

CURRICULUM VITAE PETER SCHOTMAN

(January 2023)

BIO

Peter Schotman is Professor of Empirical Finance at the School of Business and Economics of Maastricht University and research fellow of the Network for Studies on Pensions, Aging and Retirement (Netspar) in the Netherlands. He studied econometrics at Erasmus University Rotterdam, where he also obtained his PhD at the Econometric Institute. He has published on many topics in pensions and financial econometrics. Most of his research is related to long-term savings, investments for retirement provision, risk attitudes, and interest rate risk. Next to his academic research he worked as an advisor for Dutch pension funds. Within the Netspar community he has collaborated with pension professionals on industry studies on pension schemes, portfolio choice and risk management. He teaches regular courses on portfolio management, empirical asset pricing, business analytics, and statistical methods. For financial professionals he has taught course modules on financial performance evaluation, long-term risks, model uncertainty, interest rate risk, and machine learning.

PERSONAL

Name	Pieter Cornelis (Peter) Schotman
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EDUCATION

1989	PhD at Erasmus University Rotterdam: <i>Empirical Studies on the Behaviour of Interest Rates and Exchange Rates</i> ; Supervisors: Eduard Bomhoff and Teun Kloek
1984	Master (drs.) degree in econometrics, Erasmus University Rotterdam

EMPLOYMENT

1994 – present	Full Professor at Maastricht University (UM)
1991 – 1993	Associate Professor at UM
1984 – 1990	Assistant Professor at Erasmus University Rotterdam
1981 – 1984	Research and Teaching Assistant at Erasmus University
1980 – 1981	Research Assistant at the Netherlands Economic Institute

VISITING POSITIONS

Jan – June 2018	Visiting professor at Swedish House of Finance, Stockholm School of Economics
Aug 2008 – June 2009	“Hans Dalborg” professor at the Swedish Institute for Financial Research (SIFR), Stockholm School of Economics
Sept 2004	Visitor at SIFR
Sept 2001 – June 2002	Visiting professor at the Stockholm School of Economics
Spring 1997	Visiting professor at GREQAM (Université Marseille-Aix), sponsored by the EU program Human Capital and Mobility
Spring 1996	Visiting professor at GREQAM (Université Marseille-Aix), sponsored by the EU program Human Capital and Mobility
May – July 1993	Visitor at the Institute of Empirical Macroeconomics (Federal Reserve Bank of Minneapolis and the University of Minnesota)
Jan - June 1992	Visiting associate professor of Public and International Affairs at the Woodrow Wilson School, Princeton University
May - August 1990	Visitor at the Institute of Empirical Macroeconomics (Federal Reserve Bank of Minneapolis and the University of Minnesota)

TEACHING

Portfolio of courses taught at different places at different levels in different years. Current courses at UM in *italics*.

Undergraduate	<i>Investment analysis and portfolio management</i> (UM) <i>Skills lab data science</i> (UM) Introductory corporate finance (UM) Financial management (UM) Econometric methods (Erasmus University) Skills lab econometric software (Erasmus) Macroeconomics (Erasmus)
Master level	<i>Empirical asset pricing</i> (UM) Asset pricing (Stockholm School of Economics) Econometrics (Erasmus, Princeton University) Options (UM) <i>Supervision of master theses</i>
PhD	<i>Multivariate methods in empirical analysis</i> (UM) Factor models in asset pricing (Stockholm School of Economics) Asset pricing (UM, NAKE = Dutch network of doctoral education in economics) Empirical asset pricing (UM, NAKE) Term structure of interest rates (UM) Vector autoregressions (Marseille)
Professional	Big data methods in asset pricing (for Fidelity Netherlands) Asset liability management (UM) Investments (for 'Actuarieel Genootschap', the Dutch association of actuaries) Financial econometrics (at ABP, the largest Dutch pension fund) Risk management for pension plans (Netspar) Model uncertainty (for VBA, the Dutch Association of Investment Professionals)

