Actuarial Research Centre

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Actuarial Research Centre (ARC)

PhD studentship output

The Actuarial Research Centre (ARC) is the Institute and Faculty of Actuaries' network of actuarial researchers around the world. The ARC seeks to deliver research programmes that bridge academic rigour with practitioner needs by working collaboratively with academics, industry and other actuarial bodies.
The ARC supports actuarial researchers around the world in the delivery of cutting-edge research programmes that aim to address some of the significant challenges in actuarial science.

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A celebration of the Actuarial Research Centre:

A brief account of my work as a PhD student

Paul van Loon

ARC PhD student

17 January 2017

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My ARC project

Started in November 2012

Supervision:

Andrew Cairns, Alexander McNeil & Alex Veys

Initial Focus:

data driven methods for establishing liquidity premia on corporate bonds

Support from IFoA to present and discuss my work at many events

Overview

Liquidity Premia on Corporate Bonds

Quantitative Factor Investing in Corporate Bonds

Many smaller projects and on-going work

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Liquidity Premium on Corporate Bonds

- The work is an attempt to extract liquidity premia on the single issue level, with high frequency (daily), using readily available information about bonds.

- Winner best paper award at the Inernational Congress of Actuaries 2014, Washington
- Published in Annals of Actuarial Science, September 2015
- Presented work at ICA (2014), Risk & Investment IFoA conference (2014), CISI bond group (2014), IFoA sessional research event (2014)

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Liquidity Premium on Corporate Bonds:
Paper in a nutshell

- What is a Liquidity Premium?
- Illiquidity Premium of Liquidity Premium?
- Why do we care about Liquidity Premium Estimates?
- What is the liquidity of financial instruments / markets?
  - Theory & empirical proxies
  - Recently: Bank inventories? Regulation? Liquidity?
- Previous modelling efforts:
  - Structural models (→ Bank of England)
  - CDS-based approach, model-free
  - Statistical models

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Liquidity Premium on Corporate Bonds:
Paper in a nutshell (ii)

- Extensive, yet accessible Markit Iboxx IG GBP dataset
  - Daily data for ~1500 bonds, from 2003 - now
- Two stage statistical modelling using just linear regression:
  - Derive a relative liquidity proxy, related to the bid-ask spread
  - Model credit spread as a function of bond characteristics, inclusing RBAS
  - Derive liquidity premium estimate
- We fit daily cross-sectional regression models, no explicit time component
- Stitching the estimated coefficients together, we get an interesting and intuitive picture of model dynamics

