Volatility Forecasting I Garch Models Nyu

In this study, both uni-regime GARCH and Markov Regime Switching GARCH (SW-GARCH) models are examined to analyze Turkish Stock Market volatility. Various models are investigated to find out whether SW-GARCH models are an improvement on the uni-regime GARCH models in terms of modelling and forecasting Turkish Stock Market volatility. As well as using seven statistical loss functions, Superior Predictive Ability (SPA) test of Hansen (2005) and Reality Check test (RC) of White (2000) are applied to compare forecast performance of models.

Talks about the time varying betas of the capital asset pricing model, analysis of predictive densities of nonlinear models of stock returns, modelling multivariate dynamic correlations, flexible seasonal time series models, estimation of long-memory time series models, application of the technique of boosting in volatility forecasting, and more.

Written by leading market risk academic, Professor Carol Alexander, Practical Financial Econometrics forms part two of the Market Risk Analysis four volume set. It introduces the econometric techniques that are commonly applied to finance with a critical and selective exposition, emphasising the areas of econometrics, such as GARCH, cointegration and copulas that are required for resolving problems in market risk analysis. The book covers material for a one-semester graduate course in applied financial econometrics in a very pedagogical fashion as each time a concept is introduced an empirical example is given, and whenever possible this is illustrated with an Excel spreadsheet. All together, the Market Risk Analysis four volume set illustrates virtually every concept or formula with a practical, numerical example or a longer, empirical case study. Across all four volumes there are approximately 300 numerical and empirical examples, 400 graphs and figures and 30 case studies many of which are contained in interactive Excel spreadsheets available from the the accompanying CD-ROM . Empirical examples and case studies specific to this volume include: Factor analysis with orthogonal regressions and using principal component factors; Estimation of symmetric and asymmetric, normal and Student t GARCH and E-GARCH parameters; Normal, Student t, Gumbel, Clayton, normal mixture copula densities, and simulations from these copulas with application to VaR and portfolio optimization; Principal component analysis of yield curves with applications to portfolio immunization and asset/liability management; Simulation of normal mixture and Markov switching GARCH returns; Cointegration based index tracking and pairs trading, with error correction and impulse response modelling; Markov switching regression models (Eviews code); GARCH term structure forecasting with volatility targeting; Non-linear quantile regressions with applications to hedging.

We compare two more sophisticated GARCH-like models in terms of their out-of-sample forecasting power. Namely, we consider the tree-structured GARCH introduced by Audrino and Bühlmann (2001) and the GARCHMIDAS by Engle, Ghysels, and Sohn (2008). Additionally, we include the classical GARCH(1,1). We estimate the models using daily S&P 500 futures data. The models are evaluated out-of-sample based on the Diebold and Mariano Test, where the volatility proxy is constructed from high frequency data. We find evidence that the tree-structured GARCH is superior to the GARCH-MIDAS model and to the GARCH(1,1).

"Investing in options has many advantages: they provide increased cost efficiency; they have the potential to deliver higher percentage returns due to increased leverage; and they offer a number of hedging and strategic alternatives. It is therefore worthwhile to investigate the option trading strategies that offer high payoffs. This thesis provides a performance evaluation of models used in the pricing of options for a bull spread options strategy. This strategy involves the purchase of a lower strike price option, along with the sale of a second higher strike price option. The strategy is highly profitable when the price of the underlying primitive reaches the second out-of-the-money strike price before the expiration date of the options, but no further. The challenge lies in choosing the optimal out-of-the-money option strike price. The option exercise price, past primitive price jumps, and primitive volatility shifts are the important factors that are to be analyzed. Since the understanding of the primitive volatility is important, this thesis applies performance measures to compare implied volatility and historical volatility using various neural network models. GARCH implied volatility values are provided as input to both the FNN and RNN models, generating a next day forecast for implied volatility. The performance of implied volatility as a volatility measurement is compared against the historical volatility. Based on these results, the neural network models, along with the GARCH models, are further evaluated for their forecasting ability of option strike prices in a bull call spread strategy. The purpose of the research is to see the performance of different neural network models for different stock options and volatility periods. The trading profitability of these models gives us an indication of the performance ability of the FNN, RNN and GARCH models"--Abstract, leaf iv.