RESEARCH

Current interests	Pension economics and finance Term structure of interest rates Machine Learning Model uncertainty
Older research topics	Volatility models; Long-run risk; Risk management in incomplete markets; Household financial decisions; Portfolio management; Panel data econometrics for asset returns; Mortgages and fixed income derivatives; Measuring risk attitudes; Performance measurement of managed portfolios; International finance and exchange rates; Bayesian econometrics; Unit roots and cointegration; Non-linear dynamics; Flexibility of wages and labor market frictions; Hedonic price indices for real estate

PHD SUPERVISION (PROMOTOR, MAIN SUPERVISOR)

Current

- Hugo Schyns, Machine learning applications in finance
- Yixuan Ma, Heterogenous groups and collective investments

Completed

- Rasmus Lönn (2019) High-dimensional asset pricing and portfolio optimization
- Alessandro Pollastri (2018) Tales on tails
- Anna Wisniewska (2016) Essays on long-run risk

- Mukul Tyagi (2016) Risk in pension plans
- Rogier Quaadvlieg (2016) Risk and uncertainty
- Anne Balter (2016) Model uncertainty: The effect on robustness, estimation and stochastic optimisation
- Sally Shen (2015) Robust asset allocation in incomplete markets
- Bart Diris (2011) Strategic asset allocation: The effect of uncertainty on portfolio choice
- Daniela Osterrieder (2011) Persistent risk factors in financial Markets
- Kathrin Nies (2011) Individuals' paths to retirement
- Mathijs Cosemans (2010) Risk and returns dynamics
- Rik Frehen (2010) Financial risk management: From a global to an individual perspective
- Roy Hoevenaars (2008) Strategic asset allocation and asset liability management
- Boris Pavlov (2006) Panel structures in financial enigmas
- Bart Kuijpers (2004) Mortgage valuation and the term structure of interest rates
- Bart Frijns (2004) Stock price dynamics and volatility: a high frequency data perspective
- Frank Lutgens (2004) Robust portfolio optimization
- Mark Schweitzer (2000) Performance measurement of mutual funds and pension funds
- Dennis Bams (1999) The term structure of interest rates: a panel data approach
- Stefan Straetmans (1998) Extreme financial returns and their comovements
- Arjan van Bussel (1998) Valuation and interest rate risk of mortgages in the Netherlands
- Ronald Mahieu (1995) Financial market volatility

RESEARCH GRANTS

- NETSPAR (Network for Studies on Pensions, Aging and Retirement):
 - Collective investments for heterogeneous groups of individuals, 2022-2024, funding for PhD
 - "Robust models for Supervision", 2013 – 2015, funding for PhD and senior researcher
 - "Balance sheet management", 2010-2012, funding for PhD, post-doc and senior researcher
 - "Private retirement provision", 2006-2009, funding for PhD and tenure track position
 - funding for PhD project, paying for salary for Ph.D student plus costs for data and conference visits, 2006-2009
 - 20% of full professor position, 2005-2016
 - "Vormgeving van de variabele uitkering en garanties in persoonlijk pensioen" (Variable annuities with guarantees), k€20
 - "Beschermingsrendementen en toedeling overrendementen" (Hedge returns and allocation of collective return), k€10
- NWO (= Dutch Science Foundation): funding for PhD projects, paying for salary for PhD student plus costs for data and conference visits
 - Model Uncertainty, 2012
 - Performance of strategic asset allocations, 2009
 - Long run investments with persistent risk factors, 2004
 - Quantification and evaluation of financial market risks, 1998
 - Non-linear dynamics of the term structure, 1995
 - Term structure models in international finance, 1987
- ABP (Algemeen Burgerlijk Pensioenfonds; the largest Dutch pension fund): funding for PhD project, paying for salary for PhD student plus costs for data and conference visits, 2001-2004
- APG (All Pensions Group), Model validation, k€ 20, 2014, 2019
- GRI (Global Risk Institute), CAN\$ 60,400 for research on effects of low interest rates for pension plans, 2015
- BSI-GAMMA grant of \$10,000 for pension research, 2007
- INQUIRE Europe grants:
 - Model uncertainty, k€ 5, 2013
 - Beta risk estimates, k€ 10, 2008
 - Robust mean variance portfolio choice, k€ 10, 2004
 - Capital market integration in Europe, North America and the Pacific Rim Area, HFL 8,500, 1992.
- BAC, a Belgian Savings Bank, 15,000 ECU, prize award for dissertation, 1990.