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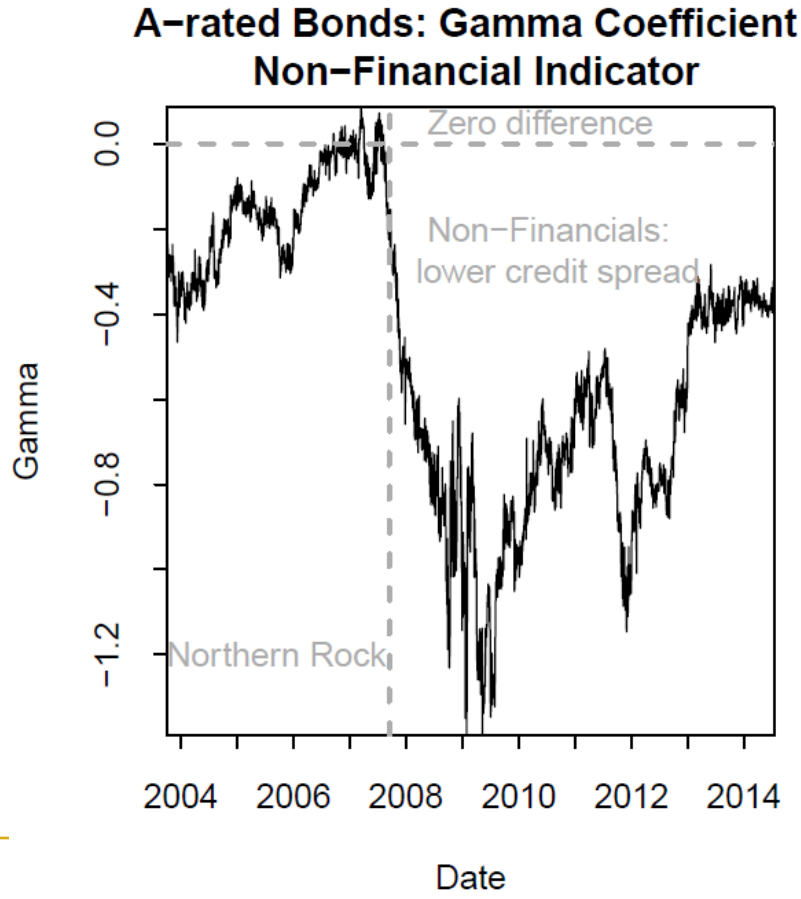
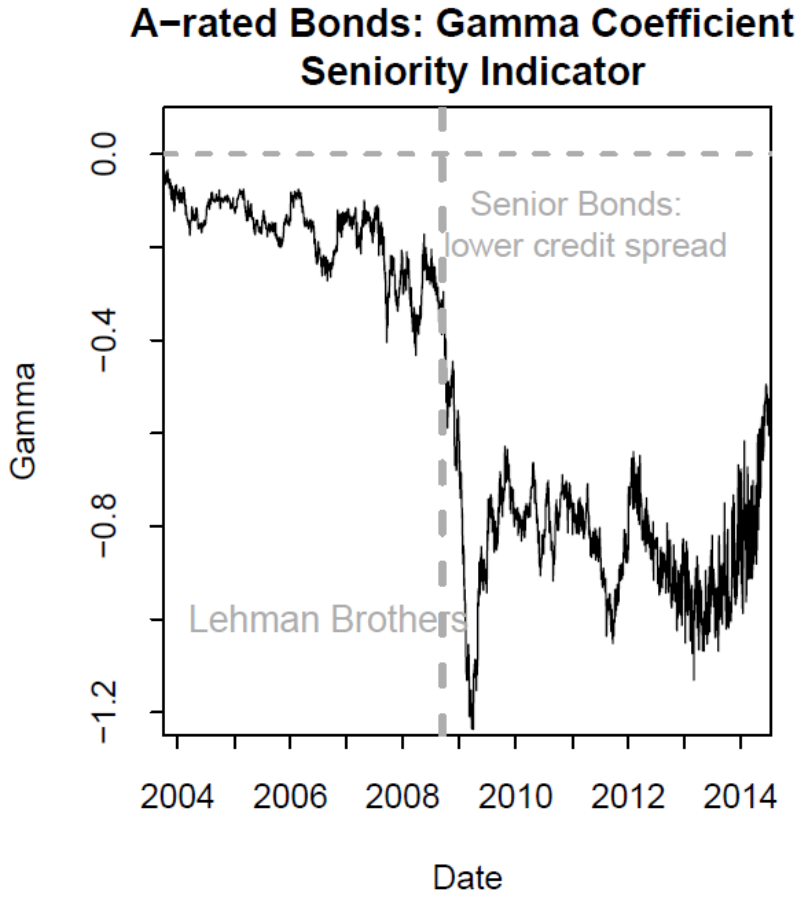
Liquidity Premium on Corporate Bonds:
Paper in a nutshell (iii)

- Ultimately, we have an estimate of Liquidity Premia for each bond, on each day, based on a model which is both robust and intuitive. An example of model dynamics;





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Liquidity Premium on Corporate Bonds:
Paper in a nutshell (iv)

- What is so useful?
  - Frequent estimates
  - Daily distributions of premia, rather than market-wide (point) estimates
  - Robust extrapolation; in the regression, RBAS is, by definition, uncorrelated to other covariates, which allows the perfectly liquid equivalent to be estimated
  - Only readily available, bond-only, information is used, but can be extended if needed

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Liquidity Premium on Corporate Bonds:
Current work

- Exploring the extent to which structural models can be used in a similar way
- Complex, subjective, parameterisation in a ‘model of the firm’ to arrive at a fair credit spread
- Liquidity Premium simplified to be the difference between observed spread and fair spread (model estimate)
- ‘Re-creating’ the Bank of England’s implementation of the Leland & Toft model
  - Update estimates on the Markit Iboxx dataset
  - Sensitivity analysis
  - Extend to bond level analysis

