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Introduction

Forecasting returns and risk in financial markets using linear and nonlinear models

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This Special Issue brings together a selection of the papers presented at the third conference in the Economic and Social Research Council (ESRC) Seminar series "Nonlinear Economics and Finance Research Community", as well as a number of other related contributions. This Conference took place at Keele University (UK) on the 1st of February 2008, and was hosted by Christopher Martin (Brunel University), Costas Milas (Keele University) and Theodore Panagiotidis (University of Macedonia), with funding from the ESRC under grant RES-451-25-4260. The aim of the seminar series is to bring together researchers working on nonlinear topics in economics and finance.

As events have unfolded, the papers included in this Special Issue are especially topical given the current economic and financial crisis. Of the ten papers, six focus on the measurement and prediction of volatility, while the remainder focus on predicting returns or first moments of key macro and financial variables, such as stock and bond returns, exchange rates, and house prices.

The papers by Andrew Patton and Kevin Sheppard, and Katja Ahoniemi and Markku Lanne, begin by considering the measurement of variability, by combining either individual measures of realised volatility, or the implied volatilities of call and put options for the same underlying asset. These two and the following four papers then consider the predictability of daily volatility. Ana-Maria Fuertes, Marwan Izzeldin and Elena Kalotychou assess the usefulness of combining non-parametric estimators of daily price variability; Martin Martens, Dick van Dijk and Michiel de Pooter consider the impact on forecasting the S&P 500 volatility of modelling features such as long memory, level shifts, and macroeconomic announcements; Marcel Scharth and Marcelo Medeiros also consider long memory, as well as asymmetry in the volatility of the Dow Jones Index; and Claudio Morana examines the macroeconomic causes of exchange rate volatility using a fractionally-integrated factor model.

The remaining four papers are concerned with predicting key macro variables. David Rapach and Jack Strauss consider the state-level forecastability of house prices in the US, and the apparent disconnect between housing prices and economic

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fundamentals that has recently become so important. Massimo Guidolin, Stuart Hyde, David McMillan and Sadayuki Ono assess the predictability of stock and bond returns using a variety of non-linear models, and Andrea Carriero, George Kapetanios and Massimiliano Marcellino consider the exchange rate forecasts from large Bayesian VARs. Finally, Amine Lahiani and Olivier Scaillet use ARFIMA models with threshold effects to forecast US unemployment.

The remainder of our introduction provides a little more detail on the ten papers in this issue.

1. Andrew Patton and Kevin Sheppard. Optimal combinations of realised volatility estimators.

The paper by Andrew Patton and Kevin Sheppard presents a novel approach to the combination of realised volatility measures to form new estimators of price variability. It overcomes the problem that the quantity of interest, volatility, is not observable, even ex post. Using high frequency IBM price data, the authors consider 32 different realised measures from 8 distinct classes of estimator, and find that an equally-weighted average cannot in general be outperformed.

2. Katja Ahoniemi and Markku Lanne. Joint modelling of call and put implied volatility.

In theory, implied volatilities for the same underlying asset backed out from call and put options should be equal. In this paper the authors note that in practice these implied volatilities often do differ. A bivariate mixture multiplicative error model is developed to describe the joint dynamics of call and put implied volatilities. The potential of the model is demonstrated in an empirical application to daily implied volatilities for the Nikkei 225 Index, where it is found that the model provides correct out-of-sample forecasts of the direction of change in implied volatility for more than 70% of trading days.

3. Ana-Maria Fuertes, Marwan Izzeldin and Elena Kalotychou. On forecasting daily stock volatility: The role of intraday information and market conditions.

The paper by Ana-Maria Fuertes, Marwan Izzeldin and Elena Kalotychou considers the use of non-parametric estimators of daily price variability that exploit intraday information. The authors compare the ability of several non-parametric estimators to forecast the daily volatility in the stock prices of 14 US stocks, and find that a combination of all non-parametric estimators forecasts best for about half of the stocks.

4. Martin Martens, Dick van Dijk and Michiel de Pooter. Forecasting S&P 500 volatility: Long memory, level shifts, leverage effects, macroeconomic announcements, and day-of-the-week seasonality.

Long-memory, level shifts, leverage effects, day-of-the-week seasonality and temporary changes due to macroeconomic news announcements have all been documented to be important features of daily realized volatility measures. This paper demonstrates the importance from a forecasting perspective of explicitly accounting for these stylized facts in time series models of realized volatility, as it is found that doing so improves the out-of-sample forecast accuracy for horizons up to 20 days ahead.

5. Marcel Scharth and Marcelo Medeiros. Asymmetric effects and long memory in the volatility of Dow Jones stocks.

Marcel Scharth and Marcelo Medeiros provide evidence that incorporating past cumulated daily returns as an explanatory variable in a flexible nonlinear framework helps to predict volatility, and that cumulative falls and increases have different effects on the level of volatility. They show that this explanatory factor accounts for large empirical values of long memory parameter estimates, and that their model is more robust than others to periods of financial crisis, when its forecasts are superior.

6. Claudio Morana. On the macroeconomic causes of exchange rate volatility.

The paper by Claudio Morana investigates whether macroeconomic volatility affects exchange rate volatility. A fractionally-integrated factor vector autoregressive model is used to identify linkages between volatility in output, inflation, money growth and the exchange rate, for the G7 economies. An out-of-sample exercise offers some support for the view that macroeconomic volatility impacts on the exchange rate.

7. David Rapach and Jack Strauss. Differences in housing price forecastability across US states.

David Rapach and Jack Strauss investigate forecasts of state-level real housing price growth for 1995–2006. They find that relatively accurate forecasts are possible for a number of interior states during this period, but that all forecasting models perform relativelypoorly for a group of primarily

coastal states. The authors conclude that housing prices and economic fundamentals were only loosely related over this period for these states.

8. Massimo Guidolin, Stuart Hyde, David McMillan and Sadayruki Ono. Non-linear predictability in stock and bond returns: When and where is it exploitable?

The paper by Massimo Guidolin, Stuart Hyde, David McMillan and Sadayuki Ono examines the comparative predictive performances of a number of linear and non-linear models for stock and bond returns in the G7 economies. Non-linear models appear to forecast better in the case of US and UK asset returns, whereas simple linear models (such as the random walk and univariate autoregressions) appear to forecast better in the case of French, Italian and German asset returns.

9. Andrea Carriero, George Kapetanios and Massimiliano Marcellino. Forecasting exchange rates with a large Bayesian VAR.

The paper by Andrea Carriero, George Kapetanios and Massimiliano Marcellino notes that models based on economic theory rarely forecast exchange rates better than simple random walk models. Motivated by the fact that exchange rates tend to move together, the authors show that the adoption of a large Bayesian VAR system for a panel of 33 exchange rates results in superior forecasting power over the random walk model.

10. Amine Lahiani and Olivier Scaillet. Testing for threshold effect in ARFIMA models: An application to US macroeconomic data.

The paper by Amine Lahiani and Olivier Scaillet develops a fractionally integrated time series model, which allows for long-memory and threshold non-linearity simultaneously. Both features have been documented to be important characteristics of macroeconomic time series variables, but they can easily be confused. The proposed model may be used to distinguish between the two, as is demonstrated by means of extensive Monte Carlo simulations. An empirical application to US unemployment shows that the model may render superior out-of-sample forecasts compared to models which allow for only one of the two aspects.