'Forecasting Volatility in the Financial Markets' assumes that the reader has a firm grounding in the key principles and methods of understanding volatility measurement and builds on that knowledge to detail cutting edge modelling and forecasting techniques. It then uses a technical survey to explain the different ways to measure risk and define the different models of volatility and return. The editors have brought together a set of contributors that give the reader a firm grounding in relevant theory and research and an insight into the cutting edge techniques applied in this field of the financial markets. This book is of particular relevance to anyone who wants to understand dynamic areas of the financial markets. * Traders will profit by learning to arbitrage opportunities and modify their strategies to account for volatility. * Investment managers will be able to enhance their asset allocation strategies with an improved understanding of likely risks and returns. * Risk managers will understand how to improve their measurement systems and forecasts, enhancing their risk management models and controls. * Derivative specialists will gain an in-depth understanding of volatility that they can use to improve their pricing models. * Students and academics will find the collection of papers an invaluable overview of this field. This book is of particular relevance to those wanting to understand the dynamic areas of volatility modeling and forecasting of the financial marketsProvides the latest research and techniques for Traders, Investment Managers, Risk Managers and Derivative Specialists wishing to manage their downside risk exposure Current research on the key forecasting methods to use in risk management, including two new chapters

Recently posited time-series models have been shown to produce conditional volatility forecasts of comparable accuracy to option implied volatilities for horizons up to one-month

ahead. As implied volatilities are thought to capture the future expectations of market participants, the relative success of time-series models, which condition solely on past information, casts doubt on the necessity of forecasting conditional volatility dynamics associated with future fundamental information arrival. Furthermore, previous research has documented a weak empirical link between financial return volatility and economic fundamentals, with perhaps the strongest example being an apparent association between macroeconomic announcements and conditional five-minute return volatility that has been shown to be miniscule in comparison to typical autoregressive volatility dynamics observed over longer horizons. Given the uncertain relevance of such seemingly minor intraday announcement effects, as well as the practical necessity of forecasting conditional volatility for horizons longer than intraday, the present paper examines the merit to augmenting time-series models of conditional EUR/USD spot foreign exchange rate return volatility to incorporate predictable volatility shocks associated with the future occurrence of macroeconomic announcements for the one-day-, one-week-, and one-month-ahead forecast horizons. Utilizing a simple macro-augmentation procedure, I find that the out-of-sample forecast accuracy of GARCH(p, q) models, as well as ARMA(p, q) and ARFIMA(p, d, q) models of realized volatility, can be significantly improved by further conditioning on the occurrence of the U.S. Employment Situation announcement over the period 1987 to 2007. Moreover, I find significant incremental information content in forecasted announcement effects associated with many U.S., French, and German announcements over both the 1987 to 2007 and the Euro era (1999 to 2007) periods. Additionally, I find that the one-week-ahead forecasted announcement effects associated with U.S. Employment Situation, U.S. NAPM, and U.S. Consumer Confidence announcements are significantly related to implied volatility (IV) during the Euro era, but that IV does not fully subsume the information content of all forecasted announcement effects, suggesting that option markets price certain, but not all, predictable announcement-driven volatility shocks. Overall, the present paper strengthens the empirical link between financial return volatility and economic fundamentals.

Using realized volatility to estimate conditional variance of financial returns, we compare forecasts of volatility from linear GARCH models with asymmetric ones. We consider horizons extending to 30 days. Forecasts are compared using three different evaluation tests. With data from an equity index and two foreign exchange returns, we show that asymmetric models provide statistically significant forecast improvements upon the GARCH model for two of the datasets and improve forecasts for all datasets by means of forecasts combinations. These results extend to about 10 days in the future, beyond which the forecasts are statistically inseparable from each other.

