Dario Palumbo

CONTACT INFORMATION

Faculty of Economics
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Cambridge
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RESEARCH INTERESTS

Primary fields: Econometrics, Finance, Time Series, Term Structure, Credit.
Secondary fields: Empirical Finance, Volatility, Heavy Tailed Distributions.

DOCTORAL STUDIES

Ph.D. in Economics, University of Cambridge, 2014 to present

Thesis title: *"Essays on Term Structure and the Modeling of Financial Risks."*

Expected Completion Date: May 2019

Thesis Committee and References:

Prof. Andrew Harvey
University of Cambridge Faculty of Economics
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Prof. Alexei Ontskiy
University of Cambridge Faculty of Economics
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RESEARCH PAPERS

"Models for Realised Volatility" (joint with Profr. Andrew Harvey) **JOB MARKET PAPER**

Overview: This paper sets up a statistical framework for modeling daily realised volatility (RV) data using Dynamic Conditional Scores models. It shows how a simple two component DCS scale model can be used to model efficiently long memory in strictly positive and fat tailed time series like RV. This approach differs from the popular Heterogeneous Autoregression (HAR) model for volatility, which is based on simply modeling the RV through regressing its current value on its past daily value, its past 7 days average, and its past 30 days average (daily, weekly and monthly average respectively). Despite its good forecasting performance, the HAR model fails to capture features of the RV data series, like the fatness f the tails of its empirical distribution, which can have a huge impact on Risk Management applications. Fitting the two component specification with leverage is then carried out assuming that the data are conditionally generated by a Generalised Beta of the second kind (GB2) distribution. This is also equivalent to estimating a

model for logRV with an Exponential Generalised Beta of the second kind (EGB2) conditional distribution, of which the normal distribution is a limiting case. Moreover, given the sore's robustness to outliers, fittinch such a model allows to identify in the residuals correlation other characteristics of the data series, like the presence of a daily effects. In addition the analysis of log RV also indicates presence of heteroscedasticity in the residuals. Moreover the relationship between the GB2 and EGB2 distributions suggests that this heteroscedasticity may be due to a dynamic shape parameters of the GB2 distribution, which in the EGB2 governs the scale. The DCS model is extended to allow for this possibility. Ultimately the forecasting power of the DCS model is compared with the HAR revealing similar forecasting performance besides its higher descriptive power.

"Modelling and Extracting the Term Structure of Interest Rates: A Unifying Framework"

Overview: A dynamic model for the estimation and forecasting of the term structure of interest rates (or zero rates yield curve) directly from observed bond prices is introduced. This model, differently from other current dynamic term structure models, is developed around the idea of combining the extraction and forecasting of the term structure in a single inferential framework. A multivariate unobserved component (Structural Time series) model is constructed to model the unobserved term structure implied in prices of traded coupon bonds, trough targeting its exponential counterpart, the discount curve. The model provides a coherent description of the unobserved signal discount function through its fitting by B-Splines (like Bowsher and Meeks (2008) have used to model term structure data directly) as well as outperforming current term structure extraction methods in fitting the observed bond prices. This general framework allows for various specifications of the dynamics of the unobserved term structure, also allowing for the potential inclusion of additional components or explanatory variable to improve on the data description. A study of the forecasting performance of the model in comparison with other existing dynamic term structure models is also presented. This comparison is performed looking at the ability to forecast observed market bond prices. The study highlights a strong sensitivity of the forecasting performance of existing dynamic models to the choice of the term structure extraction method used to construct the sample for the estimation of the parameters. Moreover, the introduced model outperforms in forecasting existing term structure dynamic models at the one, six and twelve months ahead horizon.

"Extreme Events Occurrence and the Modeling of Dynamic Tail Indices"
Overview: The paper analyses how the occurrence of extreme events has changed over time in the stock and Credit Markets, with a particular focus on Equity Indexes and CDS. The paper proposes a model for dynamic tail index in returns data. The model is based on the DCS class and is based on a Generalised t family of conditional distributions, which nests as special cases t, Generalised Error Distribution (GED) and Normal. Moreover it allows for the presence of asymmetry and therefore the possibility of specifying a different dynamics for the left and right tail indices. In addition the paper introduces a testing technique based on the LM test to detect the presence of a time varying tail index but also an indication of the specification of its potential dynamics. From an empirical analysis on returns of Equity Indexes and CDS data it turns out that, differently from what noted in the literature, if present, time varying tail indices don't necessarily have a persistent dynamics but rather depends on the extent of the variation of the occurrence of extreme events over time. The analysis of Equity Indices rarely reveals a time varying dynamics at all, or if present their dynamics is either not persistent or close to a Moving Average. On the other hand, in the case of CDS, which are data series are highly not normal, the test identifies a very persistent dynamics which is more enhanced as the empirical distribution moves far from normality. Ultimately these implications are assessed in terms of Value at Risk, while comparing the proposed model with existing dynamic conditional scale models.

