

# Introduction

On June 20–21, 2009 a large group of Rob Engle’s students, colleagues, friends, and close family members met in San Diego to celebrate his extraordinary career. This book contains 16 chapters written to honor Rob for that occasion.

Rob’s career spans several areas of economics, econometrics and finance. His Cornell Ph.D. thesis focused on temporal aggregation and dynamic macroeconometric models. As an assistant professor at MIT he began working in urban economics. In his long career at UCSD he continued his empirical work in macroeconomics and urban economics, and branched out into energy economics and finance, an interest that eventually led him to NYU’s Stern School of Business. His interest in applied problems and his original way of looking at them led Rob to develop econometric methods that have fundamentally changed empirical analysis in economics and finance. Along the way, Rob worked closely with scores of graduate students, fundamentally changing their lives for the better.

We have organized the contributions in the book to highlight many of the themes in Rob’s career. Appropriately, the book begins with Clive Granger’s history of econometrics at UCSD, tracing Clive’s arrival at UCSD and how he recruited a young Rob Engle to join him to build what ultimately became the dominant econometrics group of the late twentieth century. For those of us who were part of it (and, in one way or another that includes nearly every practicing econometrician of the time), this is an extraordinary story.

The next two contributions focus on urban economics and housing. Ed Coulson investigates the sources of metropolitan fluctuations in sectoral employment by studying various restrictions on VAR representations of stochastic processes describing national, local, and industry employment. Jim Stock and Mark Watson investigate sources of volatility changes in residential construction using 40 years of state building permit data and a dynamic factor model with stochastic volatility.

Of course, Rob’s most famous contribution to econometrics is the ARCH model, and the next five contributions focus on time-varying volatility. The empirical application in Rob’s original ARCH paper was to UK inflation uncertainty, and Gianna Boero, Jeremy Smith and Ken Wallis test the external validity of Rob’s conclusion by extending his 1958–77 sample through 2006. The ARCH class of models has subsequently found most widespread use in applications with financial data. However, Jim Hamilton shows that macroeconomists primarily interested in inference about the conditional mean rather than the conditional variance, still need to think about possible ARCH effects in the data. Further exploring the link between macroeconomics and finance, Frank Diebold and Kamil Yilmaz examine the cross-sectional relationship between stock market returns

and volatility and a host of macroeconomic fundamentals. The chapter by Ole Barndorff-Nielsen, Sinja Kinnebrock and Neil Shephard shows how the standard ARCH modeling framework may be enriched through the use of high-frequency intraday data and a new so-called realized semivariance measure for downside risk. Finally, Tim Bollerslev provides a glossary for the large number of models (and acronyms) that followed Rob's original ARCH formulation.

The next four chapters study various aspects of dynamic specification and forecasting that have interested Rob. David Hendry and Carlos Santos propose a test for "super exogeneity", a concept originally developed by Rob, David, and Jean-Francois Richard. Andrew Patton and Allan Timmermann discuss properties of optimal forecasts under general loss functions, and propose an interesting change of measure under which minimum mean square error forecast properties can be recovered. Gloria González-Rivera and Emre Yoldas develop a new set of specification tests for multivariate dynamic models based on the concept of autocontours. On comparing the fit of different multivariate ARCH models for a set of portfolio returns, they find that Rob's DCC model provides the best specification. This section is rounded out by Hal White, Tae-Hwan Kim, and Simone Manganelli who extend the CAViaR model to conditional quantiles that was originally proposed by Rob and Simone to simultaneously model multiple quantiles.

The final four chapters take up topics in finance. Luis Catão and Allan Timmermann study to what extent equity market volatility can be attributed to global, country-specific, and sector-specific shocks. Jacob Boudoukh, Christopher Downing, Matthew Richardson, and Richard Stanton explore the relationship between volatility and the term structure of interest rates. The continuous-time model developed in that chapter is quite general, but some of the ideas and empirical results are naturally related to Rob's original ARCH-M paper on time-varying risk premia in the term structure. The concept of risk-neutral distributions figures prominently in asset pricing finance as a way of valuing future risky payoffs and characterizing preferences toward risk, as exemplified in Rob's work with Josh Rosenberg. In his contribution to the volume, Stephen Figlewski provides an easy-to-follow step-by-step procedure for the construction of well-behaved empirical risk-neutral distributions. Rob has also been a leader in developing models to analyze intraday, high-frequency transactions data in financial markets. The last chapter by Taejin Kim and Jeffrey Russell proposes a new model for the minute-by-minute adjustments to the limit order book.

We thank the conference sponsors Duke University, the *Journal of Applied Econometrics*, Princeton University, the University of Chicago, and the University of California, San Diego. We thank all of the authors for their original contributions to this volume. More importantly, on behalf of the economics profession we thank Rob for his fundamental contributions to our field. Finally, at the end of the June 21st dinner, Rob was presented with a bronze oak tree with 77 leaves. Inscribed on each leaf was the name and thesis title of one of Rob's students. So most importantly, on behalf of all Rob's past, present and future students we say simply "Thanks for growing us."

Tim Bollerslev  
Jeffrey R. Russell  
Mark W. Watson

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