bond market makers consider the risk of not being able to quickly match a sold (short) position liquidity cost. Barclays Capital publish liquidity cost scores (LCS).
- Other methods of determining IRP essentially assume that spread is only comprised of credit and IRP.
 - CDS negative basis.
 - Covered bonds.
 - Merton (Structural) model.
 - Other methods (work in progress).
 - These methods are really measuring “not-credit-spread”.
- The Merton model requires information on the value of the firm (not just its equity) so is a rather intensive exercise. We shall briefly consider the LCS, CDS and covered bond methods.

Solvency II impact (1)

- **Matching adjustment (MA)** – essentially illiquidity premium with constraints.
 - Total spread **minus** fundamental spread
 - Fundamental spread =
max [E(loss on defaults) + E(loss on downgrade) , % based on long term average spread]
- Previously looked very restrictive, recent changes include:
 - Fundamental credit spread is **set by EIOPA** with the floor reduced to 35% of long term spread for corporates and 30% of current spread for government bonds.
 - Minimum rating requirements **removed**, but liquidity premium / matching adjustment **capped** at investment grade for sub-BBB securities.
 - Ring-fencing of assets and strict buy-and-hold.
 - Prepayment features permissible if they “make whole”.
 - **No diversification benefit is available for standard formula, MA business.**
- Proposed **Volatility Adjustment (VA)** approach now a real alternative.
 - 65% of the spread on an industry average portfolio.

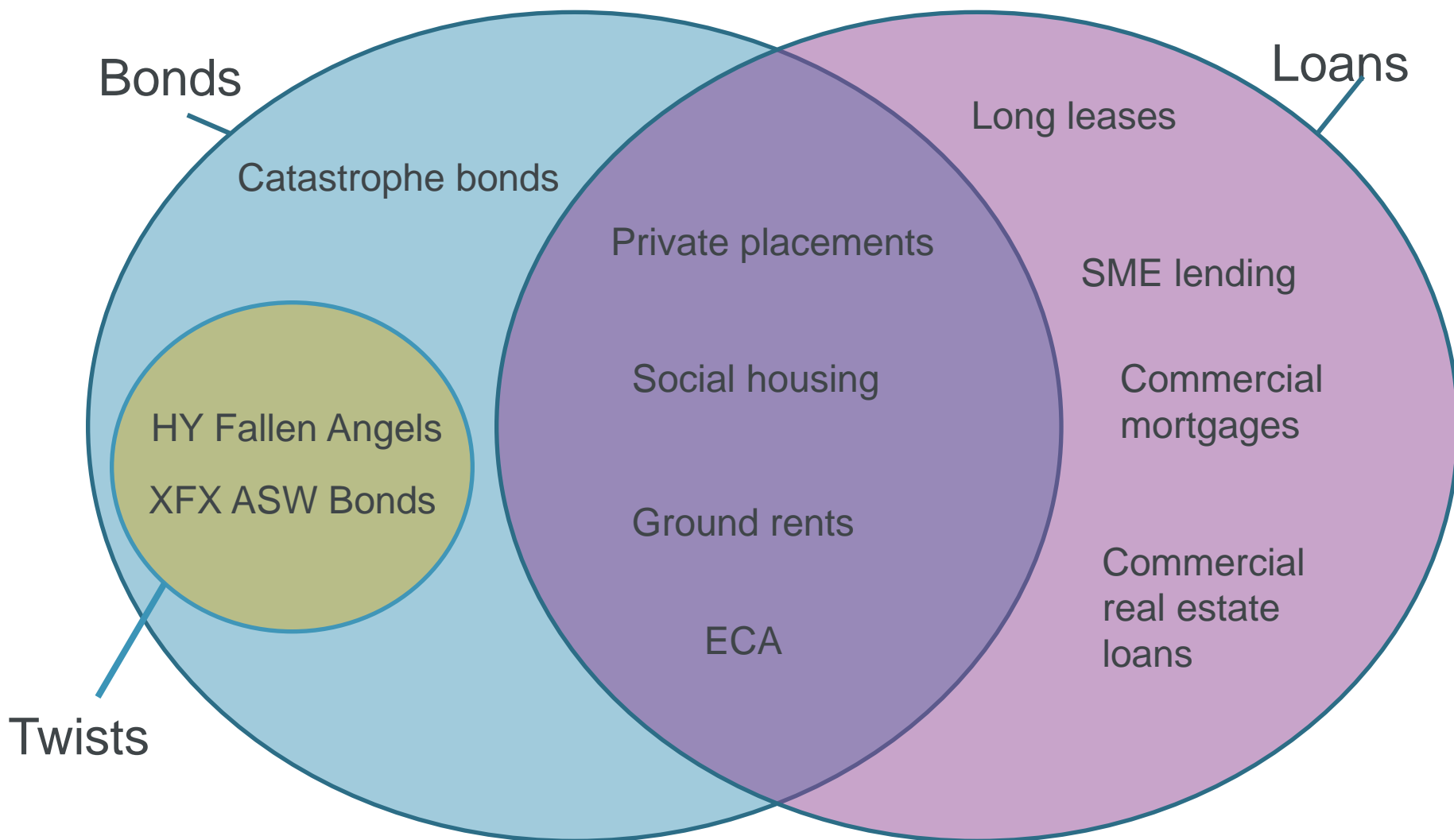
The choice between VA and MA is difficult and permanent

Solvency II impact (2)

- **Solvency Capital Requirement (SCR)** should be more in line with economic required capital
 - Closer alignment of regulatory and economic management of assets.
 - Regulatory capital treatment harmonised across Europe.
 - Should make consistent management and optimisation easier across groups.
 - Incentivises good risk management, for example ALM analysis and diversification of risks.
- **Own Risks Solvency Assessment (ORSA)**
 - Encourages full embedding of a risk-based approach to management.
 - Identification and quantification of own risk profile.
- **Liquidity risk is coming more into focus**
 - Both ORSA and to meet central clearing requirements for derivatives (EMIR).
 - Balance illiquid assets with assets for posting as collateral in derivative trades.

SII/ORSA and EMIR need all risks to be considered and balanced

Illiquid fixed income assets















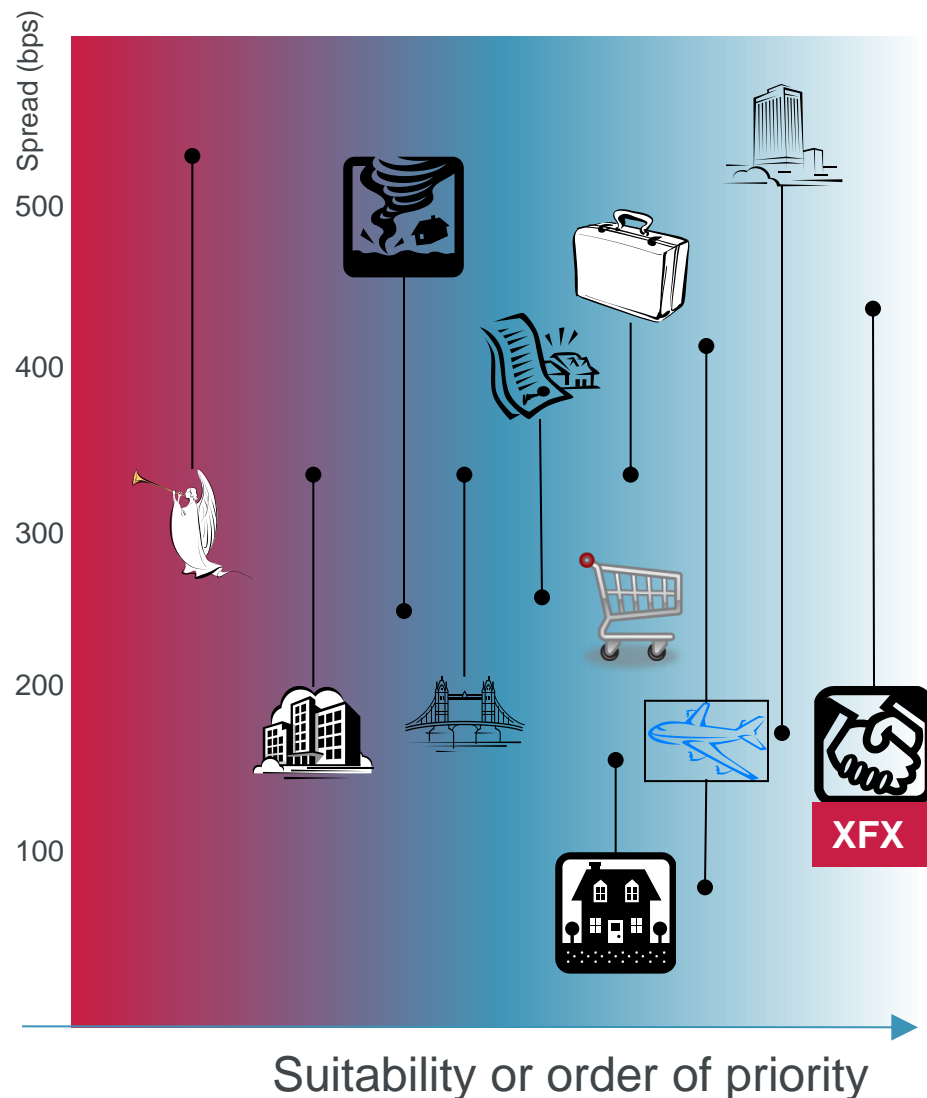
Asset class comparison*		Typical term	Inflation linked?	Underlying security	Liquidity	Key risks
Private placements		3-10y	Possible	Liens and covenants	★ ★ ★ ★ ★	If unrated will need credit analysts
Social housing debt		3-30y	Possible	Social housing Govt guarantees	★ ★ ★ ★ ★	Political risk Limited capacity
Ground rents		1-100y	Step-up	Freehold land	★ ★ ★ ★ ★	Very limited capacity Specialist
Real estate long leases		10-30y	Step-up	Land and buildings	★ ★ ★ ★ ★	Crowded Economic cycles
SME lending		1-10y	Unlikely	Mainly unsecured	★ ★ ★ ★ ★	High fees in funds Higher risk
Aircraft leases / ECA		8-15y	Amortizing	Aircraft / fixed assets, Govt guar	★ ★ ★ ★ ★	Mostly in USD Complex admin
Infrastructure debt (Equity-like also available and possibly appropriate)		5-25y	Linked/FRN	Typically senior unsecured. Construction rarely starts before fully funded.	★ ★ ★ ★ ★	Overrun risk Few debt funds Appropriate risk profile?
Commercial mortgages		1-10y	Unlikely	Secured on property	★ ★ ★ ★ ★	Skilled underwriting Monitoring
Commercial real estate lending		3-10y	FRN	Secured on property	★ ★ ★ ★ ★	Underwriting/Voids Few funds
Insurance linked securities		1-5y	FRN	Collateralised	★ ★ ★ ★ ★	Expertise/high fees Catastrophe!
Fallen Angels		1-15y	FI	Varies	★ ★ ★ ★ ★	Timing/expertise High defaults w.r.t IG
XFX swapped bonds		1-30y	FI	Varies	★ ★ ★ ★ ★	Liquidity risk (swaps)

