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EDUCATION

M.A. (Economics) University of California, Davis, December 1984

Ph.D. (Economics) University of California, San Diego, June 1989
Dissertation Title: *Estimation of Neural Network Models*
Dissertation Advisor: Halbert White

RESEARCH FIELDS

Econometric Theory, Time Series Analysis, Neural Networks, Economic Forecasting, Financial Econometrics

TEACHING FIELDS

Econometric Theory, Statistics, Time Series Analysis, Economic Forecasting

PROFESSIONAL POSITIONS

Assistant Professor, Department of Economics, University of Illinois, Urbana-Champaign, U.S., August 1989–July 1995 (on leave 1994–1995).

Associate Professor with Tenure, Department of Economics, University of Illinois, Urbana-Champaign, U.S., August 1995–July 1996 (on leave).

Professor, Department of Economics National Taiwan University, Taiwan, August 1994–present (Primary affiliation: August 1994–July 1999); joint appointment with Department of Finance, February 2000–present.

Research Fellow, Institute of Economics, Academia Sinica, Taiwan, August 1997–August 2004 (Primary affiliation from August 1999).

Director, Social Science Research Center, National Science Council, Taiwan, June 1999–August 2001.

Director, Institute of Economics, Academia Sinica, Taiwan, August 2001–Present.

Distinguished Research Fellow, Institute of Economics, Academia Sinica, Taiwan, Sept. 2004–Present.

Visiting Professor, Department of Economics, University of California, San Diego, Sept. 2005–Dec. 2005.

OTHER AFFILIATIONS

Distinguished Professor at Large, National Cheng-Chi University, Taiwan, August 2002–present.

Adjunct Professor, Xiamen University, China, April 2005–present.

Adjunct Professor, National Sun-Yat-Sen University, Taiwan, August 2005–present.

Consultant Professor, Huazhong University of Science and Technology, China, Oct. 2006–present.

AWARDS AND HONORS

ODE/EGSO Teaching Award (Large Class), College of Commerce and Business Administration, University of Illinois, 1991.

Excellent Teacher in Commerce, College of Commerce and Business Administration, University of Illinois, 1990, 1991, 1992.

ODE/EGSO Teaching Award (Small Class), College of Commerce and Business Administration, University of Illinois, 1993.

Distinguished Research Award (2-year term), National Science Council, Executive Yuan, Taiwan, 1994–1995, 1996–1997.

Lien Zhen-Dong Memorial Fellowship, College of Law, National Taiwan University, 1996.

Outstanding Scholarship Award (5-year term), Foundation for the Advancement of Outstanding Scholarship, Taiwan, 1997–2001, 2002–2006.

NTU Teaching Award, National Taiwan University, 1999.

Academic Award, Ministry of Education, Executive Yuan, Taiwan, 1999.

Member (Academician) of Academia Sinica, Taiwan, elected 2002.

Information Science Award, Joint Conference of Information Sciences, 2006.

KEYNOTE AND INVITED SPEECHES

Annual speech, Foundation in Memory of S. C. Tsiang, Taipei, Taiwan, October 21, 2002.

Invited address, 2002 Conference on Electronic Commerce (EC 2002), National Chung-Hsing University, Taiwan, December 9, 2002.

Keynote speech, 2003 Taiwan Conference on Applied Economics, Tamkang University, Taiwan, October 17, 2003.

Invited speech, Interchange Association, Japan (IAJ), Tokyo, Japan, March 25, 2004.

Nan-Qiang Lecture, Xiamen University, Xiamen, China, April 6, 2005.

Huei-Sun Lecture, National Chung-Hsin University, Taiwan, April 14, 2005.

Keynote speech, KESG (Korean Econometric Study Group) Meeting, Jeju, Korea, May 28, 2005.

President's Forum, National Cheng-Kung University, Taiwan, June 9, 2005.

Invited talk, Conference on Globalization and Economic Growth: The Role of Openness, Innovation and Human Capital, Shanghai University of Finance and Economics, Shanghai, China, Nov. 4, 2005.

Invited talk, Annual Meeting of the Chinese Quantitative Economics Association, Hangzhou, China, May 13, 2006.

