Abstracts for Theme 7 of the conference for the 200th year celebration of George Boole, Cork

Ales Cerny (CASS Business School, City University London)

Quadratic Hedging With and Without Numeraire Change

We investigate the solution of the mean-variance hedging problem without a risk-free reference asset in a general semimartingale market and establish an equivalence result for hedging with and without numeraire change. As one of the byproducts we link the existence of the classical Foellmer-Schweizer decomposition to the integrability of a certain non-tradeable numeraire.

(joint work with Jan Kallsen, CAU Kiel)

Matheus Grasselli (Fields Institute and McMaster)

Inflation and speculation in a dynamic macroeconomic model

The 2008 crisis and its aftermath led to a renewed impetus to understand the role of finance in the economy as a whole. In the mainstream approach to macroeconomics based on individual optimizing behaviour, however, finance plays a very limited role and crisis are entirely absent. In this talk, I use an alternative framework based on flows of funds between macroeconomic sectors to explore the combined effects of inflation for goods and services and speculation on financial assets, including a parsimonious model for asset price bubbles.

Paolo Guasoni (DCU)

Who Should Sell Stocks?

Never selling stocks is optimal for investors with a long horizon and a realistic range of preference and market parameters, if relative risk aversion, investment opportunities, proportional transaction costs, and dividend yields are constant. Such investors should buy stocks when their portfolio weight is too low, and otherwise hold them, letting dividends rebalance to cash over time rather than selling. With capital gain taxes, this policy outperforms both static buy-and-hold and dynamic rebalancing strategies that account for transaction costs. Selling stocks becomes optimal if either their target weight is low, or intermediate consumption is substantial.

Martin Haugh (Columbia University)

Tax-Aware Dynamic Asset Allocation

We consider dynamic asset allocation problems where the investor is required to pay taxes on her investment gains. This is a very challenging problem because the tax to be paid whenever a security is sold depends on the tax basis, i.e. the price(s) at which the security was originally purchased. This feature results in high-dimensional and path-dependent control problems which cannot be solved exactly except in the case of very stylized problems with just one or two securities and relatively few time periods. We develop several sub-optimal trading policies for these problems and use duality techniques based on information relaxations to assess their performances. Our numerical experiments consider problems with up to 25 securities and 80 time periods. The principal contribution of this paper is in demonstrating that much larger problems can now be tackled through the use of sophisticated optimization techniques and duality methods based on information-relaxations. We also consider problems with different tax rates for short- and long-term gains and demonstrate that some simple heuristic strategies can perform well relative to the (unknown) optimal solution. Finally, we note that problems based on the average-cost tax basis result in non-convex dual problems and we demonstrate how these problems can be solved using a polyhedral branch-and-cut approach.

(Joint work with Garud Iyengar and Chun Wang)

Gary Kennedy (Clarus Financial Technology)

Title: Interest rate option pricing in a low rate environment

Abstract: Low and negative interest rates have important consequences impacting some of the most basic calculations used in the valuation and risk management of interest rate options. Notably lognormal volatilities are no longer defined when rates are negative, and the famous SABR approximation formula breaks down when rates are very low. A new arbitrage-free SABR approximation has been developed by Hagan et. al. (2015), the solution is numerical relying upon a moment preserving finite difference scheme. We examine practical challenges to implementing this new approach and highlight finite difference schemes, not well-known in finance, that work well on the problem. Finally, we examine the calibration of the SABR model and reveal a great starting point for local optimisation routines.

Teemu Pennanen (Kings College London)

Indifference swap rates in incomplete markets

This work studies portfolio optimization and indifference pricing in markets where illiquidity may affect the transfer of wealth over time and between investment classes. We extend well-known results on arbitrage bounds, attainable claims and duality to illiquid markets and general swap contracts where both claims and premiums may have multiple pay-out dates. In addition to classical frictionless markets and markets with transaction costs, our model covers nonlinear illiquidity effects that arise in limit order markets.

Chris Rogers (Cambridge) Main conference IMS Plenary

Fundamental Fallacies of Finance

The Concise Oxford Dictionary defines a fallacy as "A mistaken belief esp. based on unsound argument", and the history and current practice of the finance industry provides egregious examples. This talk will fearlessly expose some of these, beat up the unsound arguments, and, unexpectedly, offer some practical suggestions on how to avoid such errors. These suggestions are unlikely ever to be adopted, for reasons that will also be explained.

Wolfgang Runggaldier (Padova)

No arbitrage conditions in multi-curve term structure modelling

The presentation concerns the multi-curve modelling of the term structure of interest rates as it arose after the big financial crisis. We discuss possible extensions to the multi-curve setting of no arbitrage conditions, in particular of the drift condition in an HJM framework.
(Based on joint work with Zorana Grbac)

Hans Schumacher (Tilburg University)

Risk Sharing, Internal Trading, and Derivative Design

Lessons taught by the crisis include that financial markets are not as frictionless as has often been presumed in theory, and that counterparties are not all alike. One side of the Second Fundamental Theorem of Asset Pricing (existence of a unique pricing measure) may be closer to validity in the real world than the other side (replication of arbitrary payoffs).

In a situation where agents face market frictions, there is an incentive to form institutions that facilitate risk sharing by the exchange of contingent claims within select groups. Such institutions do indeed exist in practice (reinsurance, collective pension funds). We discuss the design of risk sharing schemes under the assumption that, even when trades are internal, they must be carried out at market consistent prices.

Mihalis Zervos (London School of Economics)

Agency, Firm Growth and Managerial Turnover

We consider managerial incentive provision under moral hazard in a firm that is subject to stochastic growth opportunities. In the model that we study, managers are dismissed after poor performance as well as when an opportunity to improve the firm's profitability that requires a change of management arises. The optimal contract may induce managerial entrenchment, whereby, ex post-attractive growth opportunities are foregone after good performance because of contractual commitments. Realised growth depends on the frequency and size of growth opportunities as well as on the severity of moral hazard. The prospect of growth-induced turnover limits the firm's ability to rely on deferred compensation as a disciplinary device.