PROFESSIONAL ACTIVITIES

- Member of Netspar editorial board, since 2008
- Conference organisation:

- ESOBE (European Seminar on Bayesian Econometrics) annual conference, Maastricht, 25-27 Oct 2017, co-chair (with Nalan Baştürk)
- Netspar international pension workshop, Leiden, Jan 27-29 2016 and Jan 18-20 2017, co-chair (with Marike Knoef)
- Netspar pension workshops, Maastricht (2012, 2010, 2006)
- Netspar-SIFR conference on Pension Plans and Product Design, Stockholm, June 8-9, 2009 (with Magnus Dahlquist and Frank de Jong)
- European Finance Association Annual Meeting, Maastricht, August 18-21, 2004, co-chair program committee and local organisation (with Christian Wolff)
- Member of program committee for annual conferences of the Econometric Society European Meeting, European Finance Association, and Society for Financial Econometrics (SOFIE) (various years)
- Two-day international workshop “Financial Econometrics” at Maastricht University, Dec 1995.
- Associate editor for:
 - Journal of Empirical Finance, 1992 - 2011
 - Journal of Financial Econometrics, 2000 – 2015
- Member of the Academic Advisory Board of ABP (Algemeen Burgerlijk Pensioenfonds), 2001 – 2008
- External member of dissertation evaluation committees
 - many at Dutch universities (Erasmus University Rotterdam, Tilburg University, University of Amsterdam, Free University Amsterdam, Radboud University Nijmegen, University of Groningen)
 - some international: IDEI Toulouse, KU Leuven, Aarhus School of Management, Aarhus University, Stockholm School of Economics, Antwerp Management School, UNSW Sydney
- Consultant for externally funded research projects of LIFE (Limburg Institute of Financial Economics), since 1993
- Referee for international journals, among others: American Economic Review, European Economic Review, Econometrica, Econometric Theory, Economic Journal, Journal of Econometrics, Journal of Applied Econometrics, Journal of Banking and Finance, Journal of Business and Economic Statistics, Journal of Finance, Journal of Financial Markets, Journal of International Economics, Journal of International Money and Finance, Review of Economics and Statistics, Review of Economic Studies, Review of Financial Studies
- Fellowships
 - Research Fellow of GSBE (Graduate School of Business and Economics, formerly known as METEOR), since 1997
 - Fellow of CEPR (Center for Economic Policy Research), 1996-2016
 - Senior researcher, Netspar (Network for Studies on Pensions, Aging and Retirement), since 2005

ADMINISTRATION

At the School of Business and Economics of Maastricht University:

- Vice-dean, 1998-2001, 2005-2008, and 2015-2017
- Associate dean research, 2014-2017
- Scientific director of the Graduate School, 2005-2007
- Board member of the Graduate School, 1998-2001, 2007-2008, 2009-2011
- Board member of LIBER (Limburg Institute for Business and Economic Research), the contract research foundation of the School of Business and Economics, 2000-2001, 2005-2008, and 2014-2017
- Head of Department, Department of Finance, 2002-2005
- Research director for Econometrics, Finance and Monetary Economics, 2009-2011
- Member of faculty committee on ICT and computing facilities, 1991-2001
- Program director for research master program Economic and Financial Research, 2009-2011
- Founding member of program committee for Bsc Business Analytics, since 2019
- Founding member of program committee for Msc Financial Economics, 2003-2006
- Founding member of education committee of the Econometrics program, 1994-1998
- Member of evaluation committee of Problem-Based Learning in the economics curriculum, 1991
- Member of various search and advisory committees for full professor appointments, since 1999
- Member of recruitment committee for Finance department, various years since 2004
- (co-)Organiser of faculty seminar series, 1993-1995

Within Netspar (NETwork for Studies on Pensions, Aging and Retirement):

