Queensland/Princeton Conference

Adam Clements: "Semi-parametric Forecasting of Realized Volatility"
Abstract: A well developed literature exists in relation to time-series modelling and forecasting. The forecasts from such time-series models traditionally place more weight on the most recent observations. This paper proposes an alternative, general semi-parametric method for forecasting that does not involve such a model, and is applied to the problem of forecasting asset return volatility. Under this approach a forecast is a weighted average of historical volatility, with the greatest weight given to periods that exhibit the most similar market conditions to the time at which the forecast is being formed. Weighting occurs by comparing short-term trends in volatility across time (as a measure of market conditions) by the application of a multivariate kernel scheme. It is found that at a 1 day forecast horizon, the proposed method produces forecasts that are significantly more accurate than a number of competing approaches. At longer forecast horizons, it is amongst the best performing models.

Mardi Dungey (with Lyudmyla Hvozdyk): "Bivariate Jump Tests: Evidence from the US Treasury Bond and Futures Markets"
Abstract: Prices on US Treasury spot and futures data are intrinsically related. Jumps in spot prices are expected to be accompanied by jumps in futures prices, although future prices are likely to jump more frequently than spot. Using a pair of new bivariate tests for cojumping we examine these propositions for maturity pairs in high frequency US Treasury data. We establish that the cojumping is monotonic in sampling frequency and has a weaker relationship with maturity. The presence of cojumping is related to scheduled US macroeconomic news announcements. The cases where the bivariate cojumping tests give contradictory results are strongly related to news, particularly when anticipated negative news is even more negative than expected.

Jianqing Fan (with Yingying Fan): "Testing and Detecting Jumps Based on a Discretely Observed Process"
Abstract: We propose a new nonparametric test for detecting the presence of jumps in asset prices using discretely observed data. Compared with the test statistic in Aït-Sahalia and Jacod (2007), our new test statistic enjoys the same asymptotic properties but has smaller variance. These results are justified both theoretically and numerically. Thanks to the reduction of the variance, we also propose a new test procedure to identify the locations of jumps. The problem of jump identification thus reduces to a multiple comparison problem. We employ the False Discovery Rate (FDR) approach to control the type I error. Simulation studies and real data analysis further demonstrate the power of the newly proposed test method.

Renée Fry (with Mardi Dungey and Vance Martin): "Crisis Transmission and Contagion: Which Test to Use?"
Abstract: Several empirical test for contagion have been developed over the past decade in an attempt to understand the transmission of financial market crises. The conclusions of these tests often differ markedly even when the same crisis and dataset is used. This paper serves as a guide to understanding the nature of the competing tests in terms of their size and power properties using a range of Monte Carlo experiments under various crisis scenarios. In finite samples, most tests perform poorly, being either under or over sized. Most tests exhibit low power, with some parameterisations resulting in non-monotonic power functions. Some refinements to improve the sampling properties of some of the tests are also suggested.

Yongmiao Hong (with Yoon-Jin Lee): "A General Approach to Testing Nonlinear Time Series Models via Generalized Spectrum"

Abstract: This paper proposes a unified approach to testing adequacy of nonlinear time series models. The proposed test can be applied to various nonlinear time series models, including conditional probability distribution models, Markov chain regime-switching models, conditional duration models, conditional intensity models, continuous-time jump diffusion models, continuous-time regression models, and conditional quantile and interval models. Our approach is built upon the fact that for these nonlinear time series models, model adequacy usually implies that a suitably transformed process is an independent and identically distributed (i.i.d.) sequence with some specified marginal distribution. Examples include the probability integral transform of an autoregressive conditional distribution model, the integrated hazard function of a conditional duration or intensity model, the time-change transform of a continuous-time regression model, and the binary transformation of an autoregressive conditional quantile model or interval model. These transforms are, respectively, i.i.d.U[0,1], i.i.d.EXP(1), i.i.d. N(0,1) and i.i.d. Bernoulli(a) for some known $0<a<1$ when the corresponding time series models are correctly specified. The transformed process may be called the generalized residuals of a time series model since they are generalizations of Cox and Snell's (1968) concept of generalized residuals to a time series context. The proposed test checks the joint hypothesis of generalized residuals and has nontrivial power against a wide range of model misspecifications. It has a convenient null asymptotic N(0,1) distribution and is robust to dependent persistence in the underlying time series process. A Monte Carlo simulation study illustrates the merits of the approach.