*More details in the appendix

Comparing Alternative Assets

Suitability depends on the appetite and attitudes of the firm, existing risk profile and expertise.

	Private placement		Aircraft finance
	Social housing		Infrastructure
	Ground rents		Commercial mortgages
	SME loans		Insurance linked securities
	Long leases		Fallen Angel Bonds
	Direct CRE loan		Cross currency swapped bonds



Where to start?

In prioritising other opportunities to consider you, your Execs or your Board are likely to ask questions like:

1) What is the yield pick up?

2) Is this only due to illiquidity or are there other risks we're taking?

3) What is the security? Charges on fixed assets, collateral.

4) Can we model it? Yes we can! Oh hang on....

5) What is the SII treatment?

6) How much do we want to hold? This is a separate question to what is optimal.

7) What is the market capacity?

8) What is the escape route? An argument for capping exposure until better understand the risk.

9) How does it fit into the overall portfolio and our risk appetite?

Difficult questions are good, it shows that people care!

Measuring illiquidity risk premium (1)

Liquidity cost score (LCS)

- Cost as % of price to immediately execute a round-trip transaction of standard institutional size.
- This captures the traders' risk of not quickly being able to close out both sides of the trade.
- Based on a robust and tested methodology, for a large number of bonds from Barclays Capital.
- Converted to spread, this indicates the IRP as a % of total spread is currently (Sept 2013) rarely above 20% of spread. For GBP corporate bonds it ranges from 0 to 40 bps.

CDS negative basis

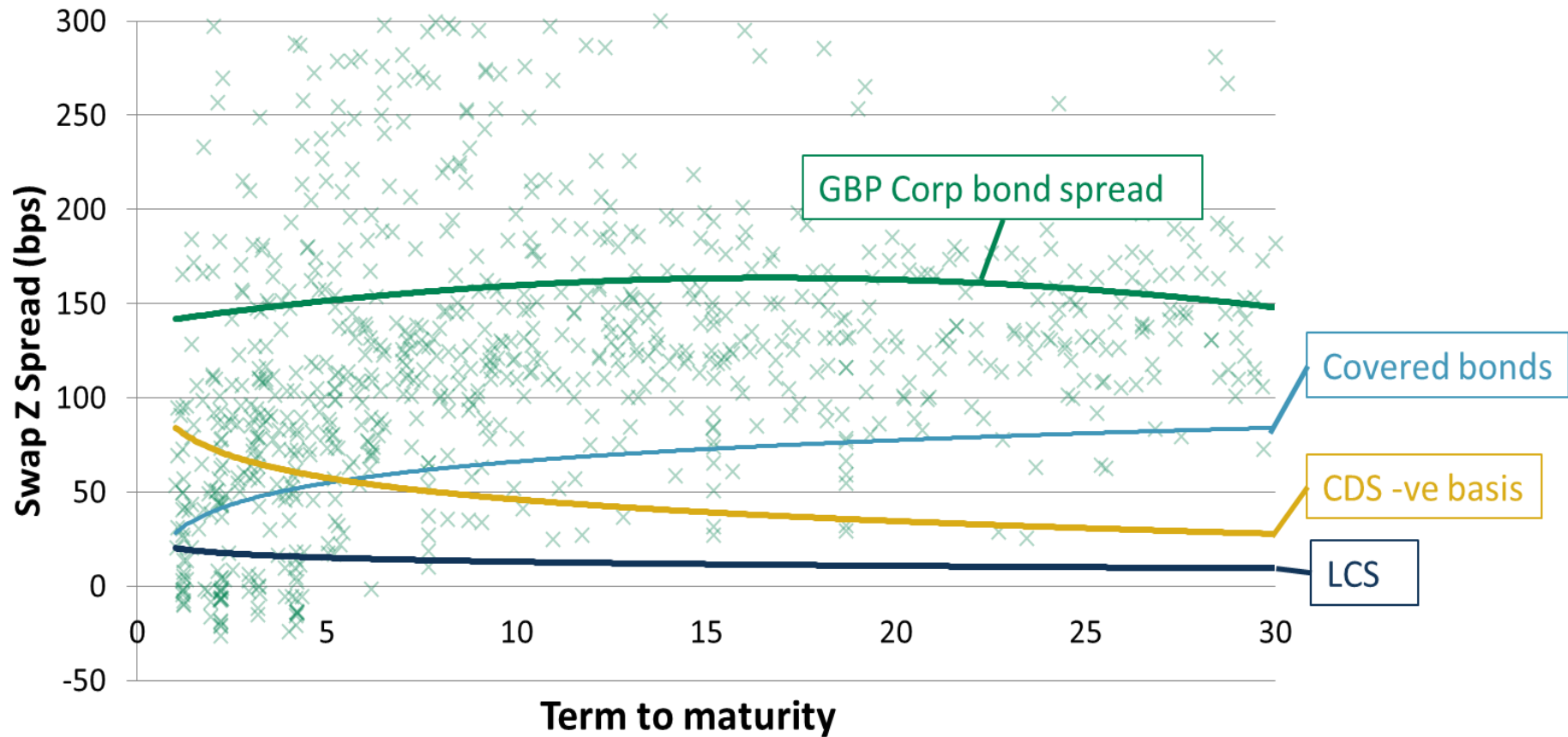
- Concept: buy a bond and (perfectly matched) insurance against default. Any residual spread (CDS spread < Bond Z spread) must be due to illiquidity (or at least, non-credit).
- CDS markets are only liquid for a small portion of the bond universe, mostly in EUR/USD and rarely above 10 years maturity. This measure can be unstable in general and of limited use / reliant on bank modelling beyond 10 years.
- At end Sept 2013 implied IRP of up to c.40% of spread with some outliers for terms under 5 years to maturity.

