Directed Risk Research Feedback

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Introduction

- On behalf of UCT and AIFMRM, I will provide feedback on the projects awarded DST Applied Risk Research Funding.
- All the projects were of the Technology-Push type.
- So far, these projects have led to four papers, in various stages of publication, and four accepted conference talks. They will potentially generate another five papers.
- I shall be providing feedback on seven of these projects.
- Further funding (Projects RP15003-5, RP15011-7, RP15020-2) has been amalgamated and used to support a summer school entitled **Building Capacity in South Africa**, which is contemporaneous with the **Financial Intermediation in Emerging Markets Conference**, being held in Cape Town in December.

UCT Project RP15002

Title: Hedging South African Interest Rate Derivatives
Author: Alex Backwell

- **Objective:**
  - To perform a large, empirical hedging back-study on South African interest-rate data, and analyse and summarise the results (including contrasts with similar studies based on developed-market data).
  - To bring the results to bear on specific economic and financial-modelling questions, including the unspanned stochastic volatility (USV) problem.
- **Progress:** A paper on titled 'Hedging Evidence for Unspanned Stochastic Volatility' has been drafted (available on SSRN) and accepted to the Bachelier Finance Society 9th World Congress.
- **Highlights:** (Amongst a number of micro results):
  - The methodology provides robust evidence that USV models are necessary to model the time-series characteristics of yield curve data;
  - The hedging of yield curve instruments is, however, surprisingly unaffected by this — classical (non-USV) hedging models perform well, even on data simulated from USV models.

UCT Project RP15006

Title: Measurement Regression Beta
Author: Kanshukan Rajaratnam

- **Objective:**
  - In this research, a systematic risk measure using measurement regression for JSE listed stocks was constructed.
  - It makes the case that the so-called 'total beta' parameter provides a more realistic and stable estimator for market related risk and return.
  - The total beta estimate, explicitly allowing for error in both variables, is less likely to underestimate the magnitude of the beta parameter.
- **Progress:** Now published: Laird-Smith, J., Meyer, K. and Rajaratnam, K. (2016). *A study of Total Beta specification through Symmetric Regression: The case of the Johannesburg Stock Exchange.* Environment Systems and Decisions, 36(2): 114-125.
- **Highlights:**
  - We were told by a practitioner that the Financial Beta is still widely used in South Africa. This exploratory research looked at using measurement regression to estimate a systematic risk measure.
  - The study has resulted in further avenues of research.
  - Finance students at UCT conducted this research under my supervision.

UCT Project RP15007

Title: Historical Cost Impact of Misestimation of Basel Capital Requirement on Consumer Loans Portfolios
Author: Kanshukan Rajaratnam

- **Objective:** The objective of the project is to determine the historical cost of misestimation of regulatory capital.
- **Progress:** This paper is complete and under review with a journal.
- **Highlights:**
  - We were unable to obtain data to measure the historical cost impact of misestimation of Basel capital requirements for consumer loans portfolio. But in searching for this data, we came across a more important problem. That is, how should a consumer loans portfolio manager make decisions on loan acquisition decisions?
  - The portfolio manager must be cognizant of future economic conditions when making capital retention decisions. This paper looks at the decisions assuming the portfolio manager has access to future economic scenarios.
  - The paper will lead to further research in this area. Additionally, this paper was a collaboration with academics at University of Virginia who are specialized in this field. This work cements that relationship.

UCT Project RP15008

Title: The impact of the change in the definition of bank capital according to Basel 3
Author: Phillip de Jager

- **Objective:** The definition of qualifying capital was changed from Basel 2 to Basel 3. This is within the context of Basel 3 requiring more capital in general. We investigate whether or not the definition change made the achievement of more capital under Basel 3 easier?
- **Progress:** The masters student has finished his dissertation on the topic and graduated. If a reserve bank co-author can be found the dissertation might be turned into an academic paper.
- **Highlights:** The results indicate that the definition change on average had a negative impact (-0.18%) on the capital position of banks. However, evidence was found that the effect was in fact positive for the largest, a European bank, (+0.0028% for every 1% increase in size) and for European banks on average (+0.005%). This possibly indicates lobbying power.

