Neil Shephard (this version: October 2019)

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Born October 8, 1964. Married, 2 children.

Academic Appointments

Current academic position:

- Frank B. Baird Jr, Professor of Science, Harvard University, 2018-. Professor of Economics and Professor of Statistics, Harvard University. Time equally split between Department of Economics and Department of Statistics.
- Chair (head of department), Department of Statistics, Harvard University, 2015-2018, 2019-2022.

Current editorial position:

- Associate editor, *Econometrica*, 2002-.

Past academic positions:

- Faculty member, Harvard University, 2013-
  - Professor of Economics and of Statistics, time equally split between Department of Economics and Department of Statistics, 2013-2018.
- Professor of Economics, Department of Economics, Oxford University, 1999-2013.
- Fellow, Nuffield College, Oxford, 1993-
  - Emeritus Fellow, Nuffield College, Oxford, 2014-.
  - Professorial Fellow in Economics, Nuffield College, Oxford, 2006-2013.
  - Official Fellow in Economics, Nuffield College, Oxford, 1993-2006.
  - Gatsby Research Fellow in Econometrics, Nuffield College, Oxford, 1991-1993.
- Lecturer in Statistics, London School of Economics, 1988-1993. Tenured aged 28.

Education

Ph.D., London School of Economics, 1990.
M.Sc., London School of Economics, 1987, Statistics (awarded with distinction).
B.A., York University, 1986, Economics and Statistics (first class, awarded with distinction).

Honours and prizes from universities and learned societies

Fellow of International Association for Applied Econometrics (elected)	2017
Guy Medal in Silver, Royal Statistical Society	2017
Fellow of the Society for Financial Econometrics (elected)	2012
Honorary doctorate, Aarhus University	2009
Fellow of the British Academy (FBA) (elected)	2006
Fellow of the Econometric Society (elected)	2004
Adam Smith Prize for undergraduate performance in economics, York University	1986

Honours from journals

Fellow of Journal of Econometrics	2017
Richard Stone Prize in Applied Econometrics	2012
Econometric Theory Multa Scripsit	2006

Administrative achievements

Masters in Data Science, Faculty of Arts and Sciences, Harvard University, (proposed with David Parkes)	2018
Harvard Data Science Initiative, (member of founding core committee)	2017
Financial Econometrics Summer School, Society for Financial Econometrics (proposed and ran until 2014)	2012
Masters in Financial Economics, Oxford University (proposed with Colin Mayer)	
Oxford-Man Institute, Oxford University, (founded and directed until 2011)	2007
Econometrics Journal, Royal Economic Society, (founded, with David F. Hendry, and first editor)	1998

Books

5. Unobserved Components and Time Series Econometrics, edited volume, Oxford University Press, (with Siem Jan Koopman), 2015.

3. The Methodology and Practice of Econometrics: A Festschrift in Honour of David F. Hendry, edited volume, Oxford University Press, 2009 (with Jennifer L. Castle).

2. Stochastic Volatility: Selected Readings, edited volume, Oxford University Press, 2005.

1. State Space and Unobserved Component Models: Theory and Applications, edited volume, *Cambridge University Press, 2004 (with Andrew C. Harvey and Siem Jan Koopman).*

Articles in Journals

67. Fitting Vast Dimensional Time-Varying Covariance Models, *Journal of Business and Economic Statistics*, 2019, (with Robert F. Engle, Cavit Pakel, Kevin Sheppard) forthcoming.

66. Time series experiments and causal estimands: exact randomization tests and trading, *Journal of the American Statistical Association*, 2019, (with Iavor Bojinov), forthcoming.

65. Moment conditions and Bayesian nonparametrics, *Journal of the Royal Statistical Society, Series B*, 2019, (with Luke Bornn and Reza Solgi), 81, 5-43.

64. Is improving access to university enough? Socio-economic gaps in the earnings of English graduates, *Oxford Bulletin of Economics and Statistics*, 2019, 81, 2019, 328-368 (with Jack Britton, Lorraine Dearden, and Anna Vignoles).