Measuring illiquidity risk premium (2)

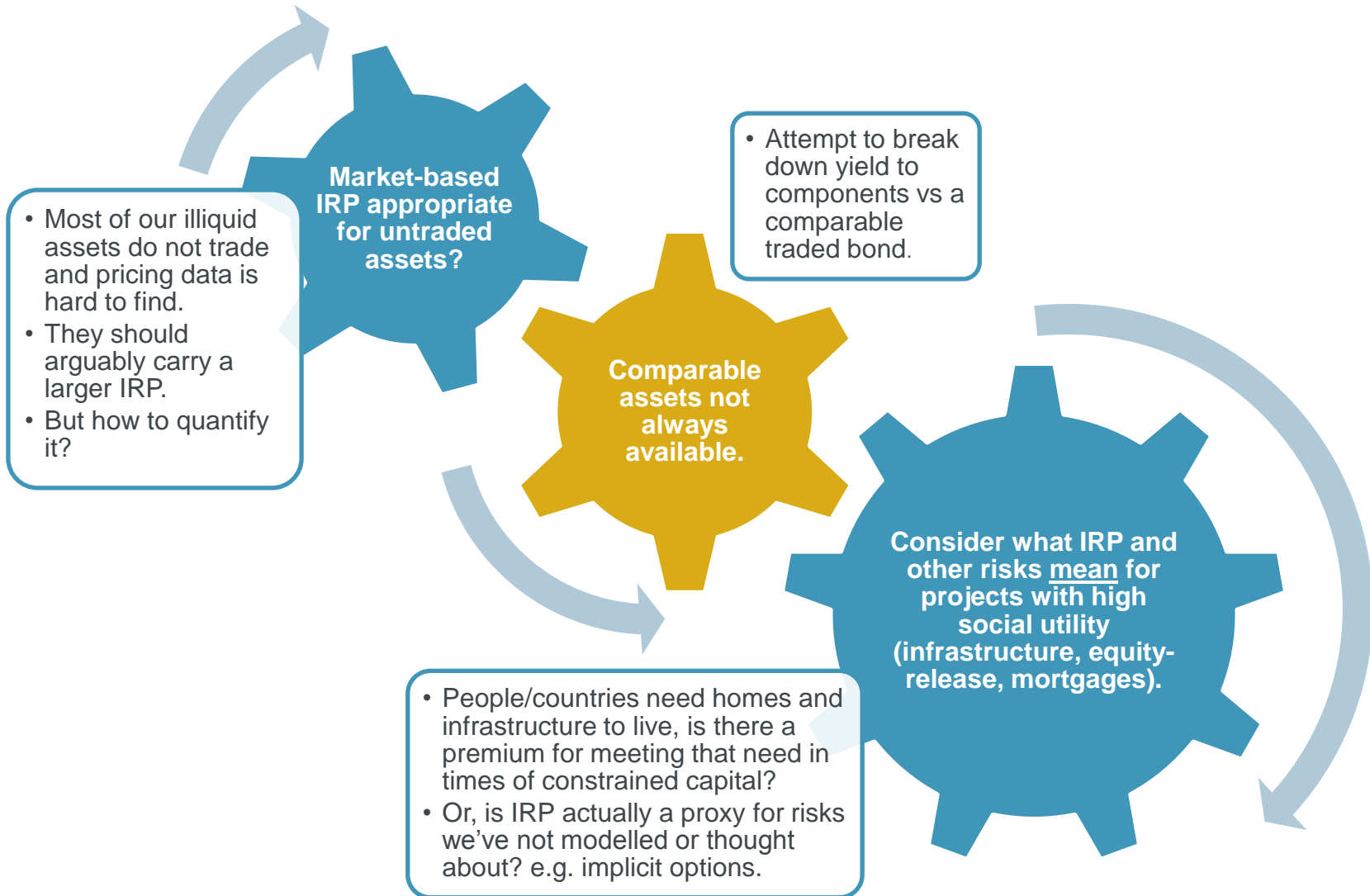
Covered bonds

- Concept: covered bonds have strict rules relating to the quality and over collateralisation of the assets securing the bonds.
 - “Credit risk free”: in the event of issuer default the investor will (eventually) get the backing assets (which hopefully have value of at least par).
 - Any spread above “risk free” is due to illiquidity premium (or at least, non-credit risk).
- The default of Dexia saw the spreads on its covered bonds balloon to extreme levels.
 - Collateral assets were still largely intact.
 - Extreme spread represented the illiquidity caused by the time and legal proceedings required.
- The argument for the risk-free nature of covered bonds is possibly tenuous, they are certainly affected by sovereign ratings and heterogeneous collateral quality.
 - Comparing Spanish to German covered bonds; the difference in spread being between 50bps (short end) to 300 bps (17 years).

Measuring illiquidity risk premium (3)



Thoughts on IRP for privately traded assets



Selection factors and challenges

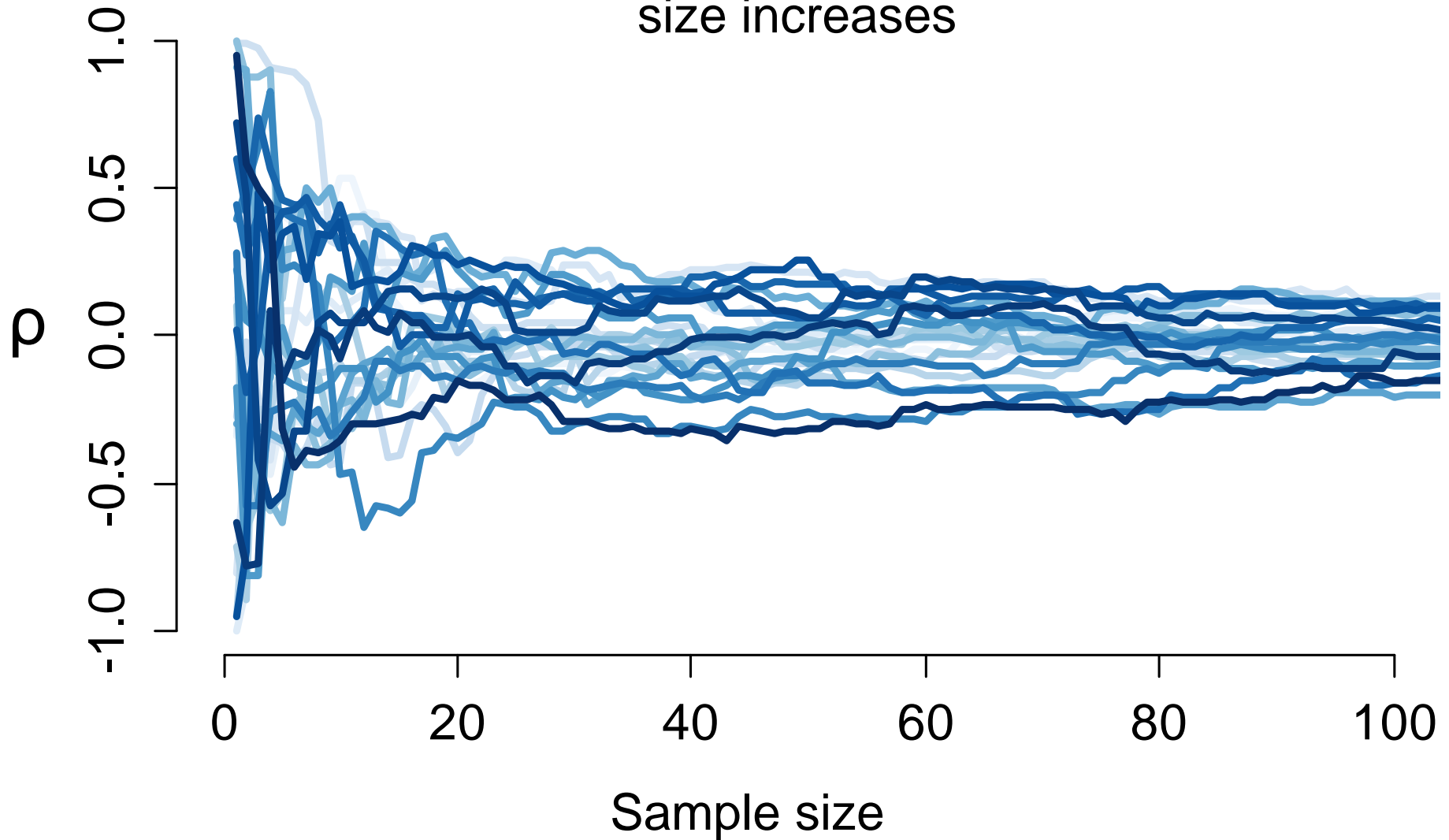
- **Technical**

- Attractiveness and return/risk assessments are model / calibration / appetite driven.
- Credible calibration data may be challenging.
- Single basis for decisions (e.g. economic capital).
 - However, regulatory bases rarely behave “economically” and may bring significant constraints.
- Optimise on expected return and asset volatility (“central” measures) and use required capital (“tail” measures) as constraints.

- **Practical**

- Valuation of non-traded instruments for reporting and risk management.
- Investment in new infrastructure, systems, processes and governance to assess and monitor opportunities.
- Obtaining approval from key stakeholders (Board, Regulator) for new assets takes time.
 - Some assets may require significant education of decision makers so they fully appreciate the risks.
 - Source assets or outsource to asset manager. Are you competent to manage the asset?

