# CURRICULUM VITAE

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| NAME: | Timo Teräsvirta |
| DATE and PLACE OF BIRTH: | January 24, 1941<br>Helsinki, Finland |
| LISTED IN: | Who's Who in the World (Marquis) |
| | Europäisches Biographisches Verzeichnis |
| | Kuka kukin on (Who's Who in Finland) |
| | Vem och vad |
| | Who's Who in Science and Engineering (Marquis) |
| | Who's Who in Economics, 4th edition<br>(inclusion is based on citations in academic journals) |
| | Vem är det (Who's Who in Sweden) 2007 |
| QUALIFICATIONS: | M.Pol.Sc. (Statistics) 1964, University of Helsinki |
| | Lic.Pol.Sc. (Statistics) 1968, University of Helsinki |
| | D.Pol.Sc. (Econometrics) 1970, University of Helsinki |
| EXPERIENCE: | 1963 – 1969: Research Assistant and Researcher, Econometric Research Institute of the Posts and Telegraphs, Helsinki |
| | Jan 1964 – Sep 1967: Assistant Lecturer, Department of Statistics, University of Helsinki |
| | Jan 1970 – Jul 1972: Acting Professor of Statistics, University of Jyväskylä |
| | Sep 1972 – Dec 1976: Senior Research Fellow, Academy of Finland (of which Sep 1975 – Dec 1976 at the London School of Economics, Jul – Dec 1976 as Academic Visitor) |
| | Mar 1976 – Jul 1980: Professor of Statistics, University of Helsinki |
| | Oct 1978 – Sep 1979: Visiting Research Fellow, Center for Operations Research and Econometrics, Université Catholique de Louvain, Louvain-la-Neuve |
| | Jul 1979: Visiting Fellow, Department of Economics, University of Warwick, Coventry |
| | Oct 1979 – Nov 1979: Visiting Scholar, Academy of Sciences of the GDR, Berlin |
| | Apr 1976 – present time: Docent, Department of Statistics, University of Jyväskylä |
| | Oct 1980 – present time: Docent, Department of Statistics, University of Helsinki |
| | Oct 1980 – Dec 1990: Senior Research Fellow, Research Institute of the Finnish Economy, Helsinki |
| | Mar 1983: Visiting Professor, Department of Statistics, University of Lund, Sweden |

Jun 1984: Visiting Professor, Department of Statistics, University of Manitoba, Winnipeg

Sep 1984 – Aug 1985: Visiting Research Professor, Department of Economics, University of California at San Diego, La Jolla, CA

Sep 1985 – Dec 1985: Visiting Professor, Department of Economics, University of Illinois, Champaign, IL

Jan 1986 – Dec 1990: Leader of Econometric and Time Series Research Team supported by the Yrjö Jahnsson Foundation, Helsinki

Mar 1987: Visiting Scholar, Department ofEconometrics and Statistics, University of Manchester

Apr 1989: Visiting Research Fellow, Bank of Norway, Oslo

Sep 1989 – Apr 1991: Visiting Research Professor, Department of Economics, University of California at San Diego, La Jolla, CA

May 1991 – Jun 1991: Visiting Scholar, National Institute of Economic Research, Stockholm, Sweden

Aug 1991 – Dec 1991: Visiting Professor, Department of Statistics, University of Gothenburg, Sweden.

Mar 1992 – Jun 1992: Consultant, Research Institute of the Finnish Economy

Sep 1992 – Dec 1994: Research Fellow, Bank of Norway, Oslo, Norway

Mar 1993: Visiting Scholar, Nuffield College, Oxford, UK

Sep 1993 – Aug 1994: Visiting Professor, Copenhagen Business School, Denmark

May 1994: Visiting Professor, Universidad Carlos III, Madrid, Spain

June 1994, Jun – Jul 1995, April 1997 and June 2001: Visiting Scholar, Humboldt-Universität zu Berlin, Germany

Oct 1994 – present time: Professor of Econometrics, Stockholm School of Economics, Sweden

June 1995: Visiting Professor, University of Exeter, UK.