- Member of Foundation Council ("Stichtingsraad"), since 2016
- Theme coordinator Balance Sheet Management, 2010–2012
- Theme coordinator Private Retirement Provision, 2006–2009
- Member of Netspar-UMBS Academy supervisory board, 2006–2011
- Research coordinator Finance, 2005

Other

- External adviser to the dean on faculty promotions at a leading European research university, 2015, 2017
- Member of NVAO (= Nederlands-Vlaamse Accreditatieorganisatie) expert team for accreditation of new master programs in finance, 2013, 2014
- Chair of NVAO expert team for continued accreditation of Bsc and Msc programs in Economics, 2022.

PUBLICATIONS

Current working papers

A Neural Network with shared dynamics for multi-step prediction of Value-at-Risk and volatility (with Nalan Baştürk and Hugo Schyns), January 2022

Empirical asset pricing with many assets and short time series (with Rasmus Lönn), October 2018, revised December 2022

Annual VaR from high-frequency data (with Alessandro Pollastri), August 2018

Asset allocation dynamics of pension funds (with Dennis Bams and Mukul Tyagi), September 2015

Pension fund asset allocation in a low interest rate environment (with Dennis Bams and Mukul Tyagi), November 2015

Optimal risk sharing in a collective defined contribution pension system (with Dennis Bams and Mukul Tyagi), July 2015

Published in international journals

Hedging long-term liabilities, *Journal of Financial Econometrics* 20, 505-538, 2022 (with Rogier Quaadvlieg)

What does a term structure model imply about very long-term discount rates? *Journal of Empirical Finance* 62, 202-219, 2021 (with Anne Balter and Antoon Pelsser)

Robust long-term interest rate risk hedging in incomplete bond markets, *Journal of Pension Economics and Finance* 20, 273-300, 2021 (with Antoon Pelsser and Sally Shen)

Robust hedging in incomplete markets, *Journal of Pension Economics and Finance* 18, 473-493, 2019 (with Antoon Pelsser and Sally Shen)

The volatility of long-term bond returns: Persistent interest shocks and time-varying risk premiums, *Review of Economics and Statistics* 99, 884-895, 2017 (with Daniela Osterrieder)

Estimating security betas using prior information based on firm fundamentals, *Review of Financial Studies* 29, 1072-1112, 2016 (with Mathijs Cosemans, Rik Frehen and Rob Bauer)

Long-term strategic asset allocation: an out-of-sample evaluation, *Management Science* 61, 2185-2202, 2015 (with Bart Diris and Franz Palm)

Strategic asset allocation for long-term investors: parameter uncertainty and prior information, *Journal of Applied Econometrics* 29, 353-376, 2014 (with Roy Hoevenaars, Roderick Molenaar and Tom Steenkamp)

Robust portfolio optimization with multiple experts, *Review of Finance* 14, 343-383, 2010 (with Frank Lutgens)

Conditional asset pricing and stock market anomalies in Europe, *European Financial Management* 16, 165-190, 2010 (with Rob Bauer and Mathijs Cosemans)

Price discovery in fragmented markets, *Journal of Financial Econometrics* 8, 1-28, 2010 (with Frank de Jong)

Price discovery in tick time, *Journal of Empirical Finance* 16, 759-776, 2009 (with Bart Frijns)

Long memory and the term structure of risk, *Journal of Financial Econometrics* 6, 459-495, 2008 (with Rolf Tschernig and Jan Budek)

Regret aversion and annuity risk in defined contribution plans, *Insurance: Mathematics and Economics* 42, 1050-1061, 2008 (with Rik Frehen, Roy Hoevenaars and Franz Palm)