Convergence of correlation coefficient as sample size increases



How wrong is your correlation estimate? (1)

- Co-dependence measures are vital to EC and SII modelling.
- Co-dependence measures:
 - Pearson correlation (or, “do X and Y have a linear relationship”)

$$\rho_{X,Y} = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y}$$

- Spearman rank correlation (or, “do X and Y increase together”)

Rank sample then apply Pearson's formula

- Kendall rank (or, “observed probability of X and Y increasing together”)

$$\tau = \frac{(\text{number of concordant pairs}) - (\text{number of discordant pairs})}{\frac{1}{2}n(n-1)}$$

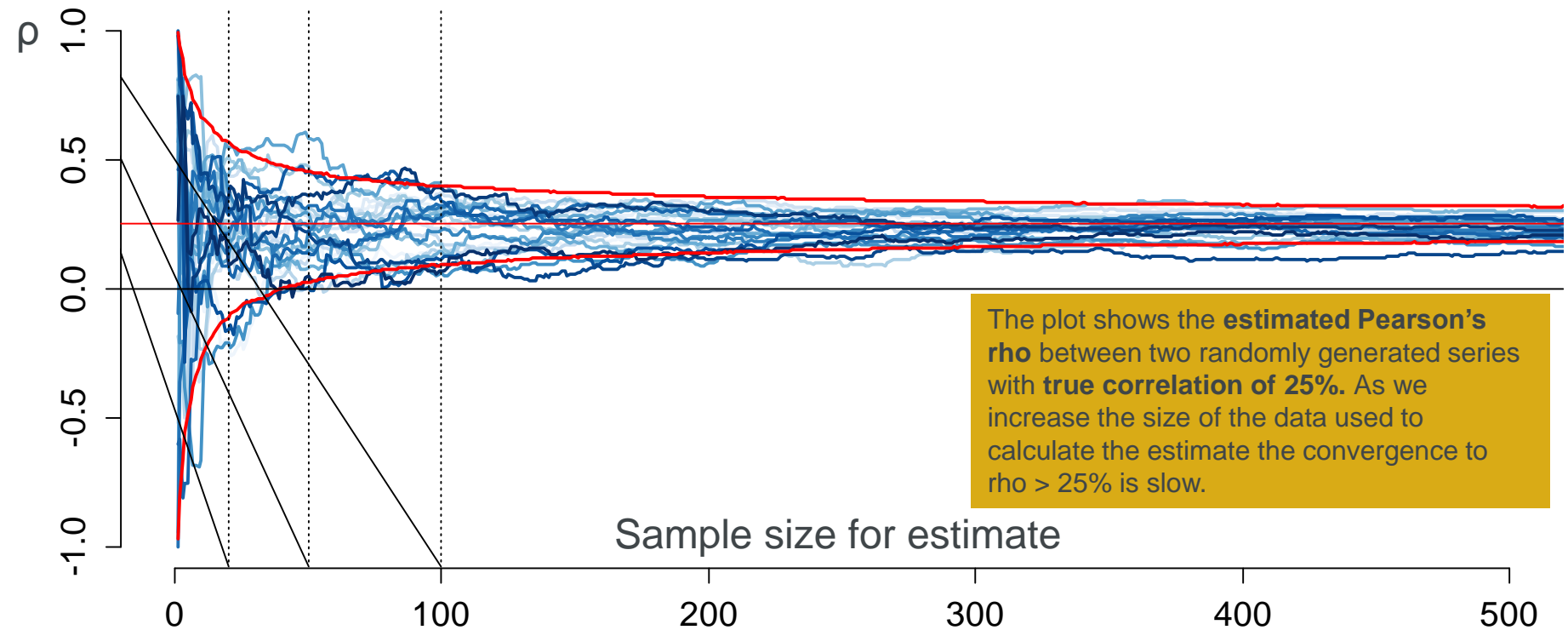
- Co-integration (or, “do X and Y have the same long run path”)

$$y_t - \beta x_t = u_t \quad (\text{where } u_t \text{ is stationary})$$

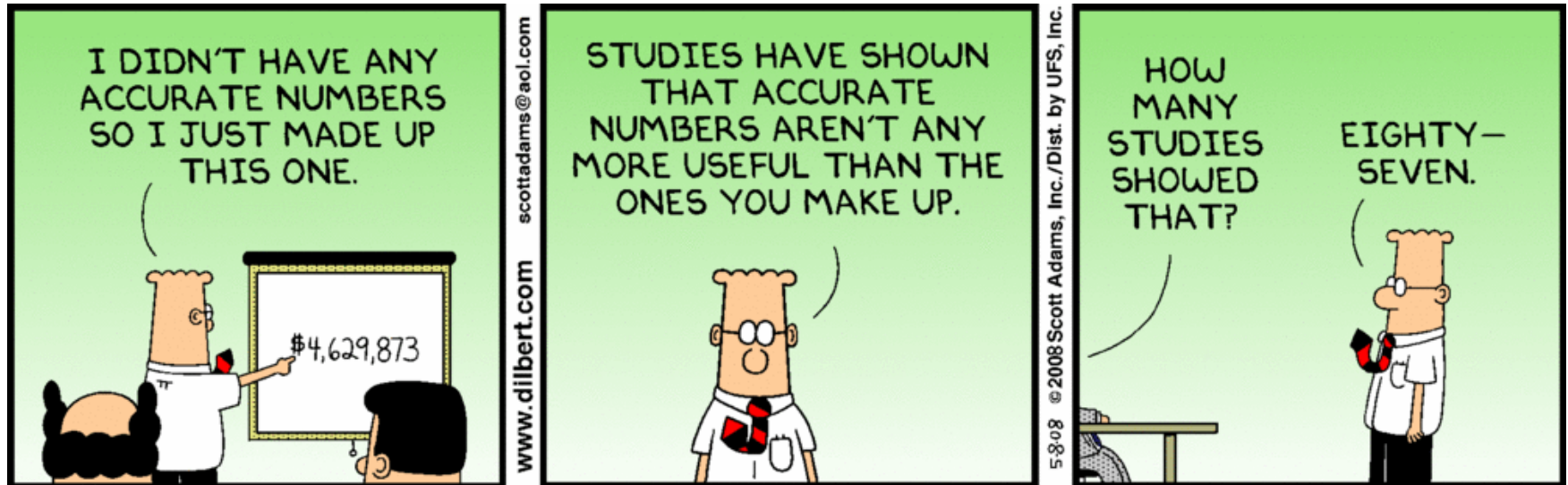
- These are different measures of co-dependence, not alternatives to one another – they measure different things. There are others which should not be ignored just because Excel doesn't include them.

How wrong is your correlation estimate? (2)

- Sample size vs Pearson correlation estimate for “true” $\rho = 25\%$.
- The rho estimate has a beta distribution whose dispersion is driven



Studies have shown...



...also don't confuse precision and accuracy

Communicating co-dependence (1)

- The most common way to communicate multiple correlations is via a correlation matrix.
- Can you quickly intuit the relationships from this?
- What about spotting errors?

	Eq-Level	Eq-Vol	Prop	Rates-Para	Rates-Slope	Rates-Twist	Rates-Vol	Infra	Cred-FIN	Cred-NONFIN	Cred-DOM	Cred-NONDOM	Loans
Eq-Level	100%	60%	60%	30%	-40%	0%	-50%	20%	-70%	-70%	-50%	-50%	-60%
Eq-Vol	60%	100%	-60%	-20%	10%	0%	50%	-30%	70%	60%	40%	40%	40%
Prop	60%	-60%	100%	30%	-40%	0%	-40%	20%	-50%	-50%	-30%	-30%	-90%
Rates-Para	30%	-20%	30%	100%	-20%	0%	-30%	60%	0%	0%	0%	0%	-30%
Rates-Slope	-40%	10%	-40%	-20%	100%	0%	30%	0%	0%	0%	0%	0%	40%
Rates-Twist	0%	0%	0%	0%	0%	100%	0%	-10%	0%	0%	0%	0%	0%
Rates-Vol	-50%	50%	-40%	-30%	30%	0%	100%	-20%	30%	20%	20%	20%	30%
Infra	20%	-30%	20%	60%	0%	-10%	-20%	100%	-20%	-20%	-20%	-20%	-20%
Cred-FIN	-70%	70%	-50%	0%	0%	0%	30%	-20%	100%	90%	60%	60%	50%
Cred-NONFIN	-70%	60%	-50%	0%	0%	0%	20%	-20%	90%	100%	40%	40%	50%
Cred-DOM	-50%	40%	-30%	0%	0%	0%	20%	-20%	60%	40%	100%	90%	40%
Cred-NONDOM	-50%	40%	-30%	0%	0%	0%	20%	-20%	60%	40%	90%	100%	40%
Loans	-60%	40%	-90%	-30%	40%	0%	30%	-20%	50%	50%	40%	40%	100%