Keynote speech, 9th Joint Conference of Information Sciences, Kaohsiung, Taiwan, Oct. 8, 2006.

Huang Da-R. Mundell Lecture, School of Finance, Renmin University, China, Oct. 25, 2006.

Invited talk, International Workshop on Forecasting and Risk Management, Chinese Academy of Science, China, Dec. 20, 2006.

EDITORSHIP

Taiwan Economic Review, Associate Editor, August 1994–July 1996; Editor, August 1996–July 1998.

Academia Economic Papers, Associate Editor, September 1998–August 2000; Executive Editor, September 2000–August 2001.

Proceedings of the Annual Meeting of Taiwan Economic Association, Editor, 1999–2000.

Statistica Sinica, Associate Editor, 1999–July 2005.

Journal of Econometrics. Associate Editor, 1999–present.

Economics Bulletin, Associate Editor, 2001–July 2005.

Studies in Nonlinear Dynamics and Econometrics. Associate Editor, 2001–Jan. 2006.

Econometric Reviews, Associate Editor, 2004–present.

Journal of Econometrics, Special issue on "Recent Development in Financial Econometrics", Guest Editor, 2005.

China Economic Quarterly, Editorial board, 2005–present.

REFEREED ARTICLES (International)

C. W. J. Granger, C.-M. Kuan, M. Mattson, and H. White, "Trends in unit energy consumption: The performance of end-use models", *Energy*, **14**, 943–960, 1989.

C.-M. Kuan and K. Hornik, "Learning in a partially hard-wired recurrent network", *Neural Network World*, **1**, 39–45, 1991.

C.-M. Kuan and K. Hornik, "Convergence of learning algorithms with constant learning rates", *IEEE Transactions on Neural Networks*, **2**, 484–489, 1991.

K. Hornik and C.-M. Kuan, "Convergence analysis of local feature extraction algorithms", *Neural Networks*, **5**, 229–240, 1992.

S. Piramuthu, C.-M. Kuan, and M. Shaw, "Learning algorithms for neural-net decision support", *ORSA Journal on Computing*, **5**, 361–373, 1993.

C.-M. Kuan and H. White, "Artificial neural networks: An econometric perspective" with reply, *Econometric Reviews*, **13**, 1–91 and 139–143, 1994.

C.-M. Kuan, K. Hornik, and H. White, "A convergence result for learning in recurrent neural networks", *Neural Computation*, **6**, 420–440, 1994.

C.-M. Kuan and M.-Y. Chen, "Implementing the fluctuation and moving-estimates tests in dynamic econometric models", *Economics Letters*, **44**, 235–239, 1994.

K. Hornik and C.-M. Kuan, "Gradient-based learning in recurrent networks", *Neural Network World*, **2/94**, 157–172, 1994.

C.-M. Kuan, "A range-CUSUM test with recursive residuals", *Economics Letters*, **45**, 309–313, 1994.

C.-M. Kuan and H. White, "Adaptive learning with nonlinear dynamics driven by dependent processes", *Econometrica*, **62**, 1087–1114, 1994.

C.-M. Kuan, "A recurrent Newton algorithm and its convergence properties", *IEEE Transactions on Neural Networks*, **6**, 779–783, 1995.

C.-M. Kuan and K. Hornik, "The generalized fluctuation test: A unifying view", *Econometric Reviews*, **14**, 135–161, 1995.

C.-S. Chu, K. Hornik, and C.-M. Kuan, "MOSUM tests for parameter constancy", *Biometrika*, **82**, 603–617, 1995.

C.-S. Chu, K. Hornik, and C.-M. Kuan, "The moving-estimates test for parameter stability", *Econometric Theory*, **11**, 669–720, 1995.

L. Nunes, C.-M. Kuan, and P. Newbold, "Spurious break", *Econometric Theory*, **11**, 736–749, 1995.

C.-M. Kuan and T. Liu, "Forecasting exchange rates using feedforward and recurrent networks", *Journal of Applied Econometrics*, **10**, 347–364, 1995.