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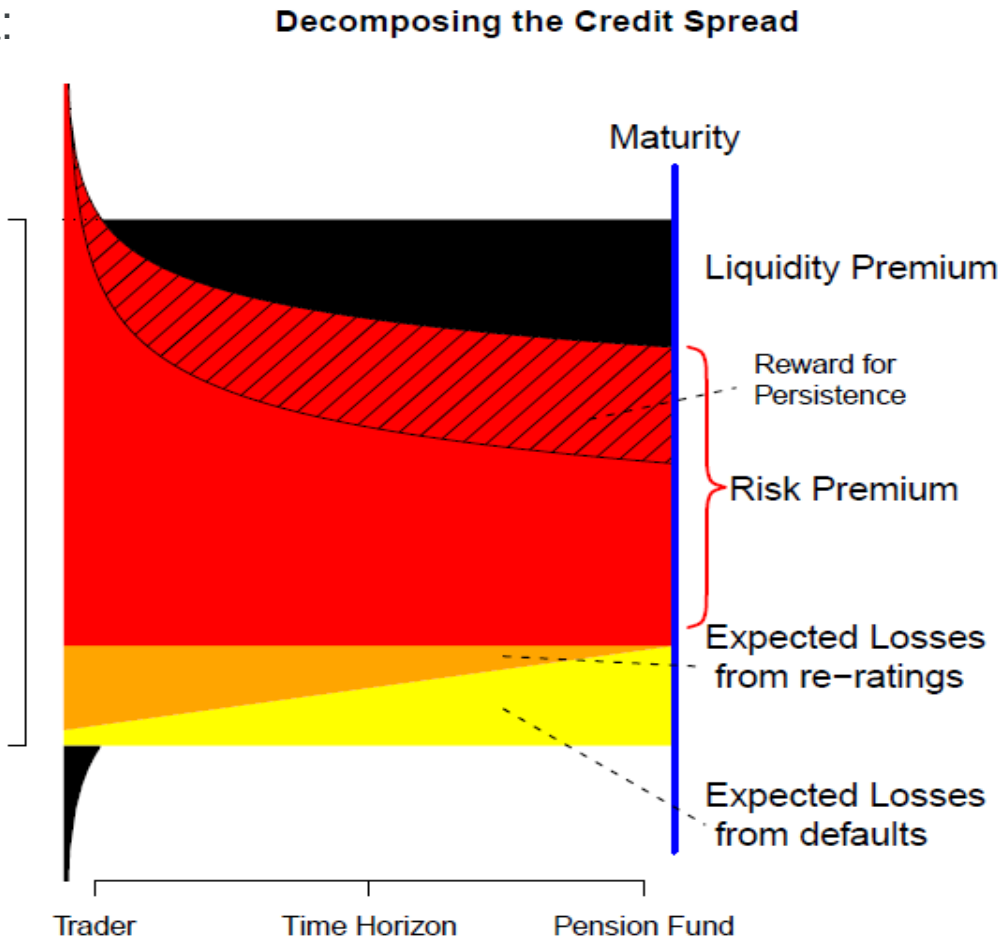
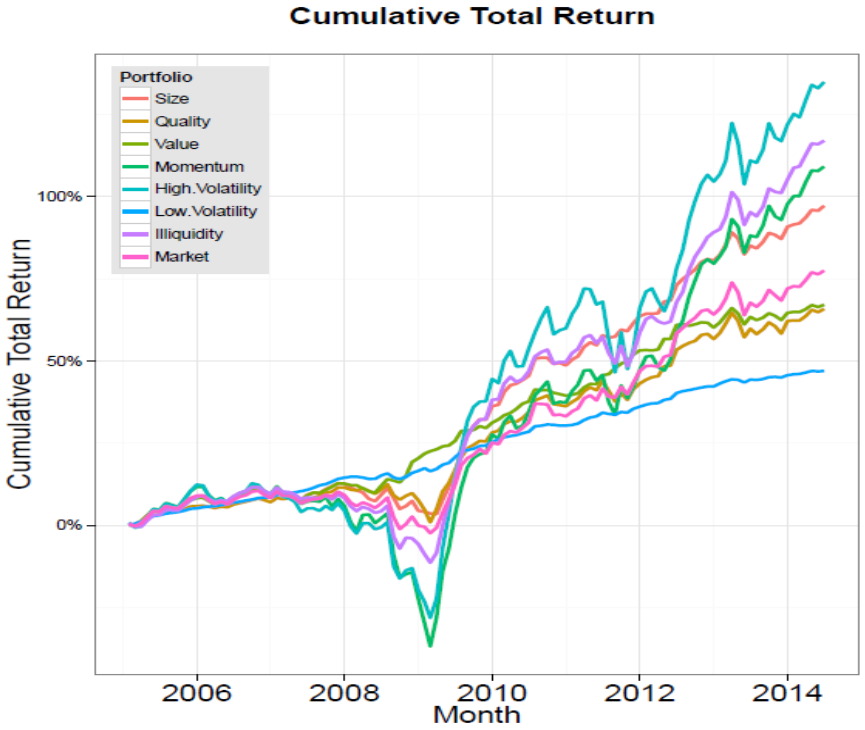
Liquidity Premium on Corporate Bonds:
Future work?