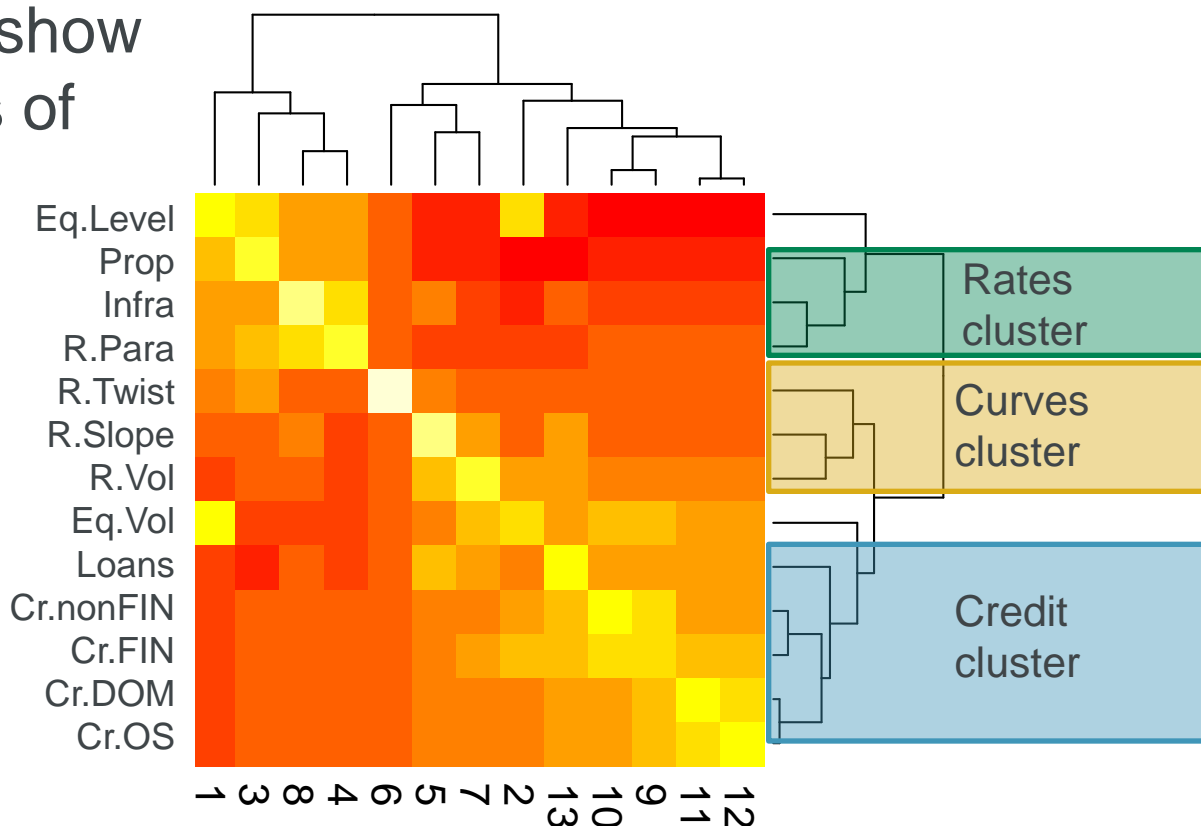
Communicating co-dependence (2)

- Adding some colour can help a bit.
- But even with a heat map, it's still hard to pick out the key relationships.

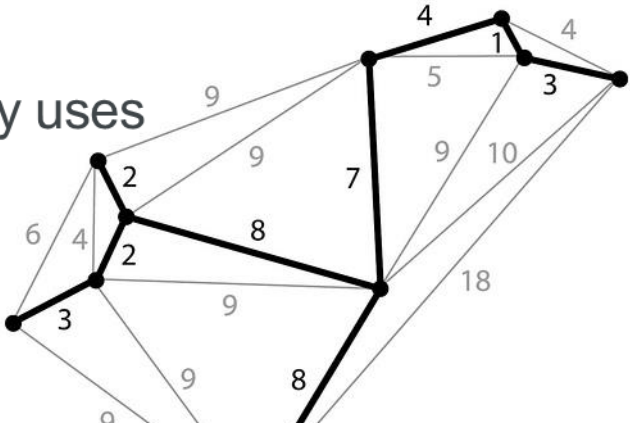
	Eq-Level	Eq-Vol	Prop	Rates-Para	Rates-Slope	Rates-Twist	Rates-Vol	Infra	Cred-FIN	Cred-NONFIN	Cred-DOM	Cred-NONDOM	Loans
Eq-Level	100%	60%	60%	30%	-40%	0%	-50%	20%	-70%	-70%	-50%	-50%	-60%
Eq-Vol	60%	100%	-60%	-20%	10%	0%	50%	-30%	70%	60%	40%	40%	40%
Prop	60%	-60%	100%	30%	-40%	0%	-40%	20%	-50%	-50%	-30%	-30%	-90%
Rates-Para	30%	-20%	30%	100%	-20%	0%	-30%	60%	0%	0%	0%	0%	-30%
Rates-Slope	-40%	10%	-40%	-20%	100%	0%	30%	0%	0%	0%	0%	0%	40%
Rates-Twist	0%	0%	0%	0%	0%	100%	0%	-10%	0%	0%	0%	0%	0%
Rates-Vol	-50%	50%	-40%	-30%	30%	0%	100%	-20%	30%	20%	20%	20%	30%
Infra	20%	-30%	20%	60%	0%	-10%	-20%	100%	-20%	-20%	-20%	-20%	-20%
Cred-FIN	-70%	70%	-50%	0%	0%	0%	30%	-20%	100%	90%	60%	60%	50%
Cred-NONFIN	-70%	60%	-50%	0%	0%	0%	20%	-20%	90%	100%	40%	40%	50%
Cred-DOM	-50%	40%	-30%	0%	0%	0%	20%	-20%	60%	40%	100%	90%	40%
Cred-NONDOM	-50%	40%	-30%	0%	0%	0%	20%	-20%	60%	40%	90%	100%	40%
Loans	-60%	40%	-90%	-30%	40%	0%	30%	-20%	50%	50%	40%	40%	100%

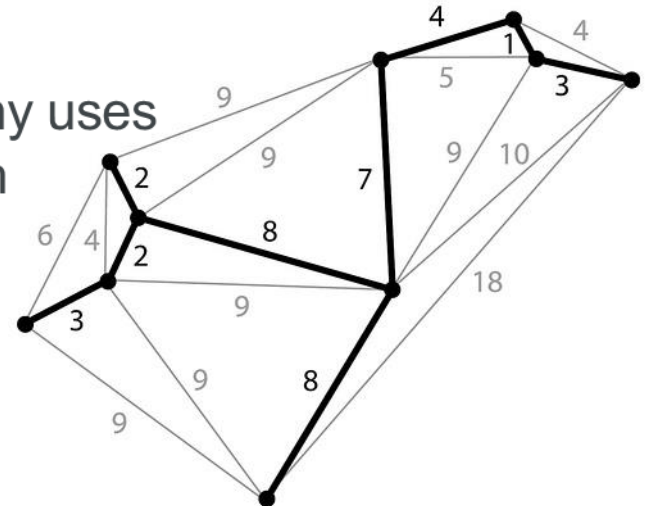
Communicating co-dependence (3)

- We could reorder the matrix and use dendrograms to infer links between variables.
- The tree structures show hierarchical clusters of risk factors.



Communicating co-dependence (4)

- We can re-express correlation as a distance between any two covariates.
 - Distance must be positive and inversely proportional to rho.
 - $\text{Distance} = \sqrt{2 \times (1 - \rho)}$
 - We then know the distance between any two points and this becomes a graph problem.
 - Minimum spanning trees (MST) have many uses including route-finding and efficient design of power networks.
 - An MST gives the path connecting all points with the shortest possible route.
- 



Communicating co-dependence (5)

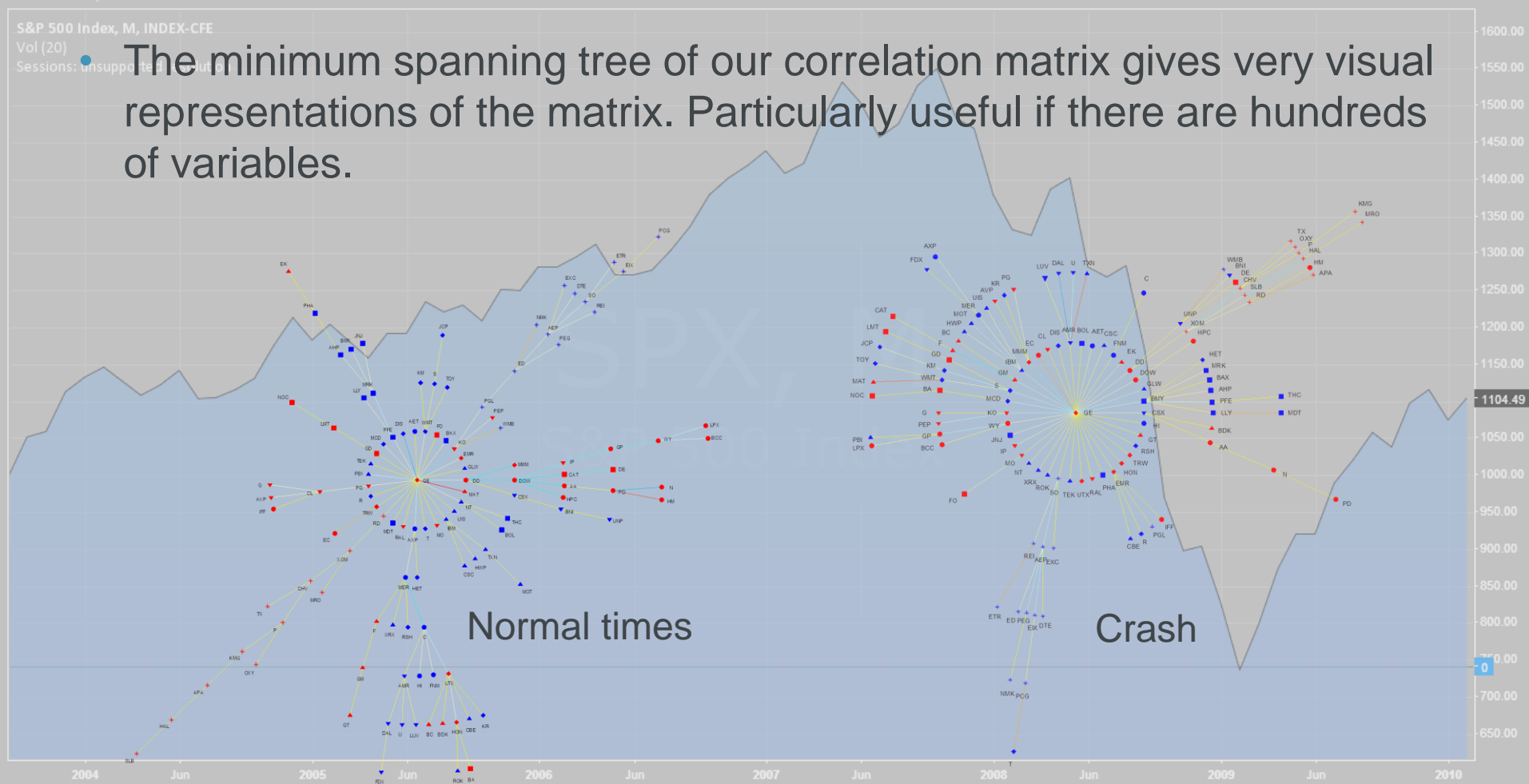
INDEX:SPX 1759.70 ▲ +12.55 (+0.72%) Open: 1758.70 High: 1774.54 Low: 1746.20 Close: 1759.70
November 08, 2013