63. A comparison of sample survey measures of earnings of English graduates with administrative data, *Journal of Royal Statistical Society, Series A* (with discussion), 2019, 182, 719-754 (with Jack Britton and Anna Vignoles).

62. A Nonparametric Bayesian Approach to Copula Estimation, *Journal of Statistical Computation and Simulation*, 2018, 88, 1081-1105, (with Shaoyang Ning).

61. Econometric analysis of multivariate realised QML: Estimation of the covariation of equity prices under asynchronous trading, *Journal of Econometrics*, 2017, 201, 19-42 (with Dacheng Xiu).

60. Continuous time analysis of fleeting discrete price moves, *Journal of the American Statistical Association,* 2017, 112, 1090-1106 (with Justin J. Yang).

59. Econometric analysis of vast covariance matrices using composite realized kernels and their application to portfolio choice, *Journal of Business and Economic Statistics*, 34, 504-518, 2015 (with Asger Lunde and Kevin Sheppard).

58. Integer value trawl processes: a class of stationary infinitely divisible processes, *Scandinavian Journal of Statistics*, 2014, 41, 693-724 (with Ole E. Barndorff-Nielsen, Asger Lunde and Almut Veraart).

57. Multivariate Rotated ARCH models, *Journal of Econometrics*, 2014, 179, 16–30 (with Diaa Noureldin and Kevin Sheppard).

56. Multivariate high-frequency-based volatility (HEAVY) models, *Journal of Applied Econometrics*, 2012, 27, 907-933 (with Diaa Noureldin and Kevin K. Sheppard).

55. Integer-valued Levy processes and low latency financial econometrics, *Quantitative Finance*, 2012, 12, 587-605 (with Ole E. Barndorff-Nielsen and David Pollard).

54. Bayesian inference based only on a simulated likelihood, *Econometric Theory*, 2011, 27, 933-956 (with Thomas Flury).

53. Multivariate realised kernels: consistent positive semi-definite estimators of the covariation of equity prices with noise and non-synchronous trading, *Journal of Econometrics*, 2011, 162, 149-169 (with Ole E. Barndorff-Nielsen, Peter R Hansen and Asger Lunde).

52. Nuisance parameters, composite likelihoods and a panel of GARCH models, *Statistica Sinica*, 2011, 21, 307-329 (with Cavit Pakel and Kevin K. Sheppard).

51. Subsampling realised kernels, *Journal of Econometrics*, 2011, 160, 204-219, (with Ole E. Barndorff-Nielsen, Peter R Hansen and Asger Lunde).

50. Realising the future: forecasting with high frequency based volatility (HEAVY) models, 2010, *Journal of Applied Econometrics*, 25, 197-231 (with Kevin K. Sheppard). We were awarded the Richard Stone Prize in Applied Econometrics for this paper in 2012.

48. Testing the assumptions behind importance sampling, *Journal of Econometrics*, 2009, 149, 2-11 (with Siem Jan Koopman and D. Creal).

47. Realised kernels in practice: trades and quotes, *Econometrics Journal*, 2009, (with Ole E. Barndorff-Nielsen, Peter R Hansen and Asger Lunde), 12, C1-C32.

46. The ACR model: a multivariate dynamic mixture autoregression, *Oxford Bulletin of Economics and Statistics*, 2008, 70, 583-618 (with Frederique Bec, Anders Rahbek).

45. Designing realised kernels to measure the ex-post variation of equity prices in the presence of noise, *Econometrica*, 2008, 76, No. 6, 1481–1536 (with Ole E. Barndorff-Nielsen, Peter R Hansen and Asger Lunde).

Reprinted in "Volatility," (editor Torben Andersen and Tim Bollerslev), Edward Elgar Publishers, 2017, forthcoming.