Oct 1996 and Mar 1999: Visiting Professor, GREQAM, Université d'Aix-Marseille II & III, France

Oct 1997: Visiting Professor, Institute for Advanced Studies, Vienna, Austria

Jan – Mar 1998 and Jan – May 2002: Visiting Research Professor, University of California at San Diego, La Jolla, CA

Jun 1998: Visiting Professor, Tinbergen Institute, Erasmus University Rotterdam, The Netherlands

Oct 1998: Visiting Professor, Norwegian University of Science and Technology, Trondheim, Norway

Feb 1999: Visiting Scholar, Banco de la República de Colombia,

Bogotá, Colombia

Oct – Dec 1999, Nov-Dec 2001, Jan-Apr 2005 and Oct-Nov 2009: Visiting Professor, University of Technology, Sydney, Australia

Aug 2000, Apr 2001 and Aug 2002: Visiting Professor, Pontifical Catholic University of Rio de Janeiro, Brazil

Oct-Nov 2000: Research Fellow, Bank of Norway, Oslo, Norway

Sep 2001 – present time: Distinguished Senior Fellow, Swedish School of Economics, Helsinki, Finland

Apr – May 2003 and 2004: Visiting Professor, Central European University, Budapest

Oct 2004 and 2005: Visiting Scholar, European Central Bank, Frankfurt am Main

Oct 2006 – present time: Professor of Economics, University of Aarhus, Denmark

Apr 2007 – present time: Member of Center for Research in Econometric Analysis of Time Series (CREATES), a Centre of Excellence financed by the Danish National Research Foundation

Apr 2008: Visiting Professor, CREST-ENSAE, Paris

May 2008: Visiting Professor, Universidad Carlos III de Madrid

Oct-Nov 2008: Visiting Professor, Université catholique de Louvain, Louvain-la-Neuve

Apr 2009: Visiting Professor, Southwestern University of Finance and Economics, Chengdu

Apr-Jun and Nov 2010: Visiting Scholar (Fernand Braudel Fellow), European University Institute, Florence

Oct 2010: Visiting Scholar, Banque de France

TEACHING (INVITED SPECIAL COURSES):

*Nonlinear econometrics* (jointly with S. Hylleberg), Copenhagen Business School, February 1994 (20 h)

*Nonlinear econometrics*, Universidad Carlos III de Madrid, May 1994 (12 h)

*Économetrie non linéaire*, GREQAM, Université d'Aix-Marseille, October 1996 (10 h)

*Modelling economic relationships with smooth transition regressions*, Scuola estiva di econometria, Bertinoro, Italy, 22-28 June 1997 (15 h)

*Advanced econometrics*, Institute for Advanced Studies, Vienna, October 1997 (24 h)

*Nonlinear time series econometrics*, Norwegian University of Science and Technology, Trondheim, 20-27 October 1998 (24 h)

*Nonlinear time series models*, Universidad del Rosario, Universidad Nacional de Colombia and Banco de la República de Colombia, Bogotá, 1-5 February 1999 (18 h)

*Graduate course in nonlinear econometrics*, Statnet Finland, Stockholm and Turku, 29 May – 2 June 2000 (20 h)

*Nonlinear econometric modeling*, Pontifical Catholic University of Rio de Janeiro, 5-13 August 2002 (10 h)

*Modelling volatility*, Swedish School of Economics, Helsinki, 31 August-10 September 2004 (24 h)

*Nonlinear time series*, IZESG, Lisbon, 10-12 January 2005 (10 h)

*Nonlinear econometrics*, Statistics Norway, Oslo, 13-17 November 2006 (15 h)

*Graduate course in nonlinear econometrics*, University of Aarhus, 29-30 March 2007 (12 h)

*Lectures on nonlinear econometrics*, CREST-ENSAE, Paris, April 2008 (13 h)

*Course on nonlinear econometrics*, Universidad Carlos III de Madrid, May 2008 (7 h)

*Course on nonlinear econometrics*, Université catholique de Louvain, Louvain-la-Neuve, October 2008 (13h)

*Nonlinear econometrics and volatility modelling*, Southwestern University of Finance and Economics, Chengdu, April 2009 (20h)

*Nonlinear econometrics and volatility modeling*, Hanken School of Economics, Helsinki, January 2010 (20h)

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| MEMBERSHIPS (ELECTED MEMBER): | International Statistical Institute 1978 |
| | Societas Scientiarum Fennica 1978 |
| | Kungliga vetenskapsakademien (The Royal Swedish Academy of Sciences) 2001 |
| PUBLICATIONS: | For publications in English, see separate list; in addition publications in Finnish, Swedish, Polish and Spanish |
| REFEREEING: | See separate list |
| PRIZES, DISTINCTIONS AND AWARDS | E.J. Nyström's Prize 1993 |
| | *Journal of Applied Econometrics* Distinguished Author 2000 |
| | Fellow of *Journal of Econometrics* 2000 |
| | Honorary Professor, Tianjin University of Finance and Economics, October 2006 |
| | Graduate Teachers Award, Stockholm School of Economics, December 2006 |
| | Guest Professor, Southwestern University of Finance and Economics, Chengdu, April 2009 |
| EDITORIAL ACTIVITIES. | 1974 – Jun 1985: Finnish Editor, Scandinavian Journal of Statistics |
| | Jan 1980 – Dec 1993: Associate Editor, Scandinavian Journal of Economics |

Jun 1985 – Dec 1988: Associate Editor, Scandinavian Journal of Statistics

Jun 1992 – Dec 2000: Associate Editor, International Journal of Forecasting

Feb 1995 – Dec 2005: Associate Editor,

Studies in Nonlinear Dynamics and Econometrics.