L. Nunes, P. Newbold, and C.-M. Kuan, "Spurious number of breaks", *Economics Letters*, **50**, 175–178, 1996.

L. Nunes, P. Newbold, and C.-M. Kuan, "Testing for unit-roots with breaks: Evidence on the great crash and the unit-root hypothesis reconsidered", *Oxford Bulletin of Economics and Statistics*, **50**, 435–448, 1997.

C.-M. Kuan, "Tests for changes in models with a polynomial trend", *Journal of Econometrics*, **84**, 75–91, 1998.

C.-M. Kuan and C.-C. Hsu, "Change-point estimation of fractionally integrated processes", *Journal of Time Series Analysis*, **19**, 693–708, 1998.

C.-M. Kuan, "A note on tests for partial parameter instability in the trend stationary model", *Economics Letters*, **65**, 285–291, 1999.

Y.-T. Chen, R. C. Chou, and C.-M. Kuan, "Testing time reversibility without moment restrictions", *Journal of Econometrics*, **95**, 199–218, 2000.

F. Leisch, K. Hornik, and C.-M. Kuan, "Monitoring structural changes with the generalized fluctuation test", *Econometric Theory*, **16**, 835–854, 2000.

M.-Y. Chen and C.-M. Kuan, "Testing parameter constancy in models with infinite variance errors", *Economics Letters*, **72**, 11–18, 2001.

C.-C. Hsu and C.-M. Kuan, "Distinguishing between trend break models: Method and empirical evidence", *Econometrics Journal*, **4**, 171–190, 2001.

C.-M. Kuan and M.-Y. Chen, "Response surfaces of MOSUM critical values", *Applied Economics Letters*, **9**, 133–136, 2002.

Y.-T. Chen and C.-M. Kuan, "The pseudo-true score encompassing test for non-nested hypothesis", *Journal of Econometrics*, **106**, 271–295, 2002. Corrigendum, *Journal of Econometrics*, forthcoming.

Y.-T. Chen and C.-M. Kuan, "Time irreversibility and EGARCH effects in U.S. stock index returns", *Journal of Applied Econometrics*, **17**, 565–578, 2002.

C.-M. Kuan and W.-M. Lee, "A new test for the martingale difference hypothesis", *Studies in Nonlinear Dynamics and Econometrics*, **8:4**, Article 1, 2004.

P.-H. Hsu and C.-M. Kuan, "Re-examining the profitability of technical analysis with data snooping checks", *Journal of Financial Econometrics*, **3**, 606–628, 2005.

C.-M. Kuan, Y.-L. Huang, and R. S. Tsay, "An unobserved-component model with switching permanent and transitory innovations", *Journal of Business and Economic Statistics*, **23**, 443–454, 2005.

C.-M. Kuan and W.-M. Lee, "Robust M tests without consistent estimation of asymptotic covariance matrix", *Journal of the American Statistical Association*, **101**, 1264–1275, 2006.

C.-L. Chen, C.-M. Kuan, and C.-C. Lin, "Saving and housing of Taiwan households: New evidence from quantile regression analysis", *Journal of Housing Economics*, forthcoming.

C.-M. Kuan, "Artificial neural networks", in *New Palgrave Dictionary of Economics*, S. N. Durlauf and L. E. Blume (eds.), forthcoming.

Y.-C. Hsu and C.-M. Kuan, "Change point estimation of nonstationary $I(d)$ processes", *Economics Letters*, forthcoming.

C,-M. Kuan and Y.-W. Hsieh, "Improved HAC covariance matrix estimation based on forecast errors," *Economics Letters*, forthcoming.

REFEREED ARTICLES (Local)

Y.-L. Huang, C.-M. Kuan, and K. Lin, "Identifying the turning points of business cycles and forecasting economic growth rates in Taiwan" (in Chinese), *Taiwan Economic Review*, **26**, 431–457, 1998.

C.-M. Kuan, "Some issues in time series model specification" (in Chinese), *Taiwan Economic Review*, **27**, 1–17, 1999.

C.-n. Chen, S. Chen and C.-M. Kuan, "Uniqueness and indeterminacy: the Marshall-Lerner condition and real exchange rate dynamics", *Taiwan Economic Review*, **28**, 401–408, 2000.