S&P 500 Index, M, INDEX-CFE

Vol (20)

Sessions: unsupported output 0

The minimum spanning tree of our correlation matrix gives very visual representations of the matrix. Particularly useful if there are hundreds of variables.

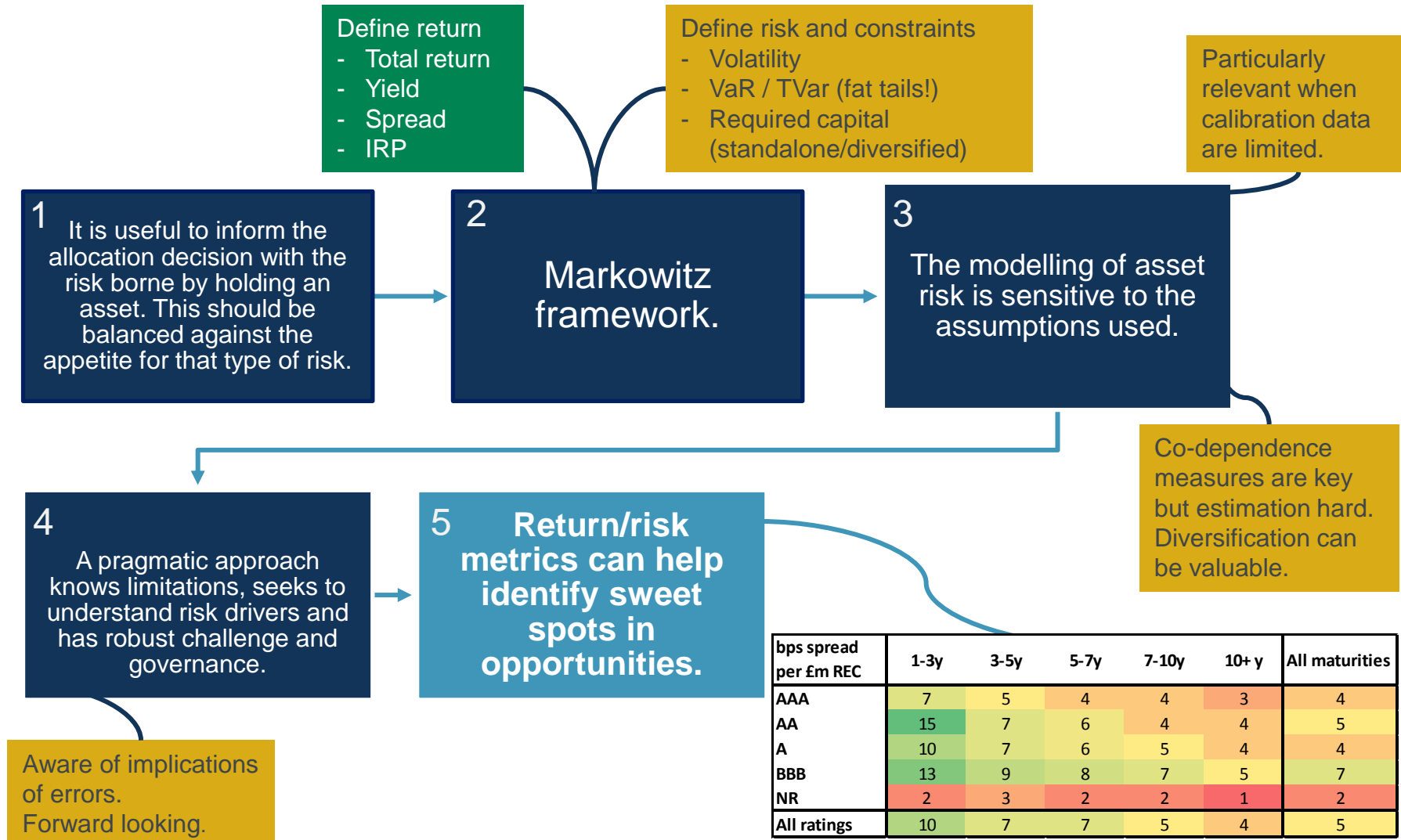


Some related thoughts...



"Buy low, sell high. Aren't there any other eternal truths?"

Risk in the driving seat?



Alternative portfolio structuring

- The **mean-variance portfolio optimisation** approach is extremely common. Despite its flaws, it is a logical way of selecting a portfolio.
 - Optimise the trade-off of future risk and return.
 - Assumes that you know both in addition to correlation.
- **Other potential approaches?**
 - Risk-led optimisation rather than based on return expectations
 - Risk parity (each class/sector contributes the same risk).
 - Most diversified portfolio.
 - Any of the above with a volatility control overlay.
 - But remember that we are supposed to be a buy and hold investor!
 - Assumptions – are long term averages the best predictor?

Is standard mean-variance optimisation used blindly?

Portfolio management – theory vs practice (1)

- **Overall goals.**
 - Many conflicting agendas needs strong leadership and communication.
- **Benchmarks.**
 - Asset benchmark should be the liabilities.
 - Debt indices are biased towards the most indebted issuers.
- **Setting mandates and IMAs takes time and can be complex.**
 - Implementing and monitoring them requires carefully planned infrastructure.
 - Appropriate targets / flexibility / constraints / fees.
 - Incentivisation of investment managers must be aligned with your goals (meet / beat pricing yield, minimise required capital, don't get defaults).

Are goals, benchmarks and incentives appropriate and aligned?

Portfolio management – theory vs practice (2)

- **Understanding.**

- Do you, your execs and board understand the implications of your assumptions?
 - Never forget how misunderstood Gaussian copulas were with CDO pricing.
- Is there robust questioning of approach?

- **When allocation goes bad.**

- Combinations of political pressure and poorly calibrated models could lead to unacceptable concentrations in poorly performing assets.
- Due diligence, segregation of roles and good monitoring are key.
- Chasing the latest shiny idea.
- Fees eat into returns.

Is there adequate challenge of new and existing approaches?

The bottom line

- **Asset allocation for a life insurer is challenging** in a low yield environment. There is a need to focus on **identifying sweet spots** of risk-adjusted return.
 - But that **can only be informed by your modelling**. It had better be right!
 - **Know the limitations of your parameter estimates.**
- **Illiquid sources** of yield seem like a **natural route**.
 - Identifying the best sources will be your competitive advantage.
- In some (all?) cases **capacity is an issue**.
- **Quantifying the illiquidity premium is possible for traded bonds**. Non-traded instruments will need robust modelling and justification.
- **SII will simplify** the calculation of illiquidity premium for regulatory reporting. But in many areas we await more detail. Making sense of the best route forward is this year's job!

Thanks

I am grateful for the assistance of my friends and colleagues at the following firms:

- Aviva
- Aviva Investors
- Bloomberg
- Barclays Capital
- EY
- Traderisks

Where shown, return figures have been rounded and represent past performance only.



