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What is the Risk-Free Rate?

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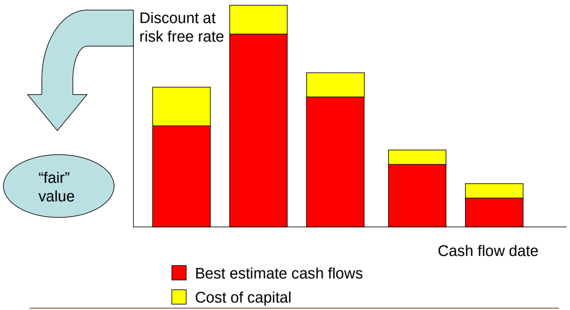
GIRO, SORRENTO

Why Risk-Free Rates Matter



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Risk Free rates pervade Actuarial Work

- CEIOPS references to "risk free rate" for discounting under Solvency II
- CFO forum "risk free" rates for market consistent embedded value
- IASB discussion paper on insurance accounting
- Controversial ASB/EFRAG discussion paper on pensions accounting
- FSA insurance sector briefing discusses role of liquidity premium for valuing annuity liabilities
- Extensive treatment in IAA RMWG paper (www.actuaries.org/CTTEES_RISKMARGIN/Documents/RMWG_Exposure_Draft2.pdf)
- Developments in markets:
  - Widening corporate bond spreads
  - Concerns over reliability of inter-bank rates such as LIBOR
  - Widening swap spreads
  - Other reference rates: SONIA, REPO

FIRM Board established working party in late 2007 to investigate…

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Workshop Agenda

- What are the possible references for risk-free discount rates?
- Why are bank risk free rates different from gilt risk free rates?
- What are the arguments for “illiquid” risk free rates?
- Conclusions

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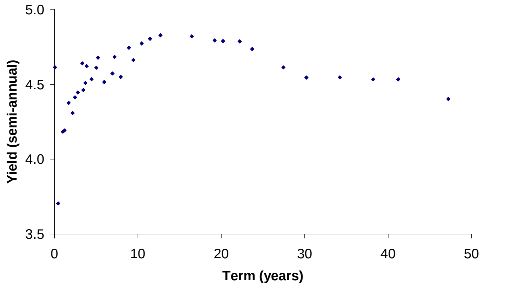
Gilt Yields



Source: DMO, run date 22 September 2008

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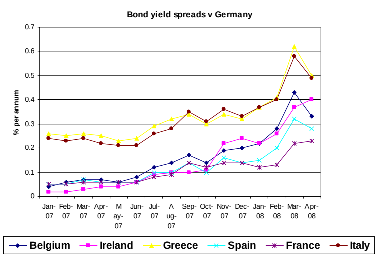
Benchmarks are Averages of Actual Trades



Example of a risk on government debt:

Euro-denominated bonds face uncertainty in the event that an issuing government leaves the Euro zone and seek to redenominate its national debt into a national currency.

Source: ECB

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Inter-Bank Market Rates

- Term deposits between banks on unsecured basis.
- Offer-side interest rates (the bid side is called LIBID)
- Very limited secondary market.
- Data collected through a survey of a panel of commercial banks (NOT investment banks)
- Submitted rates are diverse; published LIBOR is an average.
- ‘General Collateral’ and repo rates

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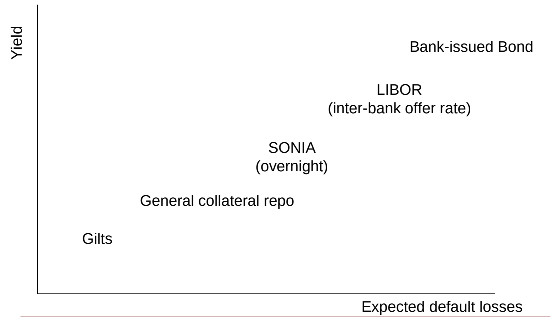
Comparison of Rates



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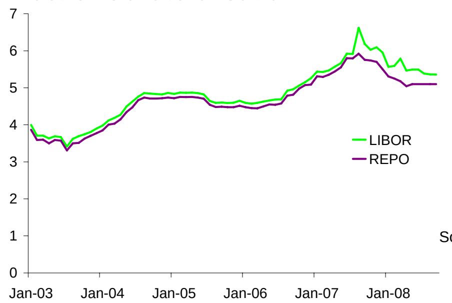
Sterling 1-month LIBOR vs REPO Effect of Collateralisation



Source: BBA

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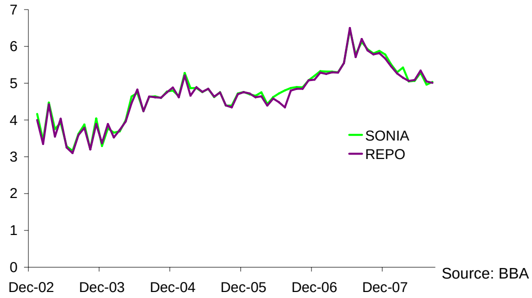
Sterling Overnight Rates
Sonia vs Repo shows little collateral effect