We propose a new model for volatility forecasting which combines the Generalized Dynamic Factor Model (GDFM) and the GARCH model. The GDFM, applied to a large number of series, captures the multivariate information and disentangles the common and the idiosyncratic part of each series of returns. In this financial analysis, both these components are modeled as a GARCH.We compare GDFM+GARCH and standard GARCH performance on two samples up to 171 series, providing one-step-ahead volatility predictions of returns. The GDFM+GARCH model outperforms the standard GARCH in most cases. These results are robust with respect to different volatility proxies. -- Dynamic Factors ; GARCH ; volatility forecasting

The following paper discusses the theory about ARCH, GARCH and HAR-RV and empirically assesses the fitting and forecasting performance of each model. It could be seen that, according to the S&P 500 (years 2004-2014) and using the realized variance (RV (t)t) as a proxy for the true conditional variance, the HAR-RV(3) model fits and predicts the conditional variance best. GJRGARCH(1), the second best model, is also quite good in predicting the conditional variance, whereas GARCH(1) and ARCH(13) performed rather poor. It is important to see that the model validation highly depends on the chosen proxy.

This book demonstrates the power of neural networks in learning complex behavior from the underlying financial time series data. The results presented also show how neural networks can successfully be applied to volatility modeling, option pricing, and value-at-risk modeling. These features mean that they can be applied to market-risk problems to overcome classic problems associated with statistical models.

Handbook of Volatility Models and Their ApplicationsJohn Wiley & Sons

With a new author team contributing decades of practical experience, this fully updated and thoroughly classroom-tested second edition textbook prepares students and practitioners to create effective forecasting models and master the techniques of time series analysis. Taking a practical and example-driven approach, this textbook summarises the most critical decisions, techniques and steps involved in creating forecasting models for business and economics. Students are led through the process with an entirely new set of carefully developed theoretical and practical exercises. Chapters examine the key features of economic time series, univariate time series analysis, trends, seasonality, aberrant observations, conditional heteroskedasticity and ARCH models, non-linearity and multivariate time series, making this a complete practical guide. Downloadable datasets are available online.

Forecasting in the presence of structural breaks and model uncertainty are active areas of research with implications for practical problems in forecasting. This book addresses forecasting variables from both Macroeconomics and Finance, and considers various methods of dealing with model instability and model uncertainty when forming forecasts.

Financial market volatility forecasting is one of today's most important areas of expertise for professionals and academics in investment, option pricing, and financial market regulation. While many books address financial market modelling, no single book is devoted primarily to the exploration of volatility forecasting and the practical use of forecasting models. A Practical Guide to Forecasting Financial Market Volatility provides practical guidance on this vital topic through an in-depth examination of a range of popular forecasting models. Details are provided on proven techniques for building volatility models, with guide-lines for actually using them in forecasting applications.

This book constitutes the refereed proceedings of the 5th International Conference on Intelligent Data Engineering and Automated Learning, IDEAL 2004, held in Exeter, UK, in August 2004. The 124 revised full papers presented were carefully reviewed and selected from 272 submissions. The papers are organized in topical sections on bioinformatics, data mining and knowledge engineering, learning algorithms and systems, financial engineering, and agent technologies.

Abstract: To forecast future option prices, autoregressive models of implied volatility derived from observed option prices are commonly employed [see Day and Lewis (1990), and Harvey and Whaley (1992)]. In contrast, the ARCH model proposed by Engle (1982) models the dynamic behavior in volatility, forecasting future volatility using only the return series of an asset. We assess the performance of these two volatility prediction models from S & P 500 index options market data over the period from September 1986 to December 1991 by employing two agents who trade straddles, each using one of the two different methods of forecast. Straddle trading is employed since a straddle does not need to be hedged. Each agent prices options according to her chosen method of forecast, buying (selling) straddles when her forecast price for

tomorrow is higher (lower) than today's market closing price, and at the end of each day the rates of return are computed. We find that the agent using the GARCH forecast method earns greater profit than the agent who uses the implied volatility regression (IVR) forecast model. In particular, the agent using the GARCH forecast method earns a profit in excess of a cost of $0.25 per straddle with the near-the-money straddle trading