44. Stochastic volatility with leverage: fast and efficient likelihood inference, *Journal of Econometrics*, 2007, 140, 425-449 (with Siddhartha Chib, Yasuhiro Omori and Jouchi Nakajima).

43. Inference for adaptive time series models: stochastic volatility and conditionally Gaussian state space form, *Econometric Reviews*, 2006, 25, 219-244 (with Charles Bos).

42. Analysis of high dimensional multivariate stochastic volatility models, *Journal of Econometrics*, 2006, 134, 341-371 (with Siddhartha Chib and Federico Nardari).

41. Limit theorems for bipower variation in financial econometrics, *Econometric Theory*, 2006, 22, 677-719 (with Ole E. Barndorff-Nielsen, Sven Erik Graversen and Jean Jacod).

40. Limit theorems for multipower variation in the presence of jumps, *Stochastic Processes and Their Applications*, 2006, 116, 796-806, (with Ole E. Barndorff-Nielsen and Matthias Winkel).

39. Econometrics of testing for jumps in financial economics using bipower variation, *Journal of Financial Econometrics*, 2006, 4, 1-30, (with Ole E. Barndorff-Nielsen).

38. Impact of jumps on returns and realised variances: econometric analysis of time-deformed Lévy processes, *Journal of Econometrics*, 2006, 131, 217-252 (with Ole E. Barndorff-Nielsen).

37. Power variation and time change, *Teoriya Veroyatnostei i ee Primeneniya,* 2005, 50, 115-130 (with Ole E. Barndorff-Nielsen).

Reprinted in *Theory of Probability and Its Applications*, 2005, 50, 1-15.

36. Likelihood-based estimation of latent generalised ARCH structures, *Econometrica*, 2004, 72, 1481-1517 (with G. Fiorentini and Enrique Sentana).

35. Econometric analysis of realised covariation: high frequency based covariance, regression and correlation in financial economic, *Econometrica*, 2004, 72, 885-925, (with Ole E. Barndorff-Nielsen),.

Reprinted in "Volatility," (editor Torben Andersen and Tim Bollerslev), Edward Elgar Publishers, 2017, forthcoming.

34. Power variation and stochastic volatility: a review and some new results, *Journal of Applied Probability*, 2004, 41A, 133-143 (with Ole E. Barndorff-Nielsen and Sven Erik Graversen). This volume was in honour of Christopher C. Heyde.

33. Power and bipower variation with stochastic volatility and jumps, (with discussion) *Journal of Financial Econometrics*, 2004, 2, 1-48 (with Ole E. Barndorff-Nielsen).

Reprinted in "*Financial Risk Measurement and Management*," (editor Frank X. Diebold), in Edward Elgar Publishers, 2012.

Reprinted in "Volatility," (editor Torben Andersen and Tim Bollerslev), Edward Elgar Publishers, 2017, forthcoming.

32. Likelihood analysis of a first order autoregressive model with exponential innovations, *Journal of Time Series Analysis*, 2003, 24, 337-344 (with Bent Nielsen).

31. Dynamics of trade-by-trade price movements: decomposition and models, *Journal of Financial Econometrics*, 2003, 1, 2-25 (with Tina H. Rydberg).

30. Integrated OU processes and non-Gaussian OU-based stochastic volatility models, *Scandinavian Journal of Statistics*, 2003, 30, 277--295 (with Ole E. Barndorff-Nielsen).

29. Realised power variation and stochastic volatility models, *Bernoulli,* 2003, 9, 243-265 and 1109-1111 (with Ole E. Barndorff-Nielsen).

28. Estimating quadratic variation using realised variance, *Journal of Applied Econometrics*, 2002, 17, 457-477 (with Ole E. Barndorff-Nielsen).

27. Computationally-intensive econometrics using a distributed matrix-programming language, *Philosophical Transactions of the Royal Society of London, Series A*, 360, 2002, 1245-1266 (with Jurgen A. Doornik and David F. Hendry).