Source: BBA

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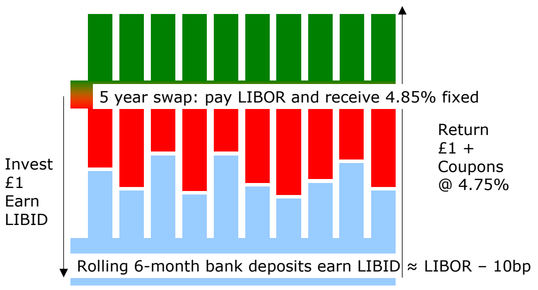
Extending Yields via Swaps



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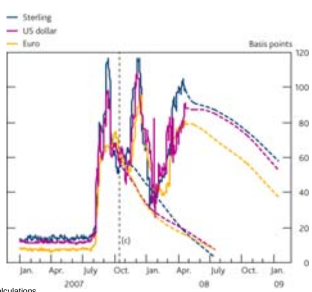
LIBOR vs SONIA Swaps (the OIS Spread)



Sources: Bloomberg and Bank calculations.

(a) Spread of three-month Libor to three-month overnight indexed swap (OIS) rates.
(b) Dashed lines show forward spreads derived from forward rate agreements as at 15 October 2007 and 22 April 2008.
(c) October 2007 Report.

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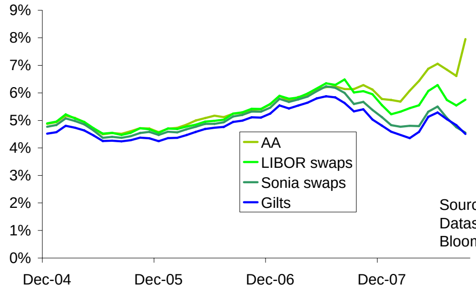
Evolution of 1-Year Sterling Rates Gilts vs Swaps x2 vs AA



Source: Datastream, Bloomberg

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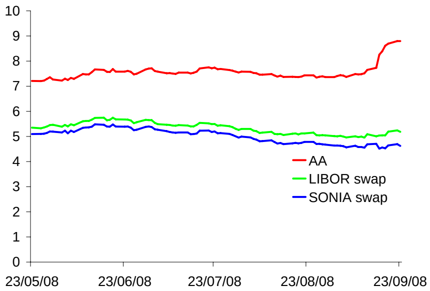
10 Year Rates: AA vs LIBOR swap vs SONIA swap (recent history only)



Source: Datastream, Bloomberg

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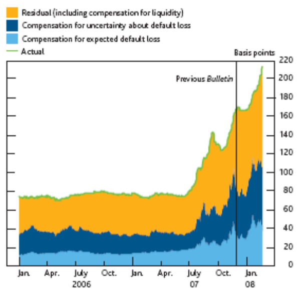
Corporate bond spreads (investment-grade)



The attached research (from B of E) does not provide a separation of the 'residual' spread into illiquidity premium and other components.

This residual may include weaknesses in the underlying Merton model for capturing the default element.

In addition, the model calibration used assumes that there is no illiquidity component in the equity return assumption.

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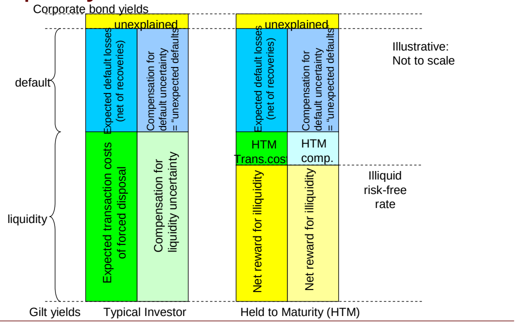
Illiquidity Effects



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Liquidity characteristics of liabilities

- Most life insurer liabilities and pension scheme obligations are long-term in nature.
- However, even within long-term contracts, there are significant differences in terms of liquidity:
  - Unit-Linked liabilities.
    These can be considered to be exactly as liquid as the corresponding assets.
  - Non-linked liabilities
    Annuities are highly illiquid – the timing of outflows for a large portfolio is near certain (in adverse scenarios additional assets are required)

  Others may depend on explicit/implicit terms of policyholder contract
- Investors with illiquid liabilities may take account of asset illiquidity rewards in liability pricing

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Defining the “Risk Free” Rate

- High credit quality bonds also tend to be …
  - liquid (little scope for information asymmetry)
  - convenient to hold (low expenses for default risk management)
- So we cannot easily extrapolate to zero credit risk, positive liquidity premium, positive convenience yield
- Sometimes “risk free” is taken to mean “reference rate”
  - For example, CEIOPS (QIS 4) appears to interpret “risk free” in this way
  - Requirements include deep and liquid market
  - “Risk free” not to be taken literally, even governments default sometimes
  - Used to imply gilts, now means LIBOR swaps, may in future be SONIA swaps

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Conclusions

- Risk of default is everywhere; no rates (even gilts) are completely free of risk
- Bank "risk free" rates, based on swaps, are higher than gilts mostly because of credit risk
- Illiquid investments carry an illiquidity premium, which may reduce liability transaction prices, but calibration is neither objective nor robust.
- Some sections of our working party report available at:

http://www.actuaries.org.uk/__data/assets/pdf_file/0010/134011/MarketConsistentValuation.pdf

- For non-life insurance, uncertainty in claim amounts usually dominates uncertainty over discounting.

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Thanks!

WP Colleagues:
Seamus Creedon
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