Stan Hurn: "Forecasting Spikes in Electricity Prices"

Abstract: Traditional approaches to modelling electricity prices are aimed primarily at predicting the trajectory of spot prices. By contrast, this paper focus exclusively on the prediction of extreme events or spikes in electricity prices. The time course of price spikes is treated as a realization of a discrete-time point process. A nonlinear variant of the autoregressive conditional hazard model is used to analyze variables thought to drive this process. The forecasting performance of the model is evaluated against a benchmark that is consistent with the assumptions of commonly-used electricity pricing models. Applications to the electricity futures market are also discussed.

Jean Jacod (with T. Hayashi and N. Yoshida): "Estimation of Volatility with Irregular and Random Sampling"

Abstract: In the context of high frequency data, one often has to deal with observations occurring at irregularly spaced times, at transaction times for example. With this kind of data we want to estimate the integrated volatility, or the integrated squared-volatility, or the sum of some power of the jumps when the process is discontinuous. We will examine how the usual estimators for such quantities behave with irregular observation grids, either deterministic grids or Poissonian grids or even more general sampling schemes, and in particular sampling schemes which are dependent on the observed process itself. We will see in particular that for Poisson-type observations (as are typically transaction times) some additional terms occur in the asymptotic estimation variance.

Jakub Jurek (with Joshua Coval and Erik Stafford): "The Pricing of Investment Grade Credit Risk during the Financial Crisis"

Abstract: This paper derives a structural model that links the pricing of equity index options, credit, and credit derivatives (e.g. tranches), which we then use to investigate the pricing of investment grade credit risk during the financial crisis. The model is able to explain the dynamics of common credit

default indices (CDX) and indicates that the repricing of credit derivatives appears consistent with the decline in the equity market, the increase in its long-term volatility, and an improved investor appreciation of the risks embedded in structured products. We find little evidence that suggests credit markets were experiencing fire sales relative to equity markets. A trading strategy aimed at exploiting the relative mispricing of credit derivatives and equity index options identified by the model delivered economically large returns in spite of the contemporaneous turmoil in equity markets.

Ken Lindsay: "Quasi-maximum Likelihood Estimation of the Parameters of Continuous Stochastic Processes"
Abstract: This paper develops a quasi-maximum likelihood procedure for estimating the parameters of multi-dimensional stochastic differential equations. The transitional density is taken to be a time-varying multivariate Gaussian where the first two moments of the distribution are approximately the true moments of the unknown transitional density. For affine drift an diffusion functions, the moments are shown to be exactly those of the true transitional density and for nonlinear drift and diffusion functions the approximation is extremely good. The estimation procedure is easily generalizable to models with latent factors, such as the stochastic volatility class of model, thereby avoiding the need to use proxies for the unobservables.

Gael M. Martin (with Catherine S. Forbes and Simone Grose): "Modeling and Predicting Volatility and its Risk Premium: A Bayesian Non-Gaussian State Space Approach"
Abstract: The object of this paper is to model and forecast both objective volatility and its associated risk premium using a non-Gaussian state space approach. Option and spot market information on the unobserved volatility process is captured via non-parametric, 'model-free' measures of option-implied and spot price-based volatility, with the two measures used to define a bivariate observation equation in the state space model. The risk premium parameter is specified as a conditionally deterministic dynamic process, driven by past 'observations' on the volatility risk premium. The inferential approach adopted is Bayesian, implemented via a Markov chain Monte Carlo (MCMC) algorithm that caters for the non-linearities in the model and for the multi-move sampling of the latent volatilities. The simulation output is used to estimate predictive distributions for objective volatility, the instantaneous risk premium and the conditional risk premium associated with a one month option maturity. Linking the volatility risk premium parameter to the risk aversion parameter in a representative agent model, we also produce forecasts of the relative risk aversion of a representative investor. The methodology is applied both to artifically simulated data and to empirical spot and option price data for the S&P500 index over the 2004 to 2006 period.