26. Some recent developments in stochastic volatility modelling, *Quantitative Finance*, 2002, 2, 11-23 (with Ole E. Barndorff-Nielsen and Elisa Nicolato).

25. Econometric analysis of realised volatility and its use in estimating stochastic volatility models, *Journal of the Royal Statistical Society, Series B*, 63, 2002, 253-280 (with Ole E. Barndorff-Nielsen).

Reprinted in "Stochastic Volatility: Selected Readings, " (editor Neil Shephard), Oxford University Press, 480-514, 2005.

Reprinted in “Financial Risk Measurement and Management” (editor Francis X. Diebold), Edward Elgar, 2012.

24. Markov chain Monte Carlo methods for stochastic volatility models, *Journal of Econometrics*, 108, 2002, 281-316 (with Siddhartha Chib and Federico Nardari).

23. Normal modified stable processes, *Theory of Probability and Mathematical Statistics*, 2001, 65, 1-19 (with Ole E. Barndorff-Nielsen).

22. Likelihood inference for discretely observed non-linear diffusions, *Econometrica*, 69, 2001, 959-993 (with Ola Elerian and Siddhartha Chib).

21. Non-Gaussian Ornstein-Uhlenbeck-based models and some of their uses in financial economics (with discussion), *Journal of the Royal Statistical Society, Series B*, 63, 2001, 167-241, (with Ole E. Barndorff-Nielsen).

20. Statistical algorithms for models in state space form using SsfPack 2.2, *Econometrics Journal*, 2, 1999, 107-160 (with Siem Jan Koopman and Jurgen A Doornik).

19. Filtering via simulation: auxiliary particle filter, *Journal of the American Statistical Association*, 94, 1999, 590-599 (with Michael K. Pitt).

18. Analytic convergence rates and parameterisation issues for the Gibbs sampler applied to state space models, *Journal of Time Series Analysis*, 20, 1999, 63-85 (with Michael K. Pitt).

17. Likelihood inference for limited dependent processes, *Econometrics Journal*, 1, 1998, C174-C202 (with Aurora Manrique).

16. Stochastic volatility: likelihood inference and comparison with ARCH models, *Review of Economic Studies*, 65, 1998, 361-393 (with Sangjoon Kim and Siddhartha Chib).

Reprinted in "Recent Developments in Time Series," (editors Stephen Leybourne and Paul Newbold), in "The International Library of Critical Writings in Econometrics, Volume 2" Edward Elgar Publishers, 2003, 196-228.

Reprinted in "Stochastic Volatility: Selected Readings, " (editor N. Shephard), 2005, 283-322, Oxford University Press.

15. Likelihood analysis of non-Gaussian measurement time series, *Biometrika* 84, 1997, 653-667 (with Michael K. Pitt).

Reprinted in *"Readings in Unobserved Component Models,"* A.C. Harvey and T. Proietti, 2005, 368-385, Oxford University Press.

14. Detecting shocks: outliers and breaks in time series, *Journal of Econometrics* 80, 1997, 387-422 (with Anthony C. Atkinson and Siem Jan Koopman).

13. Estimation of an asymmetric model of asset prices, *Journal of Business and Economic Statistics* 14, 1996, 429-434 (with Andrew C. Harvey).

12. Deletion diagnostics and transformations for time series, *Journal of Forecasting* 15, 1996, 1-17 (with Anthony C. Atkinson).

11. The simulation smoother for time series models, *Biometrika* 82, 1995, 339-350 (with Piet de Jong).

Reprinted in "Readings in Unobserved Component Models," A.C. Harvey and T. Proietti, 2005, 354-367, Oxford University Press.

10. Multivariate stochastic variance models, *Review of Economic Studies* 61, 1994, 247-264 (with Andrew C. Harvey and Esther Ruiz).

Reprinted in "ARCH: Selected Readings," (editor Robert F. Engle), 1995, 256-276, Oxford University Press.