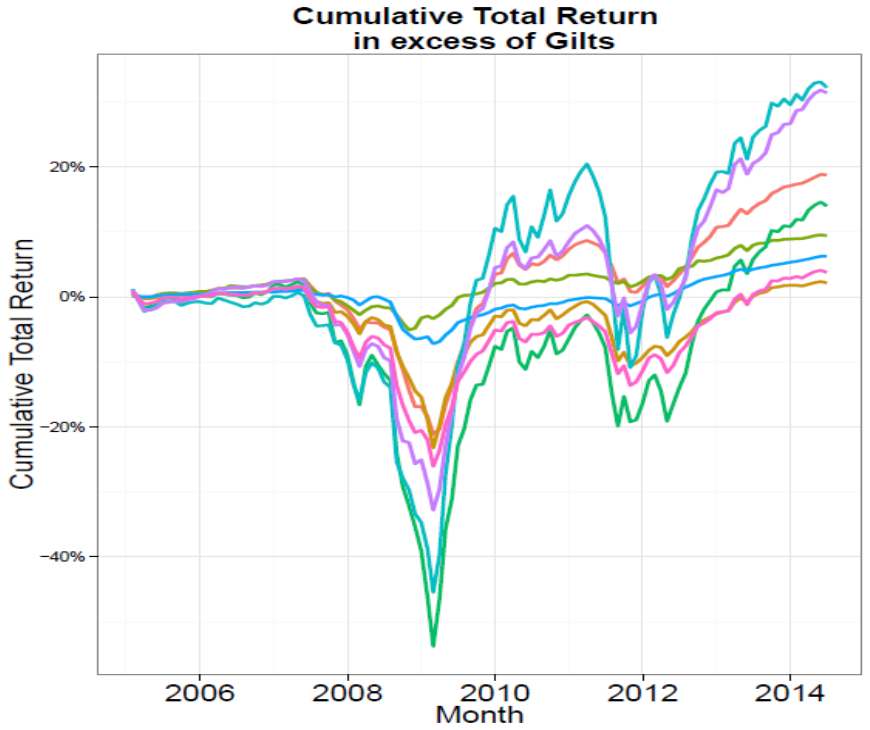
- Holding period effect and Liquidity Premia:
  - What is the expected value of the liquidity premium?
  - Considers turnover of a portfolio
  - Considers stochastic evolution of premium estimates
  - Considers premium accrual over time
- Explicitly model a liquidity term structure
- Not imposing a functional form



Quantitative Factor Investing in Corporate Bonds

- Investigate whether we can define factor portfolios, common in equity markets, using bond-only information, that have attractive features
- Presented as work in progress at the Actuarial Teachers and Researchers Conference (2015)
- Paper in submission





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Many smaller projects

- Currently finishing a paper that look at stochastic credit models and model risks embedded in rating migration matrices

- Most of my time spent, did not make this very short presentation
- Most of my time spent, did not ‘amount to anything’
- An opportunity and obligation to explore subjects (only loosely) related to the outlined PhD project

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