Vance Martin (with Yoshihiko Nishiyama and John Stachurski): "A General Hypothesis Test for Stationary Markov Processes"
Abstract: A general framework is developed to test for stationary Markov processes. The test statistic consists of computing a random density ψ_n based on averaging the transitional density $p(x, y; \theta)$ with parameter θ of a stochastic process over the sample $x = x_i$ and comparing this quantity with $\int p(x, y; \theta)\, \psi(x)\, dx$, where $\psi(x)$ is the pertinent stationary distribution. Under the null hypothesis, the statistic is shown to be a centered Gaussian random variable asymptotically. Extending the framework to the case of unknown parameters is also discussed. Applications of the testing methodology to finance are presented.

Andrew Patton (with Michela Verardo): "Does Beta Move with News? Systematic Risk and Firm-Specific Information Flows"

Abstract: This paper shows that the systematic risk (or "beta") of individual stocks increases by an economically and statistically significant amount on days of firm-specific news announcements, and reverts to its average level two to five days later. We employ intra-daily data and recent advances in econometric theory to obtain daily firm-level estimates of beta for all constituents of the S&P 500 index over the period 1995-2006, and estimate the behavior of beta around the dates of over 22,000 quarterly earnings announcements. We find that the increase in beta is larger for more liquid and more visible stocks, and for announcements with greater information content and higher ex-ante uncertainty. We also find important differences in the behavior of beta across different industries. Our analysis reveals that changes in beta around news announcements are mostly driven by an increase in the covariance of announcing firms with other firms in the market. We provide a simple model of investors' expectations formation that helps explain our empirical findings: changes in beta can be generated by investors learning about the profitability of a given firm by using information on other firms.

Vlad Pavlov: "Business Cycles and Stock Market Recoveries"
Abstract: The paper looks at the behaviour of stock market rebounds following US recessions. The results suggest a degree of synchronization between stock market and business market cycles.

Eric Renault (with Prosper Dovonon): "GMM Overidentification Test with First Order Underidentification"
Abstract: This paper revisits the asymptotic theory of GMM when the moment conditions identify a unique parameter true value θ^0 but the rank condition of the Jacobian matrix at θ^0 fails. The possibility in case of nonlinear moment restrictions of such simultaneous global identification but first order under-identification has already been pointed out by Sargan (1983). The contribution of this paper is to provide a general asymptotic theory when one can maintain an assumption of second order identification. While this issue has been addressed in a maximum likelihood context by Lee and Chesher (1986) and Rotnitzky, Cox, Bottai and Robbins (2000), we set the focus on the asymptotic behaviour of the GMM overidentification test statistic J_T. We show that with H moment conditions, when the Jacobian matrix of the moment conditions evaluated at θ^0 is of rank p-1, where p is the number of parameters, the asymptotic distribution of J_T is a half-half mixture of $\chi^2_{H\text{-}p}$ and $\chi^2_{H\text{-}(p\text{-}1)}$ instead of the standard $\chi^2_{H\text{-}p}$. In other words, the distribution of J_T for large sample sizes T has fatter tails, leading to over-rejection of the null of valid moments when using standard critical values. The practical significance of this oversize problem is illustrated by Monte Carlo experiments in the context of a test for common GARCH features proposed by Engle and Kozicki (1993).

Mathieu Rosenbaum: "On the Microstructural Hedging Error"
Abstract: We consider the issue of hedging a European derivative security in the presence of microstructure noise. In a market where the efficient price of the asset is driven by a stochastic volatility process, we assume an agent wants to use a (possibly misspecified) local volatility-type replication strategy. Focusing on microstructure noise effects, our goal is to evaluate the error between the theoretical, but practically unfeasible, strategy and its market adapted versions. The microstructural hedging error is in particular due to transaction prices discreteness and endogenous trading times. Thus, we consider a transaction price model that accommodates such inherent properties of ultra high frequency data with the assumption of a continuous semi-martingale efficient price. In this framework, we study two hedging strategies derived from the local volatility-type hedging strategy: (i) the hedging portfolio is rebalanced every time that the transaction price moves, (ii) the hedging portfolio is rebalanced only once the transaction price has varied by more than a selected value. To assess these strategies, we use an asymptotic approach where the number of rebalancing transactions goes to infinity. For the first strategy,

we show that, because of microstructure noise effects, the hedging error does not vanish. However, an optimal strategy of the second type enables to reduce it significantly.