Nov 1996 – Dec 2002: Associate Editor, Macroeconomic Dynamics

Sep 1997 – Jun 2006: Member of the Editorial Board, Empirical Economics

Sep 1998 – present time: Member of the Editorial Board, Applied Financial Economics

1999-2000: Guest Editor (with P.H. Franses) for Special Issue of Macroeconomic Dynamics, (Vol. 5, No. 4): "Nonlinear modeling of multivariate macroeconomic relations"

2000-2001: Guest Editor (with J.E.H. Davidson) for Annals of Econometrics, Special Issue of Journal of Econometrics (Vol. 110, No. 2): "Long memory and nonlinear time series"

2007-present time: Associate Editor, Monetary Studies

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| MISCELLANEOUS ACTIVITIES: | 2000: European Economic Association, Member of the Hicks-Tinbergen Award Committee |
| | June 2000 – present time: Advisory Board Member, Center for Empirical Macroeconomics, University of Bielefeld, Germany |
| | 1997 – present time: Member, Steering Committee of (EC)$^2$ Meetings |
| | 2001 – 2008: Member, Scientific Advisory Board, Research Unit on Economic Structures and Growth, an Academy of Finland Centre of Excellence |
| | Jan 2002 – 2010: Member, Prize Committee for Sveriges Riksbank's Prize in Economic Sciences in Memory of Alfred Nobel |
| | Apr 2007: Panel member: Quality and Renewal – Research Review of Uppsala University |
| | 2009 – present time: Member, Council of the Society of Financial Econometrics |
| ORGANIZER: | Programme Chairman (Econometrics), Econometric Society European Meeting 1987, Copenhagen 24-28 August 1987. |
| | Member, Programme Committee, Econometric Society European Meeting, 1982, 1986, 1991, 1993, 1996, 1998, 1999, 2002, 2006, 2007, 2009, 2011. |
| | Member, Programme Committee, 8th and 12th Scandinavian Conference on Mathematical Statistics, 1980, 1988 |
| | Member, Organizing Committee, ISF-94, The 14th International |

Symposium on Forecasting, Stockholm, 1994

Main Organizer, Workshop on Nonlinear Time Series and Econometrics, Stockholm, 24-25 May 1996

Member, Organizing Committee, Swedish Econometricians' Meeting, Stockholm, 16-17 May 1997

Local Organizer, (EC)² Conference on "Forecasting in Econometrics", Stockholm, 17-19 December 1998

Programme Chairman, 6th Tartu Conference on Multivariate Statistics, Tartu, Estonia, 19-23 August 1999

Member, Programme Committee, Workshop on "Economics with Heterogeneous Interacting Agents", 1998, 1999

Co-organizer (with P.H. Franses), Conference on "Nonlinear Modeling of Multivariate Macroeconomic Relations", Rotterdam, The Netherlands, 17-18 September 1999

Session organizer, The 20th International Symposium on Forecasting, Lisbon, Portugal, 21-24 June, 2000

Member, Programme Committee, European Economic Association Annual Congress 2001, 2004

Member, Scientific Committee, Econometrics of Stock Markets Conference, Paris, 1-2 April 2004

Session organizer and Programme Committee Member, The 24th International Symposium on Forecasting, Sydney, Australia, 4-6 July 2004

Member, Scientific Committee, Forecasting Financial Markets and Economic Decision-Making, Lodz, 2005, 2006, 2007, 2008, 2009

Member, Programme Committee, International Economic Association World Congress, Morocco, August 2005

Member, Organising Committee, Forecasting in Rio, Rio de Janeiro, 29-31 July 2008

Member, Programme Committee, 2nd Humboldt-Copenhagen Conference Financial Econometrics, Copenhagen, 13-14 May 2011

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| FIELD OF SPECIALIZATION: | Econometrics with special reference to model building and including microeconometric applications (analysis of business survey data); time series analysis, in particular economic applications, volatility models and modeling |
| LANGUAGES: | Finnish, Swedish, English, French, German, Italian |

## PUBLICATIONS IN ENGLISH

### A. Monographs

1. *On stepwise regression and economic forecasting*. Helsinki: Kansantaloudellinen Yhdistys (1970).