UCT Project RP15009

Title: Pricing Catastrophe Bonds based on a PCS Index
Author: Mario Giuricich

- **Objective:** To fit a Compound Poisson Process to American insurance loss data (from an index), with the view to applying this in the South African context.
- **Progress:**
  - The funds were used towards travel costs, so I could visit my supervisor in Wroclaw, Poland.
  - Four distributions were fitted to the data, and moreover approximations to prices of index-linked CAT bonds, were derived.
- **Highlights:**
  - An article detailing the fitting procedure used was submitted to the journal, Computational Statistics.
  - An abstract on my work on CAT bonds has been accepted for the QMF December 2016 Conference in Sydney, Australia.

UCT Project RP15018

Title: Model Uncertainty and Hedging
Authors: Peter Ouwehand, with student Lloyd Balshaw

- **Objective:** This pilot study investigates the performance of various hedging strategies under model misspecification:
  - A complicated base model (CGMY model) is used to generate vanilla option prices.
  - Simpler models (Heston, Merton, Bates, VG, Kou, etc.) are calibrated to these vanilla options. Typically, these simpler models manage a good fit to vanilla options.
  - The hedging performance of these simpler models is then tested on exotic options (lookbacks, barriers, cliquets) Hedging methods: delta, static and quadratic.
- **Progress:** Still in progress. Submission of Lloyd Balshaw's master's dissertation expected by December 2016.
- **Highlights:** The emergence of an understanding under which conditions model risk is likely to lead to significant hedging losses.

UCT Project RP15019

Title: Fast SABR
Author: Ralph Rudd

- **Objective:**
  - To provide a fast and efficient reduced-variance Monte Carlo technique based on recursive marginal quantization for the SABR stochastic volatility model.
  - To use the resultant quantization grid for fast calibration of the SABR model.
- **Progress:** A paper titled 'Pathwise Quantization of the SABR Model' has been accepted to the Bachelier Finance Society 9th World Congress.
- **Highlights:**
  - Further research directed by Prof Thomas McWalter has led to a higher-order extension to the underlying recursive marginal quantization algorithm.
  - New approximation formulae for the free-boundary SABR model as well as a PDE method have been contributed by Prof Jörg Kienitz.

AIFMRM Graduate Student Summer School

Building Capacity in South Africa

- 10 day summer school (12–21 December 2016) with world leading experts on topics of interest to the financial sector in SA
- Topic 1: Law and Finance - Katharina Pistor (Columbia University)
  - This course will concern the legal foundations of finance. How does financial regulation shape our financial system?
  - Katharina Pistor is a Professor at the Columbia Law Shool and has pioneered the legal theory of finance.
- Topic 2: Interconnectedness - Ben Golub (Harvard)
  - This course will lay the foundations of network theory as a basis to study financial interconnectedness.
  - Ben Golub is an Assistant Professor in Economics at Harvard University. He mainly works on microeconomics of networks.
- Topic 3: To be announced

Applications **competitive** for PhD and advanced Masters students. Call for applications in June 2016.

Conference on “Financial Intermediation in Emerging Markets”
Call for Papers

AIFMRM

Imperial College Business School

Ersa

Review of Finance

UCT / Imperial Business School / ERSA / Review of Finance

08 - 10 December 2016
Cape Town, South Africa

A well-functioning financial system is key for emerging markets to unlock their growth potential. This conference will address the challenges faced by financial intermediaries in emerging markets.

Keynote speakers are:

Manju Puri (Fuqua School of Business, Duke University)

and

Lesetja Kganyago (Governor, South African Reserve Bank)

Submissions welcome (http://www.aifmrm.uct.ac.za/events/ by 15 August). Of particular interest are papers addressing the following:

- Cross-border banking in emerging markets
- Bank efficiency and stability in emerging markets
- Governments role in banking — arbiter, regulator or provider?
- SME finance in the developing world
- Financial innovation and digital finance
- The bank-lending channel of monetary policy in emerging markets
- Spillovers from quantitative easing on emerging markets
- The impact of recent regulatory reforms on financial systems