

Risk and Investment Conference,
Parit Jakhria & Derek Pugh



Corporate Bond Yield Curves

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Uses of Corporate Bond Yield Curves

Life Insurance

- Annuity pricing
- Benchmarking / performance measurement
- Setting investment strategy
- Setting valuation discount rates and capital bases
- Explaining changes in capital, solvency and profit
- Calibrating stochastic models of corporate bond returns
 - E.g. as used to value With-Profits guarantees
- Solvency II Liquidity Premium = $f(\text{corporate bond yields})$

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Uses of Corporate Bond Yield Curves

Pensions

- Valuation discount rate
 - Accounting (e.g. US GAAP mandates AA spread)
 - Funding rate calculations –judgement involved
 - Practice is evolving, but still dependant on yield curves
- Transfer value pricing
- Asset Benchmarking / performance measurement

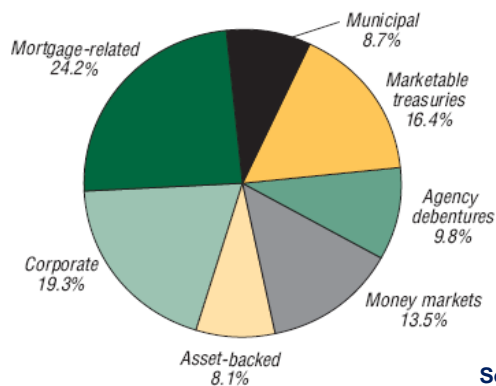
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Definition / Classification of Corporate Bonds

U.S. Bond Market (In percent)

Composition of Outstanding U.S. Bond Market
(\$30.5 trillion, as of 2008:Q1)



Source: IMF

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Practice – Benchmarks used within the industry

- Comparison with Equities
- Equities - MSCI UK & FTSE All Share
 - Highly correlated
 - Fairly standardised
- Bonds – various
 - Various extra dimensions
 - E.g. credit quality, maturity, *type*, subordination level...
 - Not as correlated
- Definition of index is key, and not standardised across the industry

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Benchmarks used within the Life industry

- 7 active UK annuity providers surveyed
- 6 out of 7 use indices for performance measurement
- Wide range of indices used
- Transparency and wide universe most desired features
- Real-time valuation and hedgeability least desired features (although hedgeability was also highest wish-list feature for two companies)
- 3 out of 7 use yield curves for annuity pricing
- 3 out of 7 use yield curves for valuation interest rates

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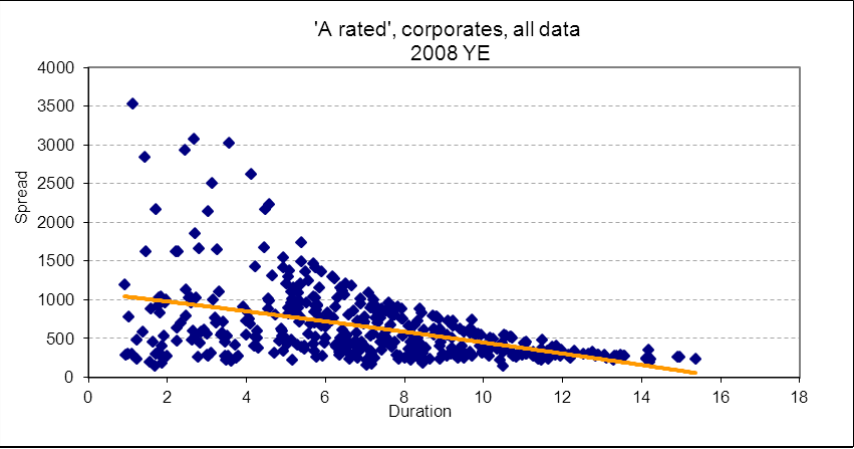
Benchmarks used within the Pensions industry

- Except for largest schemes majority of pension fund bond investments are in pooled funds
 - Choice of performance benchmarks driven by pooled fund managers
- iBoxx, Merrill Lynch and Bar Cap most commonly used
- Little consistency in indices composition with variety of
 - maturity groupings (0~5 years, >5 years, >10 years etc)
 - credit qualities (e.g. investment grade, AAA-AA-A)
 - asset class sub-types included/excluded (corporate bonds, asset backed securities, MBS, gilts etc.)

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Yield Curve Scatter – Illustration 1

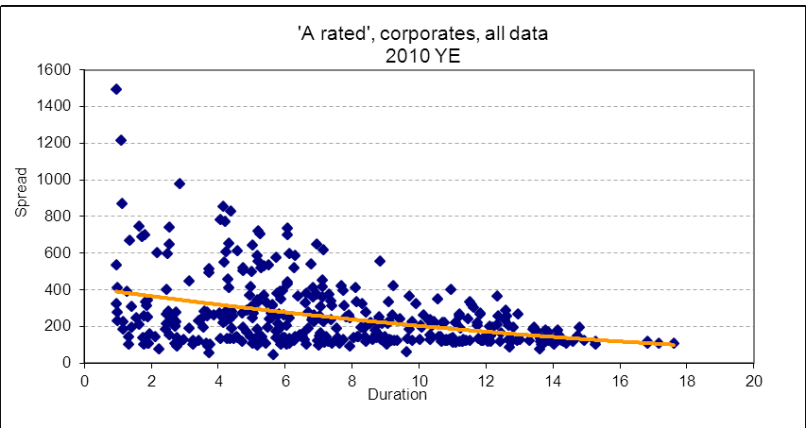


- There was a large sectoral component in 2008

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Yield Curve Scatter – Illustration 2