2. *Modelling nonlinear economic relationships*. Oxford: Oxford University Press (1993, with C.W.J. Granger). Chinese edition, Shanghai: Shanghai University of Finance & Economics Press (2006).

3. *Nonlinear econometric modeling in time series analysis*. Cambridge: Cambridge University Press (2000, co-editor with W.A. Barnett, D.F. Hendry, S. Hylleberg, D. Tjøstheim and A. Würtz).

4. *Modelling nonlinear economic time series*. Oxford: Oxford University Press (2010, with D. Tjøstheim and C.W.J. Granger).


### B. Special Issues

1. Nonlinear modeling of multivariate macroeconomic relations. Special issue of *Macroeconomic Dynamics* **5**, No. 4 (2001, co-editor with P.H. Franses).

2. Long memory and nonlinear time series. Annals issue of *Journal of Econometrics*, **110**, No. 2 (2002, co-editor with James Davidson).


### C. Articles

1. A note on predicting with seemingly unrelated regression equations. *Mathematische Operationsforschung und Statistik* **5**, 709-711 (1975).

2. A note on bias in the Almon distributed lag estimator. *Econometrica* **44**, 1317-1321 (1976).

3. Forecasting the consumption of alcoholic beverages in Finland. A Box-Jenkins approach. *European Economic Review* **8**, 349-369 (1976, with E. Leskinen).

4. On the estimation of dynamic price elasticities with Box-Jenkins methods: A case study. *Scandinavian Journal of Statistics* **4**, 1-10 (1977 with E. Leskinen).

5. Effect of feedback on the distribution of the portmanteau test statistic. *Scandinavian Journal of Statistics* **4**, 20-24 (1977).

6. The invertibility of sums of discrete MA and ARMA processes. *Scandinavian Journal of Statistics* **4**, 165-170 (1977).

7. A note on the limits of a modified Theil estimator. *Biometric Journal* **22**, 561-562 (1980, with H. Toutenburg).

8. Polynomial distributed lag revisited. *Empirical Economics* **5**, 69-81 (1980).

9. Some results on improving the least squares estimation of linear models by mixed estimation. *Scandinavian Journal of Statistics* **8**, 33-38 (1981).

10. A comparison of mixed and minimax estimators of linear models. *Communications in Statistics A* **10**, 1765-1778 (1981).

11. Underestimation of mean square error matrix in misspecified linear models, *Journal of Econometrics* **18**, 281-284 (1982).

12. Superiority comparisons of homogeneous linear estimators. *Communications in Statistics A***11**, 1595-1601 (1982).

13. Restricted superiority of linear homogeneous estimators over ordinary least squares. *Scandinavian Journal of Statistics* **10,** 27-33 (1983).

14. Short-term forecasting of industrial production by means of quick indicators. *Journal of Forecasting* **3**, 409-416 (1984).

15. Choosing between linear and threshold autoregressive models, in O.D. Anderson (ed.): *Time Series Analysis, Theory and Practice* **7**, 129-137 (1985, with R. Luukkonen).

16. Modelling the dynamic relationship between wages and prices in Finland. *Scandinavian Journal of Economics* **87**, 102-119 (1985, with P. Saikkonen).

17. Mink and muskrat interaction: A structural analysis. *Journal of Time Series Analysis* **6,** 171-180 (1985).

18. Superiority comparisons of heterogeneous linear estimators. *Communications in Statistics A* **15**, 1319-1336 (1986).

19. Model selection using business survey data. Forecasting the output of Finnish metal and engineering industries. *International Journal of Forecasting* **2**, 191-200 (1986).

20. Model selection criteria and model selection tests in regression models. *Scandinavian Journal of Statistics* **13**, 159-171 (1986, with I. Mellin).

21. The extended Stein procedure for simultaneous model selection and parameter estimation. *Journal of Econometrics* **35**, 359-371 (1987, with G. Judge, G. Yi, and T. Yancey).

22. Usefulness of proxy variables in linear models with stochastic regressors. *Journal of Econometrics* **36**, 377-382 (1987).

23. Formation of firms' production decisions in Finnish manufacturing industries. *Journal of Applied Econometrics* **3**, 125-137 (1988, with M. Rahiala).

24. Testing linearity against smooth transition autoregressive models. *Biometrika* **75**, 491-499 (1988, with R. Luukkonen and P. Saikkonen).

25. A review of PC GIVE: A statistical package for econometric modelling. *Journal of Applied Econometrics* **3**, 333-340 (1988).