This paper proposes an enhanced approach to modeling and forecasting volatility using high frequency data. Using a forecasting model based on Realized GARCH with multiple time-frequency decomposed realized volatility measures, we study the influence of different timescales on volatility forecasts. The decomposition of volatility into several timescales approximates the behaviour of traders at corresponding investment horizons. The proposed methodology is moreover able to account for impact of jumps due to a recently proposed jump wavelet two scale realized volatility estimator. We propose a realized Jump-GARCH models estimated in two versions using maximum likelihood as well as observation-driven estimation framework of generalized autoregressive score. We compare forecasts using several popular realized volatility measures on foreign exchange rate futures data covering the recent financial crisis. Our results indicate that disentangling jump variation from the integrated variation is important for forecasting performance. An interesting insight into the volatility process is also provided by its multiscale decomposition. We find that most of the information for future volatility comes from high frequency part of the spectra representing very short investment horizons. Our newly proposed models outperform statistically the popular as well conventional models in both one-day and multi-period-ahead forecasting.

Stock market volatility has been an important subject in the finance literature for which now an enormous body of research exists. Volatility modelling and forecasting have been in the epicentre of this line of research and although more than a few models have been proposed and key parameters on improving volatility forecasts have been considered, finance research has still to reach a consensus on this topic. This thesis enters the ongoing debate by carrying out empirical investigations by comparing models from the current pool of models as well as exploring and proposing the use of further key parameters in improving the accuracy of volatility modelling and forecasting. The importance of accurately forecasting volatility is paramount for the functioning of the economy and everyone involved in finance activities. For governments, the banking system, institutional and individual investors, researchers and academics, knowledge, understanding and the ability to forecast and proxy volatility accurately is a determining factor for making sound economic decisions. Four are the main contributions of this thesis. First, the findings of a volatility forecasting model comparison reveal that the GARCH genre of models are superior compared to the more 'simple' models and models preferred by practitioners. Second, with the use of backward recursion forecasts we identify the appropriate in-sample length for producing accurate volatility forecasts, a parameter considered for the first time in the finance literature. Third, further model comparisons are conducted within a Value-at-Risk setting between the RiskMetrics model preferred by practitioners, and the more complex GARCH type models, arriving to the conclusion that GARCH type models are dominant. Finally, two further parameters, the Volatility Index (VIX) and Trading Volume, are considered and

their contribution is assessed in the modelling and forecasting process of a selection of GARCH type models. We discover that although accuracy is improved upon, GARCH type forecasts are still superior.

"The main purpose of this handbook is to illustrate the mathematically fundamental implementation of various volatility models in the banking and financial industries, both at home and abroad, through use of real-world, time-sensitive applications. Conceived and written by over two-dozen experts in the field, the focus is to cohesively demonstrate how "volatile" certain statistical decision-making techniques can be when solving a range of financial problems. By using examples derived from consulting projects, current research and course instruction, each chapter in the book offers a systematic understanding of the recent advances in volatility modeling related to real-world situations. Every effort is made to present a balanced treatment between theory and practice, as well as to showcase how accuracy and efficiency in implementing various methods can be used as indispensable tools in assessing volatility rates. Unique to the book is in-depth coverage of GARCH-family models, contagion, and model comparisons between different volatility models. To by-pass tedious computation, software illustrations are presented in an assortment of packages, ranging from R, C++, EXCEL-VBA, Minitab, to JMP/SAS"--