S.-H. Hsu and C.-M. Kuan, "Identifying Taiwan's business cycles in 1990s: An application of the bivariate Markov switching model and Gibbs sampling" (in Chinese), *Journal of Social Sciences and Philosophy*, **13**, 515–540, 2001.

C.-C. Lin, M.-W. Hong, and C.-M. Kuan, "The dynamic behavior of short term interest rates in Taiwan: An application of the regime switching model" (in Chinese), *Academia Economic Papers*, **30**, 29–55, 2002.

S.-H. Hsu, C.-M. Kuan, and Y.-H. Luo, "Macroeconomic forecasting based on diffusion indexes" (in Chinese), *Taiwan Economy Forecast and Policy*, **36:1**, 1–28, 2005.

C.-C. Chuang and C.-M. Kuan, "A quantile regression analysis of return-volume relation: Evidence from the Taiwan and U.S. stock exchanges" (in Chinese), *Academia Economic Papers*, **33**, 379–404, 2005.

C.-L. Chen and C.-M. Kuan, "Taiwan's wage equation and gender wage discrimination: Evidence from quantile regression analysis" (in Chinese), *Academia Economic Papers*, **34**, 435–468, 2006.

S.-M. Wang, C.-M. Kuan, and J. C. Lo, "The effects of maternal characteristics and pregnancy status on birth weights" (in Chinese), *Taiwan Journal of Public Health*, **25:6**, 474–481, 2006.

BOOK

C.-M. Kuan, *Statistics: Concepts and Methods*, 2nd edition (in Chinese, 495 pages), Taipei: Hua-Tai Publisher, 2004.

PROCEEDINGS AND OTHERS

C.-M. Kuan, and H. White, "Some convergence results for learning in recurrent neural networks", in *Proceedings of the Sixth Yale Workshop on Adaptive and Learning Systems*, K. S. Narendra ed., pp. 103–109, New Haven: Yale University, 1990.

C.-M. Kuan and K. Hornik, "Implementing recurrent networks", in *Proceedings of the Seventh Yale Workshop on Adaptive and Learning Systems*, K. S. Narendra ed., pp. 64–68, New Haven: Yale University, 1992.

C.-M. Kuan, "Review of '*Money and Financial System*' — Essays on the Economy of Taiwan, vol. 4", *Digest of Chinese Studies*, 7–9, 1992.

C.-M. Kuan, "Review of '*Demand, Consumption, and Welfare Economics*' — Essays on the Economy of Taiwan, vol. 8", *Digest of Chinese Studies*, 13–15, 1992.

C.-M. Kuan, K. Hornik, and T. Liu, "Recurrent back-propagation and Newton algorithms for training recurrent neural networks", in *Substance Identification Analytics*, J. L. Flanagan, R. J. Mammone, A. E. Brandstein, E. R. Pike, S. C. A. Thomopoulos, M. P. Boyer, H. K. Huang, and O. M. Ratib, eds., Vol. 2093 of *Europto Series*, pp. 220–229, SPIE, 1993.

C.-M. Kuan, "Review of '*An Analysis and Forecast of International Oil Price*' — Modern Economic Studies Series No. 26", *Digest of Chinese Studies*, 9–10, 1993.

C.-M. Kuan, "Review of '*An Empirical Study of Nonlinear Consumption Function in Taiwan*' — Economics Papers No. 145", *Digest of Chinese Studies*, 11–12, 1993.

C.-M. Kuan and T. Liu, "Forecasting high-frequency futures prices: An experience with neural networks", in *Proceedings of Neural Networks in the Capital Markets*, Y. S. Abu-Mostafa ed., Pasadena: California Institute of Technology, 1994.

C.-M. Kuan, "Writing style for Taiwan Economic Review" (in Chinese), *Taiwan Economic Review*, **50**, 569–576, 1997.

J. Chou and C.-M. Kuan, "Identifying the trough of the eighth business cycle in Taiwan and the cause of its formation" (in Chinese), *Economic Papers*, No. 192, Chung-Hua Institution for Economic Research, Taipei, 1999.

C.-M. Kuan, "An empirical analysis of the domestic and foreign impacts on Taiwan's real output" (in Chinese), *Essays in Honor of Lee Yuan-Tse's 70th Birthday*, Taipei, 2006.