26. Testing linearity in univariate time series models. *Scandinavian Journal of Statistics* **15**, 161-175 (1988, with R. Luukkonen and P. Saikkonen).

27. Superiority comparisons between mixed regression estimators. *Communications in Statistics, Theory and Methods A***17**, 3537-3546 (1988).

28. Model selection, smoothing and parameter estimation in linear models under squared error loss. *Computational Statistics Quarterly* **4**, 191-205 (1988, with G. Yi and G. Judge).

29. Estimating linear models with incomplete ellipsoidal restrictions. *Statistics* **20**, 187-194 (1989).

30. Use of preliminary values in forecasting industrial production. *International Journal of Forecasting* **6**, 463-468 (1990, with J. Boucelham).

31. Testing linearity of economic time series against cyclical asymmetry. *Annales d'économie et de statistique* **20/21**, 125-142 (1991, with R. Luukkonen).

32. Estimating seasonal regression models with smoothly varying parameters. *Acta Universitatis Lodziensis, Folia Oeconomica* **113**, 69-85 (1991, with I. Mellin.)

33. Characterizing nonlinearities in business cycles using smooth transition autoregressive models. *Journal of Applied Econometrics* **7**, S119-S136 (1992, with H.M. Anderson). Reprinted in: M.H. Pesaran and S.M. Potter (eds): *Nonlinear dynamics, chaos and econometrics*, 111-128. New York: Wiley (1993).

34. Power of the neural network linearity test. *Journal of Time Series Analysis* **14**, 209-220 (1993, with C.-F. Lin and C.W.J. Granger).

35. Business survey data in forecasting the output of Swedish and Finnish metal and engineering industries: A Kalman filter approach. *Journal of Forecasting* **12**, 255-271 (1993, with M. Rahiala).

36. Testing the constancy of regression parameters against continuous structural change. *Journal of Econometrics* **62**, 211-228 (1994, with C. -F. Lin).

37. Specification, estimation, and evaluation of smooth transition autoregressive models. *Journal of the American Statistical Association* **89**, 208-218 (1994). Reprinted in: P. Newbold and S.J. Leybourne (eds): *Recent Developments in Time Series.* Cheltenham: Elgar (2003).

38. Combination of forecasts with changing weights. *International Journal of Forecasting* **10**, 47-57 (1994, with M. Deutsch and C.W.J. Granger). Reprinted in: E. Ghysels, N.R. Swanson and M. Watson (eds.): *Essays in Econometrics. Collected papers of Clive W.J. Granger. Volume 1: Spectral analysis, Seasonality, Nonlinearity, Methodology, and Forecasting,* 420-435. Cambridge: Cambridge University Press (2001).

39. Testing linearity and modelling nonlinear time series. *Kybernetika* **30**, 319-330 (1994).

40. Modelling nonlinearity in U.S. gross national product 1889-1987. *Empirical Economics* **20**, 577-597 (1995).

41. Power properties of linearity tests for time series. *Studies in Nonlinear Dynamics and Econometrics* **1**, 3-10 (1996).

42. Testing the adequacy of smooth transition autoregressive models. *Journal of Econometrics* **74**, 59-75 (1996, with Ø. Eitrheim). Reprinted in: P. Newbold and S.J. Leybourne (eds): *Recent Developments in Time Series.* Cheltenham: Elgar (2003).

43. Short-term forecasting of industrial production with business survey data: Experience from Finland's Great Depression 1990-1993, *International Journal of Forecasting* **12**, 373-381 (1996, with E. Kauppi and J. Lassila).

44. Testing parameter constancy and super exogeneity in econometric equations. *Oxford Bulletin of Economics and Statistics* **58**, 735-763 (1996, with E.S. Jansen). Reprinted in: A. Banerjee and D.F. Hendry (eds.): *The econometrics of economic policy*, 165-193. Oxford: Blackwells (1997).

45. Stylized facts of daily return series and the hidden Markov model. *Journal of Applied Econometrics* **13**, 217-244 (1998, with T. Rydén and S. Åsbrink).

46. Modeling the demand for M3 in the unified Germany. *Review of Economics and Statistics* **80**, 399-409 (1998, with J. Wolters and H. Lütkepohl).

47. Testing linearity against nonlinear moving average models. *Communications in Statistics, Theory and Methods*, **27,** 2025-2035 (1998, with K. Brännäs and J.G. De Gooijer).

48. Properties of the autocorrelations function of squared observations for second order GARCH processes under two sets of parameter constraints. *Journal of Time Series Analysis* **20,** 23-30 (1999, with C. He).