This new edition of Forecasting Volatility in the Financial Markets assumes that the reader has a firm grounding in the key principles and methods of understanding volatility measurement and builds on that knowledge to detail cutting-edge modelling and forecasting techniques. It provides a survey of ways to measure risk and define the different models of volatility and return. Editors John Knight and Stephen Satchell have brought together an impressive array of contributors who present research from their area of specialization related to volatility forecasting. Readers with an understanding of volatility measures and risk management strategies will benefit from this collection of up-to-date chapters on the latest techniques in forecasting volatility. Chapters new to this third edition: * What good is a volatility model? Engle and Patton * Applications for portfolio variety Dan diBartolomeo * A comparison of the properties of realized variance for the FTSE 100 and FTSE 250 equity indices Rob Cornish * Volatility modeling and forecasting in finance Xiao and Aydemir * An investigation of the relative performance of GARCH models versus simple rules in forecasting volatility Thomas A. Silvey * Leading thinkers present newest research on volatility forecasting *International authors cover a broad array of subjects related to volatility forecasting *Assumes basic knowledge of volatility, financial mathematics, and modelling

We propose a new method for multivariate forecasting which combines the Generalized Dynamic Factor Model (GDFM) and the multivariate Generalized Autoregressive Conditionally Heteroskedastic (GARCH) model. We assume that the dynamic common factors are conditionally heteroskedastic. The GDFM, applied to a large number of series, captures the multivariate information and disentangles the common and the idiosyncratic part of each series; it also provides a first identification and estimation of the dynamic factors governing the data set. A time-varying correlation GARCH model applied on the estimated dynamic factors finds the parameters governing their covariances' evolution. A method is suggested for estimating and predicting conditional variances and covariances of the original data series. We suggest also a modified version of the Kalman filter as a way to get a more precise estimation of the static and

dynamic factors' in-sample levels and covariances in order to achieve better forecasts. Simulation results on different panels with large time and cross sections are presented. Finally, we carry out an empirical application aiming at comparing estimates and predictions of the volatility of financial asset returns. The Dynamic Factor GARCH model outperforms the univariate GARCH. -- Dynamic Factors ; Multivariate GARCH ; Covolatility Forecasting

Calvet and Fisher present a powerful, new technique for volatility forecasting that draws on insights from the use of multifractals in the natural sciences and mathematics and provides a unified treatment of the use of multifractal techniques in finance. A large existing literature (e.g., Engle, 1982; Rossi, 1995) models volatility as an average of past shocks, possibly with a noise component. This approach often has difficulty capturing sharp discontinuities and large changes in financial volatility. Their research has shown the advantages of modelling volatility as subject to abrupt regime changes of heterogeneous durations. Using the intuition that some economic phenomena are long-lasting while others are more transient, they permit regimes to have varying degrees of persistence. By drawing on insights from the use of multifractals in the natural sciences and mathematics, they show how to construct high-dimensional regime-switching models that are easy to estimate, and substantially outperform some of the best traditional forecasting models such as GARCH. The goal of Multifractal Volatility is to popularize the approach by presenting these exciting new developments to a wider audience. They emphasize both theoretical and empirical applications, beginning with a style that is easily accessible and intuitive in early chapters, and extending to the most rigorous continuous-time and equilibrium pricing formulations in final chapters. Presents a powerful new technique for forecasting volatility Leads the reader intuitively from existing volatility techniques to the frontier of research in this field by top scholars at major universities The first comprehensive book on multifractal techniques in finance, a cutting-edge field of research

The models for volatility, autoregressive conditional heteroscedastic (ARCH) and generalized autoregressive conditional heteroscedastic (GARCH) are discussed. Stationarity condition and forecasting for simple ARCH(1) and GARCH(1,1) models are given. The model for discrete time series is proposed to be negative binomial integer-valued GARCH model, which is a generalization of the Poisson INGARCH model. The stationarity conditions and the autocorrelation function are given. For parameter estimation, three methodologies are presented with a focus on maximum likelihood approach. Simulation study on a sample size of 100 and 500 are carried out and the results are presented. An application of the model to a real time series with numerical example is given indicating that the proposed methodology performs better than the Poisson and double Poisson model-based methods.