"Time Varying Correlation between Precious Metals and Exchange Rates" (joint with Dr. Soheil Mahmoodzadeh)

Overview: Considering the correlations between financial time series, specifically precious metals and major exchange rates, is of interest of investors who are managing their portfolio risk and hedging their investments against economic stress periods. The aim of this paper is to test whether the correlation of gold and silver against EUR/USD changes over time with a specific look at economic stress in the 2008 financial crisis. The data used in this study is the EBS limit order book including one level quote (best buy and sell) and deal records at the one-second frequency. The time period we analyse is the five-year period from January 2004 to December 2008. We have used a method which is based on a test for time-varying correlation. It is based on dynamic conditional score (DCS) models and provides a framework for testing for time-varying correlation. Through testing, the results show that short run variation is evident throughout, however, there is a clear shift in the level. For the full sample, there is strong evidence for time-varying correlation. A synthetic portfolio analysis between the assets is used to assess the impact of neglecting this time varying correlation on the overall diversification and return of the portfolio.

WORK IN PROGRESS	"Credit Spreads Modeling with Non Gaussian Distributions"
	"A Testing Strategy for Dynamic Conditional Score Models" (joint with Prof. Andrew Harvey)

EDUCATION

2013-2014	**University of Cambridge** – King's College, Cambridge, UK *Master of Philosophy in Finance and Economics*. Merit Combination of advance studies and research in Financial Econometrics and Mathematical Finance, with applications on Quantitative Trading. - Dissertation on Empirical Interest Rates Modelling, titled: *"Modelling and Forecasting the Breakeven Inflation using the Nominal and Real Yield Curves in a State Space Framework"*. Dissertation Supervisor: Prof. Andrew Harvey.
2011-2013	**London School of Economics** – London, UK *Master of Science in Applicable Mathematics*. Pass A course on Mathematical Modelling with applications in Finance based on Probability, Programming, Derivatives and Fixed Income Markets. - Dissertation on Dye's Management Disclosure Theory, titled: *"Multi-Signal Voluntary Disclosure Under Uncertainty"*. Dissertation Supervisor: Prof. Adam Ostaszewski.
2008-2011	**University of York** – York,UK *Bachelor of Science in Mathematics with Economics*. First Class with Honors Quantitative course based on foundations of Economic Theory and Mathematical Finance.
2007-2008	**Università Federico II** – Napoli, Italy *Bachelor of Science: Economics of Firms and Markets*. Average: 29.3/30 Course focused mainly on Accountancy, Financial Markets, and Economic Theory.

CURRENT ACCADEMIC POSITIONS

2018-2019 **Director of Studies, Queens College** - Cambridge, UK
Supervised the academic development of undergraduates students in Economics for the college. Organised and sourced lecturers to teach the college supervision classes in the economics modules across the three years. Assessed candidates to read economics BA degree and conducted admission interviews.

2016-2019 **Bye-Fellow in Economics, Homerton College** - Cambridge, UK
Taught mathematics, statistics and econometrics for Part I and Part IIA economists. Assessed candidates to read economics BA degree and conducted admission interviews; Advised and examined a number of dissertations in empirical finance and econometrics, across Cambridge colleges (undergraduate and MPhil level). Run a Pre-sessional Mathematics course for the incoming first year students in Economics.

2015-2019 **TA in Finance, Faculty of Economics** - University of Cambridge, Cambridge, UK
Teaching Assistant for the F100 and F200 Finance module for the MPhil in Finance and Economics. Run workshops, marked courseworks and examinations.

2016-2019 **TA in Time Series, Faculty of Economics** - University of Cambridge, Cambridge, UK
Teaching Assistant in R301 Econometric II module (Time Series Component) for all MPhil Economics, MPhil Economic Research and MPhil Finance & Economics students. Run workshops, marked courseworks and examinations.