49. Testing parameter constancy in linear models against stochastic stationary parameters. *Journal of Econometrics* **90,** 193-213, *(1999, with C.-F. Lin)*

50. A simple nonlinear time series model with misleading linear properties. *Economics Letters* **62**, 161-165 (1999, with C.W.J. Granger).

51. Another look at Swedish business cycles, 1861-1988. *Journal of Applied Econometrics* **14,** 359-378 (1999, with J. Skalin).

52. Properties of moments of a family of GARCH processes. *Journal of Econometrics* **92**, 173-192 (1999, with C. He)

53. Investigating stability and linearity of a German M1 money demand function. *Journal of Applied Econometrics* **14**, 511-525 (1999, with H. Lütkepohl and J. Wolters).

54. Fourth moment structure of the GARCH (p,q) process. *Econometric Theory* **15**, 824-846 (1999, with C. He).

55. A nonlinear time series model of El Niño. *Environmental Modeling and Software* **16**, 139-146 (2001, with A.D. Hall and J. Skalin).

56. Nonlinear error correction and the UK demand for broad money, 1878-1993, *Journal of Applied Econometrics* **16**, 277-288 (2001, with A.-C Eliasson).

57. A simple variable selection technique for nonlinear models. *Communications in Statistics, Theory and Methods*, **30,** 1227-1241 (2001, with G. Rech and R. Tschernig).

58. Statistical methods for modeling neural networks. *Engineering Intelligent Systems for Electrical Engineering and Communications* **9**, 227-235 (2001, with M.C. Medeiros).

59. Modeling asymmetries and moving equilibria in unemployment rates. *Macroeconomic Dynamics* **6,** 202-241 (2002, with J. Skalin).

60. Smooth transition autoregressive models – A survey of recent developments. Econometric Reviews 21, 1-47 (2002, with D. van Dijk and P.H. Franses).

61. Moment structure of a family of first-order Exponential GARCH models. Econometric Theory 18, 868-885 (2002, with C. He and H. Malmsten).

62. Evaluating GARCH models. *Journal of Econometrics* **110,** 417-435 (2002, with S. Lundbergh).

63. Time-varying smooth transition autoregressive models. *Journal of Business and Economic Statistics* **21**, 104-121 (2003, with S. Lundbergh and D. van Dijk)

64. The net barter terms of trade: A smooth transition approach. *International Journal of Money and Finance* **8**, 81-97 (2003, with A. Persson).

65. The effects of institutional and technological change and business cycle fluctuations on seasonal patterns in quarterly industrial production series. *Econometrics Journal* **6,** 79-98 (2003, with D. van Dijk and B. Strikholm).

66. An extended constant conditional correlation GARCH model and its fourth- moment structure. *Econometric Theory* **20**, 904-926 (2004, with C. He).

67. Linear models, smooth transition autoregressions, and neural networks for forecasting macroeconomic time series: A re-examination. *International Journal of Forecasting* **21,** 755-774 (2005, with D. van Dijk and M. C. Medeiros).

68. Building neural network models for time series: A statistical approach. *Journal of Forecasting* **25**, 49-75 (2006 with M.C. Medeiros and G. Rech).

69. Evaluating models of autoregressive conditional duration. *Journal of Business and Economic Statistics* **24**, 104-124 (2006, with M. Meitz).

70. A time series model for an exchange rate in a target zone with applications. *Journal of Econometrics* **131**, 579-609 (2006, with S. Lundbergh).

71. Common features in conditional distributions for bivariate time series. *Journal of Econometrics* **132**, 43-57 (2006, with C.W.J. Granger and A.J. Patton).

72. A sequential procedure for determining the number of regimes in a threshold autoregressive model. *Econometrics Journal* **9**, 472-491 (2006, with B. Strikholm).

73. Simulation-based finite-sample linearity test against smooth transition models. *Oxford Bulletin of Economics and Statistics* **68**, 797-812 (2006, with A. González).

74. Testing constancy of the error covariance matrix in vector models. *Journal of Econometrics* **140**, 753-780 (2007, with B. Eklund).

75. Modelling autoregressive processes with a shifting mean. *Studies in Nonlinear Dynamics and Econometrics* **12**, No. 1, Article 1 (2008, with A. González).

76. Parameterizing unconditional skewness in models for financial time series. *Journal of Financial Econometrics* **6**, 208-230 (2008, with C. He and A. Silvennoinen).

77. Positivity constraints on the conditional variances in the family of Conditional Correlation GARCH models. *Finance Research Letters* **5**, 88-95 (2008, with T. Nakatani).