Institute
and Faculty
of Actuaries

Appendices

Summary of illiquid fixed income assets

Asset class comparison*		Typical term	Inflation linked?	Underlying security	Liquidity	Key risks
Private placements		3-10y	Possible	Liens and covenants	★ ★ ★ ★ ★	If unrated will need credit analysts
Social housing debt		3-30y	Possible	Social housing Govt guarantees	★ ★ ★ ★ ★	Political risk Limited capacity
Ground rents		1-100y	Step-up	Freehold land	★ ★ ★ ★ ★	Very limited capacity Specialist
Real estate long leases		10-30y	Step-up	Land and buildings	★ ★ ★ ★ ★	Crowded Economic cycles
SME lending		1-10y	Unlikely	Mainly unsecured	★ ★ ★ ★ ★	High fees in funds Higher risk
Aircraft leases / ECA		8-15y	Amortizing	Aircraft / fixed assets, Govt guar	★ ★ ★ ★ ★	Mostly in USD Complex admin
Infrastructure debt (Equity-like also available and possibly appropriate)		5-25y	Linked/FRN	Typically senior unsecured. Construction rarely starts before fully funded.	★ ★ ★ ★ ★	Overrun risk Few debt funds Appropriate risk profile?
Commercial mortgages		1-10y	Unlikely	Secured on property	★ ★ ★ ★ ★	Skilled underwriting Monitoring
Commercial real estate lending		3-10y	FRN	Secured on property	★ ★ ★ ★ ★	Underwriting/Voids Few funds
Insurance linked securities		1-5y	FRN	Collateralised	★ ★ ★ ★ ★	Expertise/high fees Catastrophe!
Fallen Angels		1-15y	FI	Varies	★ ★ ★ ★ ★	Timing/expertise High defaults w.r.t IG
XFX swapped bonds		1-30y	FI	Varies	★ ★ ★ ★ ★	Liquidity risk (swaps)

*More details in the appendix

Private Placements

- Bonds placed privately with a small group of investors rather than being offered for sale on open markets.
- ✓ Access broader range of issuers.
 - Exploiting banks' diminishing appetite for lending.
 - Small/medium-sized issuers may not be large enough to access public markets.
 - CLOs used to provide alternative source of financing, but shrinking issuance.
- ✓ More restrictive covenants = more security? Bonds may be unrated and not listed.
- ✓ Features negotiable based on borrower / lender balance of power.
 - Duration | indexing | callable.
- ✓ Good starting point for exploring illiquid credit.
 - Need to establish systems, processes (e.g. credit analysis), governance systems.
- ❖ Loans, whilst also offering a illiquidity pickup may be less attractive.
 - Floating rate coupons and borrower prepayment options.
 - Significantly more legal due diligence than a bond purchase.
- ✗ Because of non-standard features may take longer to disinvest.



Social housing

- Structures: “Covered” bonds, loans, reversionary long-leases.
- ✓ Secured debt.
- ✓ Implicit government guarantee and generally over collateralised.
- ✓ Income stream primarily fed by government benefits.
- ✓ Often very long dated.
- ✓ Features negotiable based on borrower / lender balance of power.
 - ✓ Private negotiation = illiquidity premium pickup.
 - ✗ But lack of willingness to issue inflation linked debt
- ✗ Property risk via debt’s security.
 - ✗ Depreciation / dilapidation more significant than non-social housing.
- ✗ Political risk.
 - ✗ Benefits’ system is a popular political device.
- ✗ Limit capacity / opportunity.
 - ✗ Spreads recently dipped under 100bps.



Ground rents

- Structures: Freehold ownership (land not buildings), securitisations, funds.
- Receive income from the ground rents paid by leaseholders.
- ✓ Often extremely long dated, index linked, defined uplifts.
- ✓ Security of underlying land.
- ❖ Very illiquid – attitude depends on overall portfolio liquidity vs appetite.
- ✗ Freehold ownership requires specialist management / admin.
- ✗ High acquisition costs.
- ✗ Securitisations extremely scarce.
- ✗ Funds may take significant time to allocate commitments.



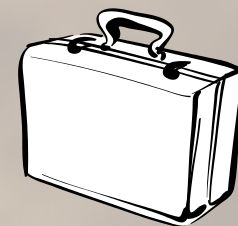


Real Estate Long Leases

- Structures: Funds / Direct arrangement
- Current proprietor sells property to an investor who agrees to lease it back. At the end of the lease the investor can either:
 - Renew the lease.
 - Find a new tenant.
 - Sell the property.
 - The lease can be structured to amortise the value of the property so that at lease expiry the investor sells the property back to the lessee for a nominal amount.
- ✓ Long dated and often have pre-agreed index linked repayment step-ups.
- ✓ Lessees may be prepared to pay a premium to free up capital.
- ❖ Very illiquid asset + may take significant time to allocate commitments.
- ✗ Potentially large queues of uninvested assets with funds.
- ✗ Opportunities may be becoming slightly crowded.
- ✗ May expose the investor to broader economic cycles (voids if lessee bankrupts)

SME lending

- Structures: Funds and direct origination of **loans** to small/medium sized enterprises.
 - Not syndicated “leveraged” loans.
- ✓ Fills role left by banks deleveraging and small CLO market.
- ✓ Borrower demand = increased yield
- ✓ Maturities from 4 to 7 years.
- ✓ Possibly with government co-investment in the UK.
- ❖ Very illiquid – attitude depends on overall portfolio liquidity vs appetite.
- ✗ High fees / costs (especially in funds).
- ✗ Funds struggling to deploy capital?
- ✗ Limited secondary market.
- ✗ Expanding CLO market may reduce attractiveness.



Aircraft lease structures

- Structures: Equity ownership of a group of aircraft, senior debt secured (with moderate LTVs) via an SPV on the aircraft, or a secured loan (secured directly on aircraft).
- ✓ Fills “shadow banking” role left by banks deleveraging and incumbent (French) banks struggling to raise USD funding for new leases.
- ✓ Secured asset is a high demand commodity (for now) and globally mobile.
- ✓ Maturities 5 to 12 years, strong yields for riskier trades.
- ✓ Maybe ECA backed carrying explicit, and irrevocable guarantee from governments.
- ✓ SII treatment: carried with no spread risk in SCR if ECA-backed.
- ✓ Similar arrangements available for trade credit for import/export of other fixed assets.
- ❖ Generally USD denominated, would need FX hedges if no appetite for FX risk.
- ❖ Maybe callable, but can have make-whole features.
- ✗ Limited fund coverage, so would need direct approach or bank syndication.
- ✗ Potentially complex administration?
- ✗ Lower risk trades maybe crowded, yielding only 50bps over GBP LIBOR.



Infrastructure/PFI



- Structures: Equity via closed end funds, debt funds, direct lending.
- ✓ Infrastructure tends to exhibit monopoly-like features = strong cashflows.
- ✓ Long maturities and investment horizons (10+ years).
- ✓ Returns higher for equity and construction (overrun) risk.
- ✓ PFI projects involve government backing/guarantees/co-investment.
- ✓ Inflation linkage (with caps and floors) may be available.
- ✗ Potentially significant construction risk (overruns) if investing in primary market.
- ✗ Very little secondary market debt as banks would crystallise losses by selling it.
- ✗ Equity funds have high fees and leverage can exaggerate losses.
- ✗ Very few debt funds – most concentrate on unsecured debt; appropriate risk profile?
- ✗ Limited opportunities in developed world and the opportunity is potentially starting to get crowded.

Commercial mortgages



- Structures: Funds, direct access
- ✓ High yield.
- ✓ Long duration.
- ✓ High demand due to bank deleveraging.
- ✓ Secured on the underlying property.
- ✓ Risk adjusted return can look attractive.
- ✗ Requires skilled underwriting. Avoid concentrations. Strong borrower covenants.
- ✗ Potentially high default rate (commensurate with high yield).
- ✗ Small, illiquid secondary market (although specialist buyers of distressed books).
- ✗ Chasing volume could lead to lower quality and higher defaults.

Direct Commercial Real Estate Lending



- Structures: Secured and unsecured bonds financing commercial real estate.
- ✓ Fills role left by deleveraging banks.
- ✓ Wide range of potential risk / return profiles.
- ✓ Terms of 3 to 10 years depending on underlying cashflow and LTV stability.
- ✓ Relatively low loan to value (LTV) available at reasonable spreads.
- ✓ Preferable SII treatment compared to direct real estate ownership.
- ✓ Potentially have security via a charge on the underlying real estate.
- ❖ Illiquid and limited secondary market.
 - ❖ Attitude depends on overall portfolio liquidity vs appetite.
- ✗ Requires skilled underwriting. Avoid concentrations. Strong borrower covenants.
- ✗ Exposure to borrower credit risk, cashflow base and voids.
- ✗ Limited funds universe – specialist management.

Insurance Linked Securities



- Structures: Funds, specialist managers, direct access (limited secondary market)
- ✓ ~~Uncorrelated with~~ Risk driver unrelated to major asset classes.
- ✓ Range of risk/return options as well as risk type (life/non-life).
- ✓ Growing capacity as traditional re(insurers) offload exposure.
- ✓ Potential to diversify against liability exposure?
 - ✓ Life risk securities tends to reference extreme mortality.
- ❖ Most common risk types include US/Euro wind, California/Japan earthquake¹.
- ✗ Complex structures and risks; requires expert due diligence.
- ✗ Needs specialist management to identify value and avoid “poor-risks”.
- ✗ May not be suitable for large composite insurers as likely to be exposed to most insurance risks already.
- ✗ High fees and potentially volatile income/returns.

