Guillaume Roussellet

Main Affiliation

NYU Stern School of Business
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Research Interests

Yield curve modeling, asset and derivative pricing, financial econometrics, non-linear filtering and factor models, monetary policy and macrofinance.

Appointment

2015 - 2017 **NYU Stern School of Business - Volatility Institute**, New York, U.S.

Post-doctoral researcher
Supervisor - Robert Engle

Education

Spring 2015 **NYU Stern School of Business - Economics department**, New York, U.S.

Visiting Scholar
Sponsor - David Backus

2012 - 2015 **University Paris-Dauphine, CREST, and Banque de France**, Paris, France

Ph.D. in Applied Mathematics (Econometrics)
Dissertation: "*Non-Negativity and Zero Lower Bound in Affine Yield Curve Models*"
Committee: Alain Monfort (supervisor), Christian Gouriéroux, Éric Renault, Olivier Scaillet, Nour Meddahi, Serge Darolles.

2011 - 2012 **Paris School of Economics**, Paris, France

M.Sc in Economics

2009 - 2012 **ENSAE - Paristech**, Malakoff, France

B.Sc, M.Sc in Economics, Statistics and Econometrics

2007 - 2009 **Lycée Lakanal**, Sceaux, France

Classes Préparatoires - Humanities and Social Sciences (B/L)

Professional and Research Experience

Summer 2012 **Banque de France**, Paris, France

Intern in yield curve modeling

Summer 2011 **CEPII research center**, Paris, France

Research assistant: Assessing Fiscal Sustainability in the Presence of Systemic Banks

Summer 2010 **French Treasury Department, Ministry of Finance**, Paris, France

Intern in forecasting aggregate dividends in national accounts

Job Market Paper

Affine Term Structure Modeling and Macroeconomic Risks at the Zero Lower Bound

- *Abstract:* We propose the first affine term structure model capturing the joint dynamics of macroeconomic variables and the yield curve while being consistent with the zero lower bound. The short-rate dynamics, constituting the main novelty of our framework, is given by a gamma-zero distribution whose shape depends on a quadratic combination of a Gaussian vector gathering macroeconomic and yield-specific risk factors. As a result our model-implied short-rate has a lower bound that it can reach and stay at for a certain length, which depends on macroeconomic shocks. Under a standard pricing kernel specification, we show that both physical and pricing dynamics are affine so the levels and forecasts of interest rates at all maturities are closed-form functions of the yield factors and the macroeconomy. We provide an empirical application investigating the pricing of inflation risks in nominal and real term structures of U.S. rates. Our model is able to reproduce the time-series properties, moments, and expected excess returns of both yield curves with only three latent factors. We show that the short-term inflation risk premium becomes highly negative during the crisis reflecting high deflation fears. As a consequence staying at the zero lower bound is perceived as beneficial and raising interest rates too soon is shown to be detrimental for both the real economy and investors' utility.

Papers

Staying at Zero with Affine Processes: An Application to Term Structure Modeling (with Alain Monfort, Fulvio Pegoraro and Jean-Paul Renne),

▶ *Forthcoming in the Journal of Econometrics*

- *Abstract:* We build an Affine Term Structure Model that provides non-negative yields at any maturity and that is able to accommodate a short-term rate that stays at the zero lower bound (ZLB) for extended periods of time while longer-term rates feature high volatilities. We introduce these features through a new univariate non-negative affine process called ARG-Zero, and its multivariate affine counterpart (VARG), entailing conditional distributions with zero-point masses. The affine property of this new class of processes implies both explicit bond pricing and quasi-explicit lift-off probability formulas. We provide an empirical application to Japanese Government Bond (JGB) yields, observed weekly from June 1995 to May 2014 with maturities from six months to ten years. Our four-factor specification is able to closely match yield levels and to capture conditional yield variances.

A Quadratic Kalman Filter [code] (with Alain Monfort and Jean-Paul Renne),

▶ *Journal of Econometrics - Volume 187, Issue 1, July 2015, Pages 43–56.*

- *Abstract:* We propose a new filtering and smoothing technique for non-linear state-space models. Observed variables are quadratic functions of latent factors following a Gaussian VAR. Stacking the vector of factors with its vectorized outer-product, we form an augmented state vector whose first two conditional moments are known in closed-form. We also provide analytical formulae for the unconditional moments of this augmented vector. Our new Quadratic Kalman Filter (Qkf) exploits these properties to formulate fast and simple filtering and smoothing algorithms. A simulation study first emphasizes that the Qkf outperforms the extended and unscented approaches in the filtering exercise showing up to 70% RMSEs improvement of filtered values. Second, it provides evidence that Qkf-based maximum-likelihood estimates of model parameters always possess lower bias or lower RMSEs than the alternative estimators.

Credit and Liquidity in Interbank Rates: A Quadratic Approach (with Simon Dubecq, Alain Monfort and Jean-Paul Renne),

▶ *Journal of Banking and Finance - Volume 68, July 2016, Pages 29-46.*

- *Abstract:* A bank that lends on the unsecured market requires compensations for facing the default risk of the borrowing bank (credit risk) and the risk associated to its own future funding needs (liquidity risk). In this paper, we propose a quadratic term-structure model of the spreads between unsecured and risk-free interbank rates. Our no-arbitrage econometric framework allows us to decompose the term structure of spreads into credit and liquidity components and to identify risk premia associated with each of these two risks. Our results suggest that, over the period 2012–2013, most of the reduction in interbank spreads comes from a decrease in liquidity-related risk components.