Reprinted in "Recent Developments in Time Series," (editors Stephen Leybourne and Paul Newbold), Edward Elgar Publishers, 2003, 135-152.

Reprinted in "Stochastic Volatility: Selected Readings, " (editor Neil Shephard), Oxford University Press, 156-176, 2005.

Reprinted in “Volatility,” (editor Torben Andersen and Tim Bollerslev), Edward Elgar Publishers, 2017, forthcoming.

9. Partial non-Gaussian time series models, *Biometrika* 81, 1994, 115-131.

8. A local scale model: state space alternatives to integrated GARCH processes, *Journal of Econometrics* 60, 1994, 181-202.

7. Fitting nonlinear time series models with applications to stochastic variance models, *Journal of Applied Econometrics* 8, 1993, S135-152.

Reprinted in "Econometric Inference using Simulation Techniques" (editors B.W. Brown, Alain Monfort and Herman K. Van Dijk), Chichester: John Wiley & Sons, 1995, 151-168.

6. Maximum likelihood estimation of regression models with stochastic trend components, *Journal of the American Statistical Association* 84, 1993, 590-595.

5. Distribution of the ML estimator of a MA(1) and a local level model, *Econometric Theory* 9, 1993, 377-401.

4. The exact score for time series models in state space form, *Biometrika* 79, 1992, 823-826 (with Siem Jan Koopman).

3. Numerical integration rules for multivariate inversions, *Journal of Statistical Computation and Simulation* 39, 1991, 37-46.

2. From characteristic function to distribution function: a simple framework for the theory, *Econometric Theory* 7, 1991, 519-529.

1. On the probability of estimating a deterministic component in the local level model, *Journal of Time Series Analysis* 11, 1990, 339-347 (with Andrew C. Harvey).

Articles in Edited Books

21. Likelihood Inference for Exponential-Trawl Processes, The Fascination of Probability, Statistics and their Applications, edit by Podolskij, M., Stelzer, R., Thorbjørnsen, S., Veraart, A.E.D. (2016), in 251-281, Springer

20. Martingale unobserved component models, in Unobserved Components and Time Series Econometrics, edited by Siem Jan Koopman and Neil Shephard, Oxford University Press, 2015, 218-249.

19. Volatility, in Encyclopedia of Quantitative Finance, edited by Rama Cont, John Wiley and Sons Ltd, Chichester, UK, 2010, 1898-1901 (joint with Ole E. Barndorff-Nielsen).

18. Measuring downside risk: realised semivariance, in Volatility and Time Series Econometrics: Essays in Honor of Robert F. Engle, edited by T. Bollerslev, J. Russell and M. Watson (eds), Oxford University Press, 2010, 117-136 (joint with Ole E. Barndorff-Nielsen and S. Kinnebrouck).

17. Stochastic Volatility: Origins and Overview, in T.G. Andersen, R.A. Davis, J.-P. Kreiss and T. Mikosch (eds.) *Handbook of Financial Time Series*, Springer, 233-254, (joint with Torben G. Andersen), 2009

16. Stochastic volatility, in New Palgrave Dictionary of Economics, 2nd edition, (edited by Steven Durlauf and Lawrence Blume), MacMillan, 2008. Reprinted in "Macroeconometrics and Time Series Analysis" (edited by Steven Durlauf and Lawrence Blume), MacMillan, 2009.

15. Variation, jumps and high frequency data in financial econometrics (with Ole E. Barndorff-Nielsen) in *Advances in Economics and Econometrics. Theory and Applications, Ninth World Congress*, (edited by Richard Blundell, Persson Torsten and Whitney K Newey), Econometric Society Monographs, Cambridge University Press, 2007, 328-372.

14. Parallel computation in econometrics: a simplified approach (with Jurgen A. Doornik and David F. Hendry) in *Handbook of Parallel Computing and Statistics* (edited by E. J. Kontoghiorghes), Chapman and Hall, 2006, 449-476.