1) Source: Artemis.bm

Fallen Angels (1)

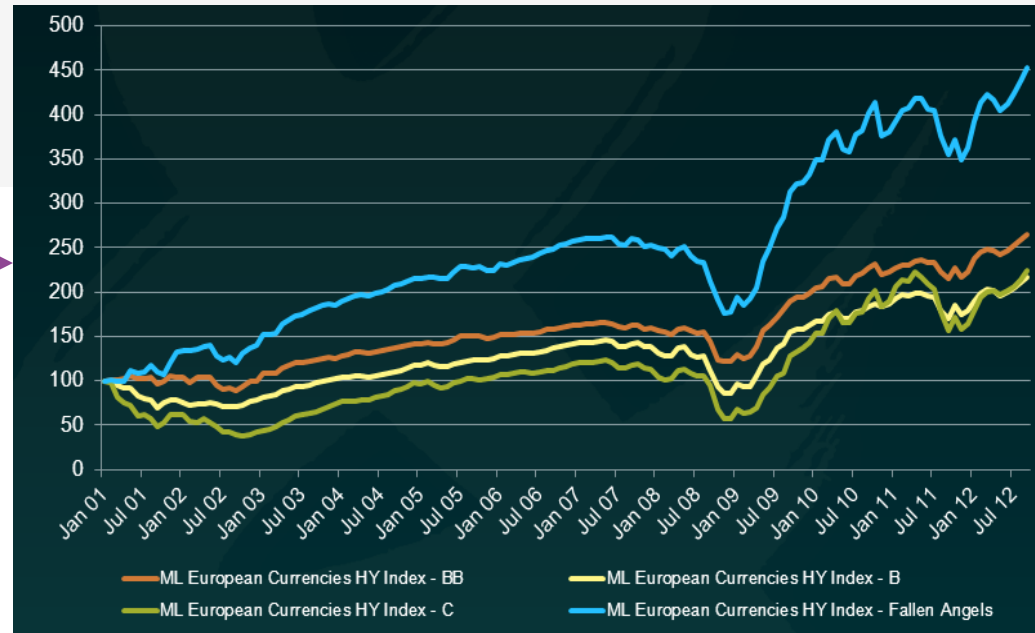


- Structures: Funds, ETFs, High yield bonds
- There is strong empirical evidence that forced selling of bonds downgraded from investment grade (IG) (\geq BBB) leads to spreads exceeding the implied default risk (the bonds are “cheap”), when compared to bonds issued as sub-investment grade.
- ✓ Studies by Barclays Capital[ref] and Merrill Lynch[ref] suggest that total returns on Fallen Angels significantly outperform every other high yield rating segment.
- ✓ Total returns on the Merrill Lynch Fallen Angels index have averaged 13% pa since 2001 vs 7% for the overall high yield index.
- ✗ The fallen angel’s “halo” is transient. So timing is crucial. Falling angels’ bond prices significantly underperform in the 30 days prior to downgrade and 10 days after. Thereafter they tend to outperform.
- ✗ This opportunity may be better suited to a trading book (perhaps in the shareholder fund) it may not always be appropriate for a large, buy-and-hold allocation within an annuity fund.
- ✗ This is an exercise in “picking the best from a bad bunch”. Compared to an investment grade portfolio defaults will still be high and if the bond experiences further downgrades it may change from a Fallen Angel to a falling knife.
- ✗ Requires a very different skill set from traditional credit portfolio management.

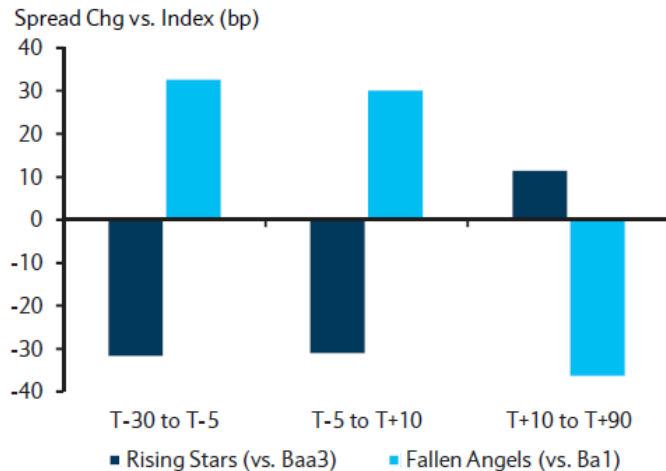
Fallen Angels (2)

- Worthwhile, but risky, total returns.

- But timing is everything.

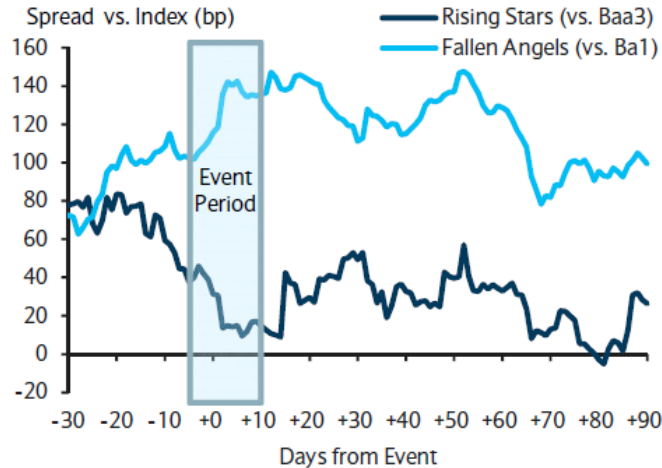


Aggregate rising star and fallen angel relative performance by timeframe



Note: OTE was excluded in the data set above. Source: Barclays Research

Aggregate rising star and fallen angel relative performance by days from ratings migration event

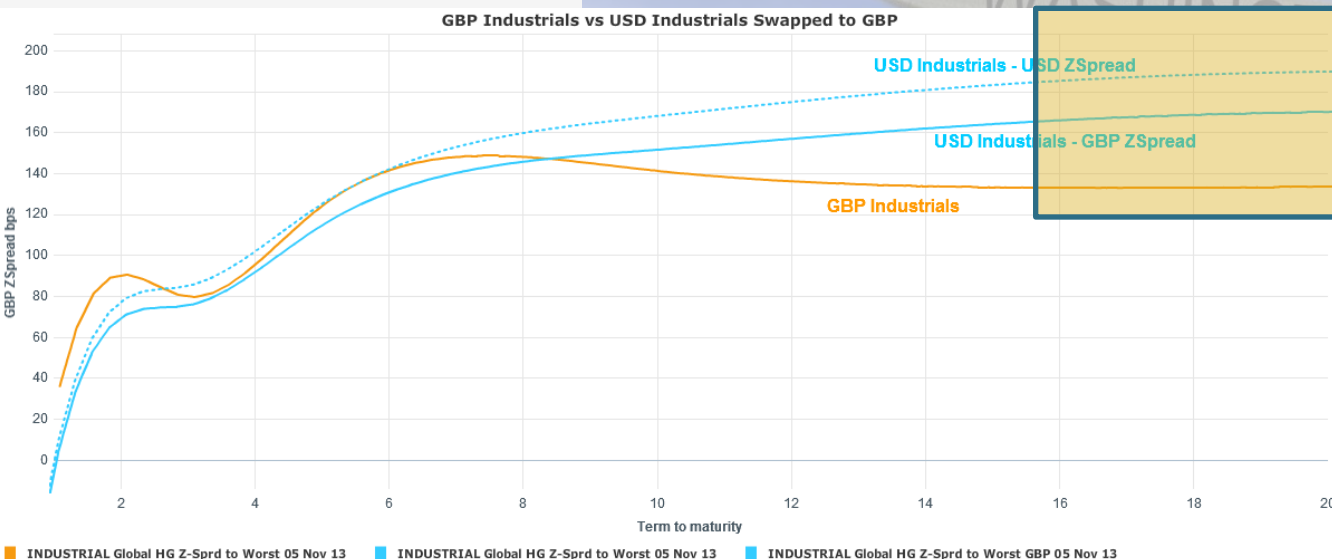


Note: OTE was excluded in the data set above. Source: Barclays Research



Cross-currency Swapped Bonds (1)

- Hold bonds in foreign currencies and swap the cashflows (fixed-fixed) into domestic currency. The aim is to either exploit relative value (same name / similar risk, higher post-swap spread) or to access more diverse names/industries.
- ✓ Access the much larger EUR and USD bond markets.
- ✓ Conceptually simple and now relatively common, low risk means of yield pick-up / diversification.
- ✗ The cross-currency swap can eat all of the “extra” spread. But diversification may still be worthwhile.
- ✗ The source of the apparent difference in spread may be due to a risk/seniority differential. Need to be cognisant of additional risks such as callable features.



- ✗ Must post collateral against FX derivative movements: liquidity risk.
- ✗ Consider cost of capital for liquidity risk?
- ✗ Risk of key decision makers assuming this is an arbitrage. It is not.

Cross-currency Swapped Bonds (2)

- ❖ Telefonica GBP and USD bonds | same rating (BBB) and security (Senior Unsecured).
- ❖ Similar maturity and duration, although in cashflow matching may allocate to different buckets.
- ❖ After swapping cashflows to GBP, the USD bond has c.70bps pa higher spread.
- ❖ On the face of it, the swapped USD bond seems the natural choice vs the GBP bond.