Scenario Generation For Long-Run Interest Rate Risk Assessment (with Robert Engle and Emil Siriwardane)

▶ *Revise and Resubmit in the Journal of Econometrics, 2016.*

- *Abstract:* We propose a statistical model of the term structure of sovereign yields tailored for long-term probability-based scenario generation and forecasts. While being simple to estimate, our model is able to reproduce simultaneously the positivity of the yield curve, high persistence, factor structure and time varying volatilities and correlations. It features a regime switching short rate model. A complete benchmark of the model following Diebold and Li is performed in terms of forecasting ability and coverage properties. We show that the proposed model improves performance relative to a standard model from the literature.

Other Published Works and Working Papers

Fiscal Sustainability in the Presence of Systemic Banks: The Case of EU Countries (with Agnès Bénassy-Quéré),

▶ *International Tax and Public Finance - Volume 21, Issue 3, June 2014, Pages 436-467.*

Affine Modeling of Credit Risk, Credit Event and Contagion (with Alain Monfort, Fulvio Pegoraro and Jean-Paul Renne),

▶ *Work in progress.*

Hedge Fund Portfolio Management with Illiquid Assets (with Serge Darolles),

▶ *Work in progress.*

Seminar and Conference Presentations

2016 *Conferences* - 9^{th} Annual Conference of the Society for Financial Econometrics (SoFiE), Barcelona Graduate School of Economics Time-Series workshop, 69^{th} European Summer Meeting of the Econometric Society (Esem), 3^{rd} European Econometric Society Winter Meeting.

Seminars - Bank of Canada, Laval University, NYU Stern (Qfe).

2015 *Conferences* - North American Winter Meeting of the Econometric Society (Nawm), 7^{th} Annual Conference of the Volatility Institute, World Congress of the Econometric Society (Eswc), Banque de France workshop on *Modeling the term structure at the ZLB*, Computational and Financial Econometrics Conference (Cfe).

Seminars - Brown University, Crest, Banque de France.

2014 *Conferences* - 7^{th} International Risk Forum on Big Data, 31^{st} Spring International Conference of the French Finance Association (AFFI), 7^{th} Annual Conference of the Society for Financial Econometrics (SOFIE), 20^{th} International Conference on Computing in Economics and Finance (CEF), 1^{st} Conference of the International Association for Applied Econometrics (IAAE), 21^{st} International Conference on Computational Statistics (COMPSTAT), 29^{th} European Summer Meeting of the Econometric Society (ESEM).

Seminars - Banque de France Seminar, University of Lugano, Bank of Canada, University of Geneva.

2013 *Conferences* - 6^{th} International Risk Forum on Liquidity Risk, French Association of Economics Conference (AFSE), 30^{th} Spring International Conference of the French Finance Association (AFFI), European Central Bank Workshop on Non-conventional Monetary Policy, North-American Summer Meeting of the Econometric Society (NASM), 28^{th} European Summer Meeting of the Econometric Society (ESEM), Computational and Financial Econometrics Conference (CFE).

Seminars - Banque de France.

Discussions in Academic Conferences

2016 European Finance Association (EFA)
2015 Banque de France Workshop on *Term Structure Modeling and the Zero Lower Bound*
2014 31^{th} Spring International Conference of the French Finance Association (AFFI)
2013 30^{th} Spring International Conference of the French Finance Association (AFFI)

Referee Activity

Economics Letters, Journal of Banking and Finance.

Grants and Awards

2015 2-year NYU-Stern Volatility Institute fellowship
2012 3-year Banque de France Fellowship
2012 CREST Fellowship

Teaching

2013 - 2015 Portfolio Management, MBA – Université Dauphine, Bärchen
2013 - 2015 Financial Econometrics, Graduate (TA) – ENSAE-Paristech
2013 - 2015 Time Series Econometrics, Graduate (TA) – ENSAE-Paristech
2012 - 2013 Macroeconomics, Undergraduate (TA) – Paris I Sorbonne University

References

Prof. Robert Engle (chair)
NYU Stern School of Business,
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Prof. Alain Monfort
CREST,
15 Boulevard Gabriel Péri, office 1121,
Malakoff, 92245, France
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Phone: +33 1 41 17 77 28

Prof. Olivier Scaillet
University of Geneva and SFI,
GFRI UNI MAIL, Bd du Pont d'Arve 40,
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Prof. Andrew Patton
Duke University,
213 Social Sciences Building, Box 90097
Durham, NC 27708-0097, USA
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Languages and Skills

Languages	French (native), English (fluent), German (intermediate), Chinese (notions).
Computer	C++, R, Scilab, Matlab, Stata, Eviews, SAS, Mathematica, Python, MS Office, LaTeX

Personal Interests

Music (19 years of trumpet in Conservatory and orchestra/big band), Swing dancing, History, Classical Literature, Sports, Travel.

Last update: September, 2016