- Strategic asset allocation with liabilities: beyond stocks and bonds, *Journal of Economic Dynamics and Control* 32, 2939–2970, 2008 (with Roy Hoevenaars, Roderick Molenaar and Tom Steenkamp)
- Optimal prepayment of Dutch mortgages, *Statistica Neerlandica* 61, 137–155, 2007 (with Bart Kuijpers)
- Non-synchronous trading and testing for market integration in Central European emerging markets, *Journal of Empirical Finance* 13, 462–494, 2006 (with Ania Zalewska)
- Nonlinear dynamics in Nasdaq dealer quotes, *Computational Statistics and Data Analysis* 51, 2246–2266, 2006 (with Bart Frijns)
- Direct estimation of the risk neutral factor dynamics of affine term structure models, *Journal of Econometrics* 117, 179–206, 2003 (with Dennis Bams)
- The cost of capital in international financial markets: local versus global beta, *Journal of International Money and Finance* 21, 905–929, 2002 (with Mathijs van Dijk, Kees Koedijk and Clemens Kool)
- When unit roots matter: excess sensitivity and excess smoothness of long-term interest rates, *Journal of Empirical Finance* 8, 669–694, 2001
- Measuring risk attitudes in a natural experiment: an empirical analysis of the television game show LINGO, *Economic Journal* 111, 821–848, 2001 (with Roel Beetsma)
- Horizon sensitivity of the inflation hedge of stocks, *Journal of Empirical Finance* 7, 301–315, 2000 (with Mark Schweitzer)
- An empirical application of stochastic volatility models, *Journal of Applied Econometrics* 13, 333–360, 1998 (with Ronald Mahieu)
- The re-emergence of PPP in the nineties, *Journal of International Money and Finance* 17, 51–61, 1998 (with Kees Koedijk and Mathijs van Dijk)
- Price discovery in the foreign exchange market: an empirical analysis of the yen/dmark rate, *Journal of International Money and Finance* 17, 5–27, 1998 (with Frank de Jong and Ronald Mahieu)
- Small sample properties of the regression test of the expectations model of the term structure, *Economics Letters* 57, 129–134, 1997
- The dynamics of short term interest rate volatility reconsidered, *European Finance Review* 1, 105–130, 1997 (with Francois Nissen, Kees Koedijk and Christian Wolff)
- Nonlinear interest rate dynamics and implications for the term structure, *Journal of Econometrics* 74, 149–176, 1996 (with Gerard Pfann and Rolf Tschernig)
- A Bayesian approach to the empirical valuation of bond options, *Journal of Econometrics* 75, 183–215, 1996
- Priors for the AR(1) model, *Econometric Theory* 10, 579–595, 1994
- Neglected common factors in exchange rate volatility, *Journal of Empirical Finance* 1, 279–311, 1994 (with Ronald Mahieu)
- Cross sectional versus time series estimation of term structure models: empirical results for the Dutch bond markets, *Journal of Banking and Finance* 18, 997–1024, 1994 (with Jeroen de Munnik)
- Range vs Maximum in the OLS-Based Version of the CUSUM-Test, *Economics Letters* 40, 379–381, 1993 (with W. Krämer)
- Posterior analysis of possibly integrated time series with an application to real GNP, in: P. Caines, J. Geweke and M. Taqqu (eds.), *New Directions in Time Series Analysis, Part II*, Springer Verlag (Berlin), 1992 (with Herman van Dijk)
- On Bayesian routes to unit roots, *Journal of Applied Econometrics* 6, 387–401, 1991 (with Herman van Dijk)
- A Bayesian analysis of the unit root in real exchange rates, *Journal of Econometrics* 49, 195–238, 1991 (with Herman van Dijk)
- How to beat the random walk: an empirical model of real exchange rates, *Journal of International Economics* 29, 311–322, 1990 (with Kees Koedijk)
- Dominant real exchange rate movements, *Journal of International Money and Finance* 8, 517–531, 1989 (with Kees Koedijk)
- The term structure in the U.S., Japan, and West Germany, *Carnegie Rochester Conference Series on Public Policy* 28, 269–319, 1988 (with Eduard Bomhoff)
- Professional publications (many in Dutch)*
- Een reële oriëntatie van het nieuwe pensioencontract, Netspar Design Paper 205, 2022 (with Rens van Gastel, Niels Kortleve and Theo Nijman)

Doorbeleggen met garanties?, Netspar Design Paper 153, 2020 (with Roderick Molenaar, Mark Irwin and Peter Dekkers)