78. Testing parameter constancy in vector autoregressive models against continuous change. *Econometric Reviews* **28**, 225-246 (2009, with C. He and A. González).

79. Testing for volatility interactions in the Constant Conditional Correlation GARCH model. *Econometrics Journal* **12**, 147-163 (2009, with T. Nakatani).

80. Modeling multivariate autoregressive conditional heteroskedasticity with the Double Smooth Transition Conditional Correlation GARCH model. *Journal of Financial Econometrics* **7**, 373-411 (2009, with A. Silvennoinen).

81. Stylized facts of financial time series and three popular models of volatility. *European Journal of Pure and Applied Mathematics*, **3**, 413-447 (2010, with H. Malmsten).

82. Stylized facts of return series, robust estimates, and three popular models of volatility. *Applied Financial Economics* **21**, 67-94, (2011, with Z. Zhao).


## D. Articles in Books and Proceedings

1. Aspects of rational distributed lag models with autoregressive – moving average disturbances and their economic applications, in A. Suvanto (ed.): *Proceedings of the 2nd Finnish-Soviet Symposium in Economics*. 149-171. Helsinki (1979).

2.  On the superiority of the polynomial distributed lag estimator over ordinary least squares in the estimation of distributed lags, in *Contributed Papers, 42nd Session, International Statistical Institute*, Manila (1979).

3.  Restricted superiority of linear homogeneous estimators over OLS in the estimation of linear models, in *Contributed Papers, 43rd Session of the International Statistical Institute*, Buenos Aires-Argentina, Vol. I (1981).

4.  On the accuracy of mixed estimators in the estimation of linear models, in E.G. Charatsis (ed.): *Selected Papers on Contemporary Econometric Problems*, 173-183. Athens: The Athens School of Economics and Business Science (1982).

5.  Strong superiority of heterogeneous linear estimators. *American Statistical Association 1983 Proceedings of the Business and Economic Statistics Section*, 135-139 (1984).

6.  Smoothness in regression: Asymptotic considerations, in I.B. MacNeill and G.J. Umphrey (eds.): *Time Series and Econometric Modeling*, 47-64. Dordrecht: Reidel (1987).

7.  Reducing the dimension of input vector in transfer function models: The case of quick indicators, in P. Lehtonen and A. Somervuori (eds.): *A Tribute to Aarni Nyberg on His 60th Birthday*, 115-121. Helsinki: Acta Academiae Oeconomicae Helsingiensis A 52 (1987).

8.  How we got the data, in T. Pukkila and S. Puntanen (eds.): *Proceedings of the Second International Tampere Conference in Statistics*, 1-7. Tampere: University of Tampere (1987).

9.  Linear model selection, criteria and tests, in S. Kotz, N.L. Johnson and C.B. Read (eds.): *Encyclopedia of Statistical Sciences*, Supplement, 83-87. New York: Wiley (1989, with I. Mellin).

10.  Structural change in Swedish and Finnish industrial output series, in P. Hackl and A. Westlund (eds.): *Economic structural change. Analysis and Forecasting*, 291-300. Berlin: Springer-Verlag (1991).

11.  Estimating the smoothing parameter in piecewise constant regression, in W.E. Griffiths, H. Lütkepohl and M.E. Bock (eds.): *Readings in econometric theory and practice: A volume in honor of George Judge*, 215-241. Amsterdam: North-Holland (1992, with I. Mellin).

12.  Experiments in modeling nonlinear relationships between time series, in S. Eubank and M. Casdagli (eds): *Nonlinear modeling and forecasting. Proceedings of the Workshop on Non-linear Modeling and Forecasting*. Held September 1990, in Santa Fe, New Mexico, 189-197. Redwood City, CA: Addison-Wesley (1992, with C.W.J. Granger).

13.  Forecasting the output of Finnish forest industries using business survey data, in K.H. Oppenländer and G. Poser (eds.): *Business cycle analysis by means of economic surveys*, Part I, 305-319. Aldershot: Avebury (1992, with M. Rahiala).

14.  Modeling nonlinearity over the business cycle, in J.H. Stock and M.W. Watson (eds.): *Business cycles, indicators and forecasting*, 311-325. Chicago: Chicago University Press (1993, with C.W.J. Granger and H. Anderson).

15.  Aspects of modelling nonlinear time series, in R.F. Engle and D. L. McFadden (eds.): *Handbook of Econometrics*, Vol. 4, 2919-2957. Amsterdam: North-Holland (1994, with D. Tjøstheim and C.W.J. Granger).

16. Linearity testing and nonlinear modelling of economic time series, in W. A. Barnett, A.P. Kirman and M. Salmon (eds.): *Dynamic nonlinear models in economics*, 281-293. Cambridge: Cambridge University Press (1996).