Annastiina Silvennoinen, "Determining the Dimension of a Conditional Correlation GARCH Model with Common Dynamics"
Abstract: One of the leading objectives of capturing the correlation dynamics among a set of asset returns is to extract information regarding possibilities to diversify the risk of a portfolio consisting of these assets. One aspect in common to all conditional correlation MGARCH models is that, by simplifying the dynamics in order to keep the parameterization feasible, the underlying assumption is to assume that the correlation dynamics among the group of asset returns are similar. Being able to identify groups of assets that share similar patterns in their correlation dynamics would allow the investor to group the assets according to their correlation characteristics, which in turn can be used when choosing which assets to include in a portfolio. We propose a testing framework to compare the similarity of the correlation patterns among a group of asset returns. The objective is to find an optimal dimension of a conditional correlation model such that its components share similar enough correlation dynamics that it would be plausible to fit a parameterized correlation structure on such a group. Early evidence from size and power-like simulations indicate a promising start.

Daniel Smith: "The Stochastic Equicorrelation Model"
Abstract: We present a model of stock returns in which the conditional variances of each asset is modeled as GARCH process and all assets share a common conditional correlation coefficient that is modeled as a latent autoregressive process, which we label the SECO model. We propose a multi-stage estimation approach in which the individual GARCH models are estimated one-by-one and then the correlation parameters are estimated in a second stage, much like the DCC model. An advantage of the SECO model is that the log-likelihood can be computed without having to invert the correlation matrix many times, which can be very computationally burdensome when the number of assets is large. The SECO model can then be feasibly estimated in quite large-dimensional problems. The model also allows the common conditional correlation coefficient to depend on macroeconomic conditioning variables. We fit the model to 49 industry portfolios between July 1965 and December 2006 and find that correlations are typically between 0.5 and 0.7 but during the Tech bubble around the turn of the Millennium the average correlation dropped to 0.3. We also demonstrate how the SECO model can be used to compute the Value-at-Risk to be easily computed when there are very many risk factors.

Susan Thorp (with Annastiina Silvennoinen): " Commodity, Stock and Bond Correlations in Calm and Crisis: Evidence from Smooth Transition Models"
Abstract: Commodities are widely thought to offer diversification benefits to conventional portfolios that are robust to extreme events. We reassess the conditional correlation structure between weekly returns (1990-2009) to commodity futures and bonds and stocks using Double Smooth Transition Conditional Correlation - GARCH. We test time, the US stock volatility predictor VIX and non-commercial futures traders' long open position as transition variables for conditional correlation. We show that correlation of most commodity futures with the S&P500 increased between 1990 and 2009, peaking in the recent crisis, sometimes at levels dramatically higher than normal. We notice two main patterns in the time transition to higher correlation: for most foods, grains and energy commodities, increases have been sharp and concentrated in the crisis; for base metals and some others, correlations began to increase around the turn of the century, and then intensified during 2008-09. We also find a surprising switching pattern linked to VIX and non-commercial traders' positions: for several commodities an increase in the VIX decreases correlation with stock returns early in the sample then increases it later. For copper, increases in non-commercial interest raises correlation up until 1999, then is linked to decreases later. Commodities correlation with returns to a US bond index generally became more negative and exhibit similar switches.

These switching patterns may indicate a structural break in the conditional correlation processes between commodities and conventional assets.

Viktor Todorov (with Tim Bollerslev): "Estimation of Jump Tails"
Abstract: We consider the problem of estimating the jump tails of an Ito semimartingale with regularly-varying jump tails. The estimation strategy proposed in the paper is based on first forming moments associated with the compensated jump measure using the assumption of regular variation in the jump tails and further exploring the time-variation structure in the jumps. We then show how to make the estimation feasible first for the case of continuous price record, and then for the case of high-frequency sampling. We apply our theoretical results to real stock market data.

Wei Xiong: "Index Investing and the Financialization of Commodities"
Abstract: This paper examines the financialization process of commodities precipitated by the rapid growth of index investment to the commodities markets since early 2000s. We find that concurrent with the increasing presence of index investors, there is an increasing trend in the exposures of commodity prices to aggregate shocks, such as shocks to the world equity index and US dollar exchange rate, and to shocks to other commodities, such as oil. In particular, this trend is more pronounced for commodities in the two popular commodity indices, the GSCI and DJ-AIG indices. As a result of the financialization process, the spillover effects of the recent financial crisis contributed to a substantial part of the large increase of commodity price volatility in 2008. Our study thus highlights the increasingly important interactions between commodities markets and financial markets.