2014-2019 **College Supervisor, University of Cambridge** - Cambridge, UK
Supervised undergraduate Economics students in Part I: Paper 1 (Microconomics I), Paper 2 (Macreconomics I), Paper 3 (Quantitative Methods in Economics), Part IIA: Paper 3 (Theory and Practice of Eonometrics I) and 6 (Mathematics and Statistics for Economics), Part IIB: Paper 10 (Theory and Practice of Econometrics II), Paper 6 (Banking and Finance). Prepared and Marked Mock Exams and courseworks. Run Supervision and Revision Classes.

PAST ACCADEMIC POSITIONS

2017-2018 **TA in Advanced Derivatives, Judge Business School** - University of Cambridge, Cambridge, UK
Teaching Assistant for the Introduction to Derivatives module for the Master of Finance course (Michelmas).

2015-2016 **TA in Asset Pricing, Faculty of Economics** - University of Cambridge, Cambridge, UK
Teaching Assistant for the F400 Asset Pricing module for all MPhil Economics, MPhil Economic Research and MPhil Finance & Economics students. Run workshops, marked courseworks and examinations.

INDUSTRY POSITIONS	
2011-2013	**Flow Sales Analyst, FI Flow Rates, Royal Bank of Scotland M&IB** – London, UK.
	Covering Italian Banks, Insurance companies and Asset Managers. Trading for clients Euro Sovereign & Covered Bonds on primary and secondary markets. Collecting orders for primary issues of Covered and Government Guaranteed bonds as well as for other securities in European and US Auctions.
2011	**Structured Sales Analyst, FI Flow Rates, Royal Bank of Scotland M&IB** – London, UK.
	Development and pricing of structured derivatives with the Structured Solution team. Traded structured derivatives with an Italian Banks, Italian Regional Institutions and Supranational Banks.
2010	**Structured Sales Summer Internship, FI Flow Rates, Royal Bank of Scotland M&IB** – London, UK
	3-month rotational program within sales, trading, structuring and research. Working for Structured Solution sales teams in rates and credit. Pricing derivative products.

HONORS AND AWARDS	• Awarded King's College Benefactor's Studentship. • Awarded top student in Mathematics with Economics at University of York.

CONFERENCES, WORKSHOPS, SEMINARS	
2018	• University of Cambridge (Econometric Seminar) • Queen Mary University, London (Econometrics and Finance Workshop) • 4th ICNTEF Conference, Saint Petersbourg, Russia (4th Conference in New Trends in Econometrics and Finance)
2017	• University of Cambridge (Econometric Seminar) • University of Minho, Braga, Portugal (5th PhD Workshop in Economics) • University of Lisbon, Lisbon, Portugal (Econometrics Seminar)
2016	• University of Cambridge (Econometric Seminar, INET Empirical Finance Reading Group, INET Panel Data Workshop, INET INET/Cemmap Econometric Methods Symposium) • University of Minho, Braga, Portugal (4th PhD Workshop in Economics) • University of Louvaine, Louvaine, Belgium (CEMS PhD Courses on Term Structure Models and the Zero Lower Bound, Empirical Finance Workshop).
2015	• University of Cambridge (Econometric Seminar, INET Workshop on Microstructure Theory and Application, INET Big Data Methods Workshop, INET Econometrics of Networks Workshop)

	- University of Minho, Braga, Portugal (3rd PhD Workshop in Economics, 12th NIPE Summer School on "Predictive Econometric Modeling with Applications to Financial Economics, Macroeconomics, and the Interface")
SKILLS	- **Languages**. Italian Native Speaker. Fluent in English (written and spoken). Beginner in Spanish. - **IT**. Proficient in Microsoft Office (Word, Excel, PowerPoint, Access), Matlab, R, Maple11, Java, C++, Bloomberg, Reuters.
HOBBIES AND SPORTS	- **Fencing**. Fellow of Italian Fencing Federation and Cambridge University Fencing Club. - **Debating**. Experienced debater and ex-member of the York Debating Society and Cambridge Union. - **Music**. Professional Classical and Jazz guitar player. - **Sommelier.** Certified sommelier of 1st level, Associazione Italiana Sommelier (Italian Sommelier Association).