17. Smooth transition models, in C. Heij, H. Schumacher, B. Hanzon and K. Praagman (eds.): *System dynamics in economic and financial models*, 109-136 (with discussion). New York: Wiley (1997).

18. Modeling economic relationships with smooth transition regressions, in A. Ullah and D.E.A. Giles (eds.): *Handbook of applied economic statistics*, 507- 552. New York: Dekker (1998).

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**E. Miscellaneous**

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Modelling conditional and unconditional heteroskedasticity with smoothly time-varying structure (January 2008, with C. Amado).

Testing the Granger noncausality hypothesis in stationary models of unknown functional form (March 2008, with Anne Péguin-Feissolle and Birgit Strikholm).

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**Referee for the following journals:**

Acta Universitatis Lodziensis, Folia Economica

AMBIO – A journal of the Human Environment

Annales d'économie et de statistique

Annals of the Institute of Statistical Mathematics

Applied Stochastic Models in Business and Industry

Biometrika

Canadian Journal of Physics

Communications in Statistics A, Theory and Methods

Computational Statistics & Data Analysis

Decision Support Systems

Ecological Economics

Econometric Reviews

Econometric Theory

Econometrica

Econometrics Journal

Economic Journal

Economic Modelling

Economica

Economics Letters

Empirical Economics

Energy Economics

Energy Journal

European Economic Review

European Journal of Finance

Finnish Economic Papers

German Economic Review

IEEE Transactions on Neural Networks

International Economic Review

International Journal of Forecasting

International Review of Economics and Finance

Jahrbücher für Nationalökonomie und Statistik

Journal of the American Statistical Association

Journal of Applied Econometrics

Journal of Applied Statistics

Journal of Business & Economic Statistics

Journal of Business Cycle Analysis and Measurement

Journal of Development Economics

Journal of Econometrics

Journal of Economic Dynamics and Control

Journal of Empirical Finance

Journal of Financial Econometrics

Journal of Forecasting

Journal of International Money and Finance

Journal of Macroeconomics

Journal of Money, Credit and Banking

Journal of Official Statistics

Journal of Public Economics

Journal of the Royal Statistical Society, Series B

Journal of Statistical Computation and Simulation

Journal of Statistical Planning and Inference

Journal of Time Series Analysis

Kansantaloudellinen Aikakauskirja

Linear Algebra and its Applications

Macroeconomic Dynamics

Manchester School (The)

Marketing Science

Mathematical Finance

Metrika

Neural Computation

Neural Processing Letters

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Quantitative Finance

Review of Economics and Statistics

Review of Financial Economics

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Scandinavian Housing and Planning Research

Scandinavian Journal of Economics

Scandinavian Journal of Statistics

Scottish Journal of Political Economy

Statistica Sinica

Statistical Inference for Stochastic Processes

Statistical Papers

The Statistician (Journal of the Royal Statistical Society, Series D)

Statistics

Stochastic Analysis and Applications

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World Bank Economic Review

**Principal supervisor for the following graduate students at SSE**
**(titles of their PhD theses included):**

1. Åsbrink, S. E., 1997, *Nonlinearities and regime shifts in financial time series,* EFI, Stockholm School of Economics, Stockholm.

2. Hagerud, G. E., 1997, *A new non-linear GARCH model,* EFI, Stockholm School of Economics, Stockholm.

3. He, C., 1997, *Statistical properties of GARCH processes,* EFI, Stockholm School of Economics, Stockholm.

4. Skalin, J., 1998, *Modelling macroeconomic time series with smooth transition autoregressions,* EFI, Stockholm School of Economics, Stockholm.

5. Lundbergh, S., 1999, *Modelling economic high-frequency time series,* EFI, Stockholm School of Economics, Stockholm.

6. Eliasson, A.-C., 1999, *Smooth transitions in macroeconomic relationships,* EFI, Stockholm School of Economics, Stockholm.

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8. Rech, G., 2002, *Modelling and forecasting economic time series with single hidden-layer feedforward autoregressive artificial neural networks*, EFI, Stockholm School of Economics, Stockholm.

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10. Malmsten, H., 2004, *Properties and evaluation of volatility models,* EFI, Stockholm School of Economics, Stockholm.

11. González, A., 2004, *Nonlinear dynamics and smooth transitions,* EFI, Stockholm School of Economics, Stockholm.

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13. Meitz, M., 2006, *Five contributions to econometric theory and the econometrics of ultra-high-frequency data.* EFI, Stockholm School of Economics, Stockholm.

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