WORKING PAPERS

W.-M. Lee and C.-M. Kuan, Testing over-identifying restrictions without consistent estimation of asymptotic covariance matrix, submitted.

C.-C. Chuang, C.-M. Kuan, and H.-y. Lin, The stock return-volume relations: Causality in quantiles and pattern of causal effects, submitted.

Y.-L. Huang and C.-M. Kuan, Innovation regime switching in real exchange rate and long-run PPP.

C.-M. Kuan and H.-Y. Lin, An encompassing test of non-nested quantile regression models.

S.-H. Hsu and C.-M. Kuan, Consistent parameter estimation in conditional moment restrictions.

CONFERENCE ORGANIZING/PROGRAM COMMITTEE

Far Eastern Meeting of the Econometric Society, Singapore, July 1–3, 1999.

International Conference in Honor of Gregory Chow: China and the World Economy, City University of Hong Kong, Hong Kong, June 14–16, 2002.

WEAI Pacific Rim Conference (Chair), Institute of Economics, Academia Sinica, Taipei, Taiwan, Jan. 9–12, 2003.

International Conference on the Analysis of High-Frequency Financial Data and Market Microstructure (Co-Chair), Institute of Economics, Academia Sinica, Taipei, Taiwan, Dec. 15–16, 2003.

Far Eastern Meeting of the Econometric Society, Seoul, Korea, June 30–July 2, 2004.

Taipei International Conference on Growth and Development in Global Perspectives (Chair), Institute of Economics, Academia Sinica, July 2004. Taipei, Taiwan, July 23–24, 2004.

Taipei Conference on Macroeconomics and Development (Chair), Institute of Economics, Academia Sinica, Taipei, Taiwan, Dec. 16–17, 2004.

First Symposium on Econometric Theory and Applications (SETA2005, Co-Chair), Institute of Economics, Academia Sinica, Taipei, Taiwan, May 18–20, 2005.

International Conference of the Asia-Pacific Economic Association (APEA), Hitotsubashi University, Tokyo, Japan, July 30–31, 2005.

Far Eastern Meeting of the Econometric Society, Beijing, China, July 9–11, 2006.

Second Symposium on Econometric Theory and Applications (SETA2006, Co-Chair), Xiamen University, Xiamen, China, April 4–6, 2006.

International Symposium on Financial Engineering and Risk Management (FERM2006), Xiamen University, Xiamen, China, July 5–6, 2006.

Third Symposium on Econometric Theory and Applications (SETA2007), Hong Kong University of Science and Technology, Hong Kong, April 13–15, 2007.

Far Eastern Meeting of the Econometric Society (Co-Chair), Taipei, Taiwan, July 11–13, 2007.

Fourth Symposium on Econometric Theory and Applications (SETA2008, Co-Chair), Seoul National University, Korea, May, 2008.

OTHER PROFESSIONAL ACTIVITIES

Member of the Econometric Society and Taiwan Economic Association

Secretary General and President, Taiwan Economic Association, 2001 and 2003.

Referee for:

National Center for Supercomputing Applications, U.S.
National Science Council, Taiwan
National Science Foundation, U.S.

Neural Information Processing Systems (NIPS)
Social Sciences and Humanities Research Council, Canada
University Grants Committee, Hong Kong
Academia Economic Papers
Applied Economics
Econometric Reviews
Econometric Theory
Econometrics Journal
Economic Modelling
IEEE Transactions on Information Theory
IEEE Transactions on Neural Networks
IEEE Transactions on Systems, Man, Cybernetics
International Economic Review
International Journal of Forecasting
Journal of Applied Econometrics
Journal of Asia Pacific Economy
Journal of Business and Economic Statistics
Journal of Econometrics
Journal of Empirical Finance
Journal of Forecasting
Journal of Macroeconomics
Journal of Mathematical Systems, Estimation, and Control
Journal of Money, Credit and Banking
Journal of the American Statistical Association
Journal of Urban Economics
Neural Networks
Quarterly Review of Economics and Finance
Review of Economics and Statistics
Sankhya, The Indian Journal of Statistics
Statistica Sinica
Taiwan Economic Review
Water Resource Research