Autoregressive Conditional Heteroskedastic (ARCH) processes are used in finance to model asset price volatility over time. This book introduces both the theory and applications of ARCH models and provides the basic theoretical and empirical background, before proceeding to more advanced issues and applications. The Authors provide coverage of the recent developments in ARCH modelling which can be implemented using econometric software, model construction, fitting and forecasting and model evaluation and selection. Key

Features: Presents a comprehensive overview of both the theory and the practical applications of ARCH, an increasingly popular financial modelling technique. Assumes no prior knowledge of ARCH models; the basics such as model construction are introduced, before proceeding to more complex applications such as value-at-risk, option pricing and model evaluation. Uses empirical examples to demonstrate how the recent developments in ARCH can be implemented. Provides step-by-step instructive examples, using econometric software, such as Econometric Views and the G@RCH module for the Ox software package, used in Estimating and Forecasting ARCH Models. Accompanied by a CD-ROM containing links to the software as well as the datasets used in the examples. Aimed at readers wishing to gain an aptitude in the applications of financial econometric modelling with a focus on practical implementation, via applications to real data and via examples worked with econometrics packages.

Empirical Studies on Volatility in International Stock Markets describes the existing techniques for the measurement and estimation of volatility in international stock markets with emphasis on the SV model and its empirical application. Eugenie Hol develops various extensions of the SV model, which allow for additional variables in both the mean and the variance equation. In addition, the forecasting performance of SV models is compared not only to that of the well-established GARCH model but also to implied volatility and so-called realised volatility models which are based on intraday volatility measures. The intended readers are financial professionals who seek to obtain more accurate volatility forecasts and wish to gain insight about state-of-the-art volatility modelling techniques and their empirical value, and academic researchers and students who are interested in financial market volatility and want to obtain an updated overview of the various methods available in this area.

This thesis investigates the behavior of a class of Averaged Conditional Correlation [ACC] GARCH models proposed by Audrino & Barone-Adesi (2006) and their combinations with Functional Gradient Descent [FGD], proposed by Audrino & Bühlmann (2003). Their performance is compared against that of Constant Conditional Correlation [CCC] and Dynamic Conditional Correlation [DCC] GARCH. We seek to answer the question of whether ACC and FGD are appropriate models for volatility forecasting with respect to their applications in the financial industry. For this purpose, we propose an evaluation framework which focuses on "real-world" application. Essentially, we simulate a bank's global minimum variance portfolio which requires a certain amount of regulatory capital to be put aside each day. Furthermore, we propose a weighting scheme to objectively account for all evaluations in order to arrive at a versatile model. Empirical evidence is collected on the stocks prices of 16 companies quoted by the New York Stock Exchange. We confirm the findings of Audrino (2006), as the FGD proves to be highly important, especially when estimating SVaR where the training period tends to be very short and turbulent. In terms of final value in the

bank's portfolio simulation, TACC-FGD dominates all other remaining models. In some cases, CCC-FGD even enables constant conditional correlation specification to outperform the dynamic one (DCC). Weighting all the individual evaluations together, TACC-FGD demonstrates its versatility by achieving the highest overall score. In short, the ranking favours FGD, followed by Averaged Correlation models, DCC and finally the simplest specification, CCC.

This best-selling introduction to econometrics is specifically written for finance students. The new edition builds on the successful data- and problem-driven approach of the first edition, giving students the skills to estimate and interpret models while developing an intuitive grasp of underlying theoretical concepts.

While it is clear that the volatility of asset returns is serially correlated, there is no general agreement as to the most appropriate parametric model for characterizing this temporal dependence. In this paper, we propose a simple way of modeling financial market volatility using high frequency data. The method avoids using a tight parametric model, by instead simply fitting a long autoregression to log-squared, squared or absolute high frequency returns. This can either be estimated by the usual time domain method, or alternatively the autoregressive coefficients can be backed out from the smoothed periodogram estimate of the spectrum of log-squared, squared or absolute returns. We show how this approach can be used to construct volatility forecasts, which compare favorably with some leading alternatives in an out-of-sample forecasting exercise.