13. Multipower variation and stochastic volatility (with Ole E. Barndorff-Nielsen), *Stochastic Finance*, (edited by A.N. Shiryaev, M.R. Grossinho, P.E. Oliveira, M.L. Esquivel), Springer, 2005, 73-82.

12. A central limit theorem for realised power and bipower variations of continuous semimartingales, in *From Stochastic Analysis to Mathematical Finance, Festschrift for Albert Shiryaev* (edited by Kabanov, Y and R Lipster), Springer, 2006, 33-68, (with O.E. Barndorff-Nielsen, S.E. Gravensen, J. Jacod and M. Podolskij).

11. Introduction, in Stochastic Volatility (edited by Neil Shephard), Oxford University Press, 2005, 1-33.

10. Are there discontinuities in financial prices? in *Celebrating Statistics: Papers in Honour of Sir David Cox on his 80th Birthday*, (edited by Anthony Davison, Yadolah Dodge and Nanny Wermuth), Oxford University Press, 2005, 213-231.

9. How accurate is the asymptotic approximation to the distribution of realised volatility? in *Identification and Inference for Econometric Models. A Festschrift for Tom Rothenberg*, (edited by Donald W.K. Andrews and James H.Stock), Cambridge University Press, 2005, 306-331 (with Ole E. Barndorff-Nielsen).

8. Measuring and forecasting financial variability using realised variance with and without a model, in *State Space and Unobserved Component Models: Theory and Applications. Proceedings of a Conference in Honour of James Durbin*. (Edited by Andrew C. Harvey, Siem Jan Koopman and Neil Shephard), Cambridge University Press, 2004, (with Ole E. Barndorff-Nielsen, Bent Nielsen and Carla Ysusi), 205-235.

7. Auxiliary variable particle filters, in A. Doucet, J.F.G. de Freitas and N.J. Gordon (eds.), *Sequential Monte Carlo Methods in Practice* (New York: Springer-Verlag. 2001), 273-293 (with Michael K. Pitt).

6. Modelling by Lévy processess for financial econometrics, in Ole E. Barndorff-Nielsen, Thomas Mikosch and Sid Resnick (eds.), *Lévy Processes - Theory and Application* (New York: Birkhauser, 2001), 283-318 (with Ole E. Barndorff-Nielsen).

5. A modelling framework for the prices and times made on the New York stock exchange, in W.J. Fitzgerald, R.L. Smith, A.T. Walden and P. C. Young (eds.), *Non-Stationary and Non-Linear Signal Extraction* (Cambridge: Issac Newton Institute Series, Cambridge University Press, 2000), 217-246 (with Tina Hviid Rydberg).

4. Time varying covariances: a factor stochastic volatility approach, (with discussion) in J.M. Bernardo, J.O. Berger, A.P. Dawid and A.F.M. Smith (eds.), *Bayesian Statistics 6, Proceedings of the Sixth Valencia International Meeting* (Oxford: Oxford University Press, 1999), 547-570 (with Michael K. Pitt).

3. Statistical aspects of ARCH and stochastic volatility, in D.R. Cox, David V. Hinkley and Ole E. Barndorff-Nielsen (eds.), *Time Series Models in Econometrics, Finance and Other Fields* (London: Chapman & Hall, 1996), 1-67.

Reprinted in the *Survey of Applied and Industrial Mathematics*, issue on Financial and insurance mathematics, 3, 764-826, Scientific Publisher TVP, Moscow, 1996 (in Russian).

2. Outliers and switches in time series, in P. Mandl and M. Huskova (eds.), *Asymptotic Statistics* (Heidelberg: Physica-Verlag, 1994), 35-48 (with A.C. Atkinson and Siem Jan Koopman).

1. Structural time series models, in G.S. Maddala, C.R. Rao and H.D. Vinod (eds.), *Handbook of Statistics, Vol. 11 Econometrics* (Amsterdam: North Holland, 1993), 261-302 (with A.C. Harvey).