Default life-cycles for retirement savings, Netspar Design Paper 70, 2017 (with Anna Grebentchikova, Roderick Molenaar and Bas Werker)

Interest rate models for pension and insurance regulation, Netspar Design Paper 56, 2016 (with Dirk Broeders and Frank de Jong), also published in *Het Verzekeringsarchief*, 1-2017, 15-25

Open grenzen, *Economische Statistische Berichten*, 21-jan-2016, 74-76 (with Martin Strobel en Tom van Veen)

Modelrisico op de balans, *Pensioen Bestuur en Management*, 2013-4, 30-33

De RAM in het nieuwe pensioenakkoord, Netspar Design paper 10, 2012 (with Frank de Jong)

Commissie parameters: verruim taakopdracht naar risico en rendement, *Tijdschrift voor Pensioenvraagstukken*, 2010-3, 31-33

Heeft de langetermijnbelegger tijd om op de lange termijn te wachten?, *Pensioen Bestuur en Management*, 2010-1, 6-7

Strategic Asset Allocation, Netspar Panel Paper 8, 2009 (with Frank de Jong and Bas Werker)

Het gemiddelde rendement als risicofactor, in: *Vergezichten*, Liber Amicorum voor Prof.dr. Jean Frijns, 2005

Risico-aversie in Lingo!, *Economische Statistische Berichten*, 30-juli-1999, 560-563 (with Roel Beetsma)

De opmars van financiering en belegging, *Economische Statistische Berichten*, 7-jan-1999, 4-9 (with Kees Koedijk)

Een vlinder in China: over efficiëntie en persistentie, inaugural lecture, Universiteit Maastricht, 1998

Modelkeuze bij prestatiemeting van beleggingsfondsen, in: *Kritisch en Constructief: 40 jaar grensverkenningen in de econometrie*, Liber Amicorum voor Prof.dr. Teun Kloek, redactie: H.K. van Dijk, R. Harkema, P. Kooiman en P.C. Schotman, 1997

Naschrift, *Economische Statistische Berichten*, 13-sept-1995, 816-817 (with Arjan van Bussel, Kees Koedijk and François Nissen)

De prestaties van beleggingsfondsen, 1989 - 1994, *Economische Statistische Berichten*, 28-juni-1995, 604-607 (with Arjan van Bussel, Kees Koedijk, François Nissen and Leonard Pijnenburg)

De Life-index voor beleggingsrendement, *Economische Statistische Berichten*, 13-juli-1994 (with Arjan van Bussel, Jan-Willem Goslings, Kees Koedijk and Bert van Tuel)

Unpublished

Firm characteristics, industry and time effects, and the cross-section of expected stock returns, 2011, permanent working paper, invited for resubmission after 3rd round review at *Journal of Applied Econometrics* (with Rob Bauer, Bart Diris and Borislav Pavlov)

Tax-deferred saving for early retirement: Analysis of the Dutch Levensloop scheme, January 2011 (with Frank Lutgens and Kathrin Nies)

Predicting returns with a co-fractional VAR model, January 2011 (with Daniela Osterrieder)

Predictability-robust dynamic portfolio choice, presented at the American Finance Association meetings, January 2008 (with Frank Lutgens)

On the determinants of financial subjective well-being, presented at CEPR conference on European Pension Challenges, Zürich, October 2007 (with Kathrin Nies)

Valuation and optimal exercise of Dutch mortgage loans with prepayment restrictions, October 2006 (with Bart Kuijpers)

Price discovery on foreign exchange markets with differentially informed traders, CEPR DP 2296, August 2001 (with Frank de Jong, Ronald Mahieu and Irma van Leeuwen)

Valuation and interest rate risk of the prepayment option in Dutch mortgages, working paper, 2000 (with Arjan van Bussel)

Big news and small samples, Tinbergen discussion paper 97-083/2, 1997 (with Stefan Straetmans and Casper de Vries)

Real estate diversification: by country or by continent, LIFE working paper 93-05, 1993 (with Piet Eichholtz and Ronald Mahieu)

Jeffreys prior in continuous time, working paper, Princeton University, 1992