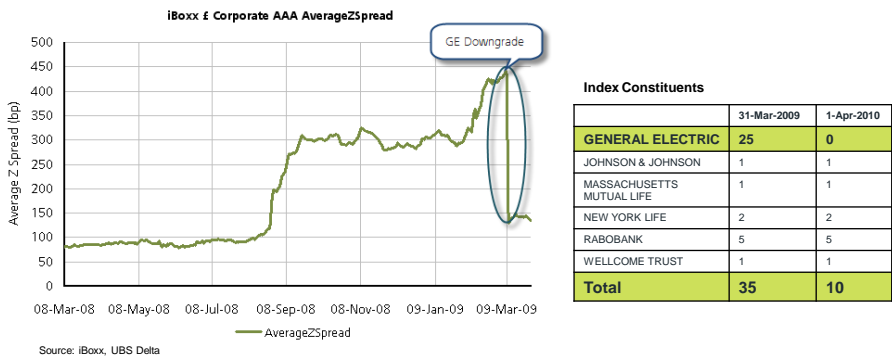


- Current Picture – 2010 YE

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Yield Curve Discontinuity – Illustration



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Issues To Consider 1

At first Glance

- Too broad → Large Scatter
- Too Narrow → Continuity Issues
- Tip of iceberg – Devil is in the detail!

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Issues To Consider 2

Further Issues To Consider:

- Yield definition and compounding frequency
- Spread type and reference rate
- Non-vanilla features (e.g. optionality)
- Bid-offer spreads
- Technical curve construction

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Spread Definition

Spread Type:

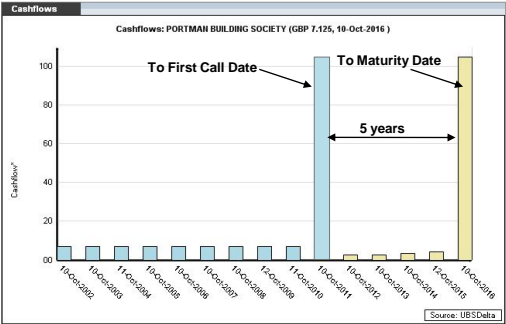
- Yield spread, govt spread, interpolated spread (I-spread)
 - Yield difference between bond and reference asset
- Z-spread (zero-volatility spread)
 - Size of parallel shift required in reference zero curve
 - Option-adjusted spread (OAS) additionally may allow for yield volatility
- Asset swap spread (ASW), margin (ASM), gross spread
 - Coupon paid in a tradable 'par asset swap' package
- Credit default swap spread

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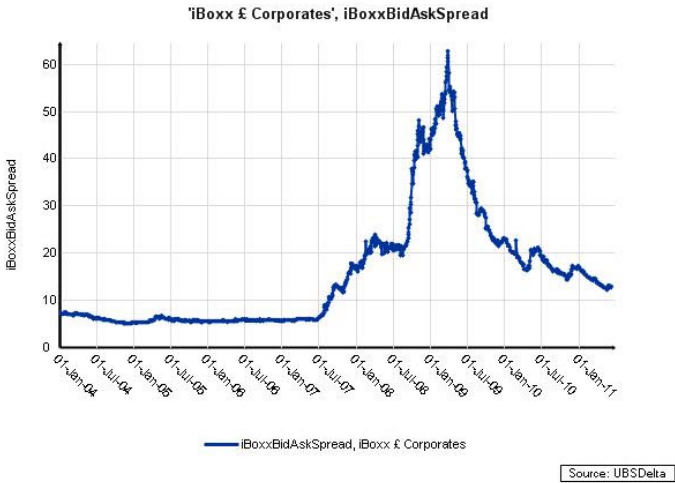
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Yield Convention

Issuer	PORTMAN BUILDING SOCIETY
Description	Fixed to Floating Bond Fixed 7.125% Coupon to 10-10-2011 Floating at 5 year UK Gilt + 320bps after
Maturity Date	10-Oct-2016
Call Date	10-Oct-2011
ASM	146.07
ZSpread	149.14
SpreadToFirst	828.95
GovBenchmarkSpread	214.79
YieldToMaturity	3.98
YieldToFirst	9.13



Bid-Offer Spreads



Practical Lessons 1

- Understand limitations
 - No panacea
 - What is curve being used for?
 - Review curve usage (particularly in stressed markets)
- Annuity pricing
 - Does curve fairly represent investment strategy?
- Use of curves to set investment strategy
 - Do constituents have desired balance of risk / return?
 - How will investment guidelines be written?

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Practical Lessons 2

- Curves in reserving (liquidity premium) and capital bases
 - Constituents of curve should reflect assets held
 - Review treatment of non-vanilla features
 - Try to avoid arbitrage of own office basis
 - Term structure of spreads important
- Use of curves to track solvency, profit etc
 - Check against spread movements on actual assets

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Current Providers of Yield Curves

Distinction between indices and curves:

Main Indices

- iBoxx
- Merrill Lynch
- Barcap

Yield curve providers

- Bloomberg Fair Value
- UBS Delta
- Barcap

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Current Theory and Practice

Comparison UBS Delta versus Bloomberg Fair Value:

- Bloomberg curves use more restricted set of bonds
 - Only bonds with 'Bloomberg Generic' prices
 - Excludes illiquid bonds
 - Hence yields significantly lower during recent crisis
 - Other technical differences less important
- Compared with UBS Delta curves
 - Based on constituents of iBoxx index
 - With UBS Delta curve fitting methodology

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Current Theory and Practice

Comparison UBS Delta versus Bloomberg Fair Value:

