

2004 ANNUAL REPORT

Communication Economics and Electronic

Markets Research Centre

School of Economics and Finance
Curtin University of Technology
GPO Box U1987
Perth WA 6845

Telephone: + 61 8 9266 4258

Facsimile: + 61 8 9266 2391

Web page: <http://www.cbs.curtin.edu.au/business/research/ceem-research-centre>

FROM THE DIRECTOR

Welcome to the 2004 CEEM Annual Report. The year was productive with substantial activity across research themes. This activity resulted in academic research published in scholarly journals, conference participation, professional development and input into public policy debate. The educational mission of the Centre assisted Tanya Mokdad to complete her Economics Honours degree. Tanya accepted a Graduate position with the Budget Group Division at the Commonwealth Department of Finance and Administration commencing in February 2005. CEEM employment continues to assist Fleur Parra (Management) and Michael Schipp (Economics and Finance) to complete their degrees. Joachim Tan (Finance) comes on board next year to complete his PhD thesis under the supervision of Gary Madden (Economics) and Meher Manzur (Banking). Joachim's position is funded by an Australian Research Council Discovery Project.

The activity reported herein is the result of a team effort. Thanks to CEEM staff and students for their hard work and support. In particular, CEEM wishes to acknowledge Professor Mike Wood (Executive Dean CBS), Associate Professor Geoff Crockett (Dean of Operations CBS), Professor Ram Ramaseshan (Head, CBS R&D Committee), Associate Professor Ian Kerr (Head, School of Economics and Finance) and Associate Professor Sandra Hopkins (Head, Department of Economics) for their foresight and active support. Appreciation is also extended to public and private sector organizations that support CEEM research and education programs, and to the Advisory Board for their continued valuable contribution. In 2005, the team anticipates an exciting year with planned collaboration on projects with Russel Cooper (University of Western Sydney), Robert Fildes (Lancaster University, UK), M. Ishaq Nadiri (New York University USA), Paul Rappoport (Temple University, USA), Lester Taylor (University of Arizona, USA), Truong Truong (University of New South Wales) and Moon-Koo Kim (ETRI, Korea).

Gary Madden
Director

HIGHLIGHTS

INVITED SOUTH AFRICAN RESEARCH COUNCIL PRESENTATIONS

An invitation to visit the University of South Africa (UNISA), Pretoria was received from Professor Dorette van Ede the Director of the School of Applied Social Sciences. The September visit was funded through the South African Research Council Thuthuka (Zulu for 'growth') Program. This visit allowed Gary to assess the progress of Zandi Lesame's DLitt et Phil thesis work (Gary is her Proposer), and consult with UNISA graduate students. The trip itinerary also included presentations to: Department of Communication Science at UNISA (Pretoria); Department of Media Studies at the University of the North (Limpopo Province); and the Link Centre for Telecommunications Policy and Regulation at the University of Witwatersrand (Johannesburg). The trip also provided Gary with an opportunity to visit several townships to review the operation of telecentres. Telecentres are a key mechanism to address communications technology inequity based on geographic location.

INTERNATIONAL SYMPOSIUM ON FORECASTING 2004 ORGANIZATION

The ISF2004 Organizing Committee appointed Gary as a Program Chair for the International Institute of Forecaster's International Symposium on Forecasting 2004 with a mission to cultivate a stream of telecommunications forecasting sessions. The sessions: Telecommunications Business Forecasting (John Street DoCITA, Penny Blankfield Telstra, Aniruddha Banerjee NERA Economic Consultants); Telecommunications I (Kjell Stordahl Telenor Networks, Borgar Olsen Telenor R&D, Mohsen Hamoudia France Telecom); Telecom Consumer Demand Studies (Alastair Robertson Lancaster University, Ashley Lloyd Curtin University of Technology, Paul Rappoport Temple University); Modelling ICT and Traffic Forecast Methodology (Russel Cooper University of Western Sydney, Paul Gretton Productivity Commission, Joachim Tan Curtin University of Technology, Gary Madden Curtin University of Technology); and Telecommunications II (Nigel Meade Imperial College London, Clive Mason BT Retail, Stuart Bretschneider Syracuse University) generated much discussion, and provided a sound basis for future collaboration. A highlight of the meetings was a Keynote Address by Noble Laureate, Clive Granger. Clive spoke of the essential contribution that forecasting makes to rational economic decision-making, and planning more generally.

CBS SPONSORED CONFERENCE PUBLISHES PHYSICA-VERLAG VOLUME

A selection of papers presented at the International Telecommunications Society conference, 'M-business, E-commerce and the Impact of Broadband on Regional Development and Business Prospects', held in Perth, June 22-24 2003, were published by Physica-Verlag (Heidelberg) in June. The contents of the volume are:

FRONTIERS OF BROADBAND, ELECTRONIC AND MOBILE COMMERCE

Contribution to Economics Series, Physica-Verlag, Heidelberg

Edited by

R. Cooper (University of Western Sydney, Australia), G Madden (Curtin University of Technology, Australia)

Part I. E-COMMERCE BUSINESS MODELS

1. Cellular 3G Broadband and WiFi, J Hausman (Massachusetts Institute of Technology, USA)
2. Geographic and Socially Embedded B2C and B2B E-Commerce, C Steinfield (Michigan State University, USA)
3. SME International E-Commerce Activity, J Tiessen (McMaster University, Canada)
4. SME Interaction in Supply Chains, P Malone (National Office for the Information Economy, Australia)

Part II. TECHNOLOGY AND PRODUCTIVITY

5. Deciding on Network Architecture for 3G Wireless Services, H Kim (University of Pittsburgh, USA)
6. Rational Explanations of ICT Investment, R Cooper (University of Western Sydney, Australia), G Madden (Curtin University of Technology, Australia)
7. Measurement of Total Factor Productivity Growth for US Telecommunications, J Bernstein (Carleton University, Canada), C Zarkadas (NERA Economic Consultants, USA)
8. Measuring TFP for an Expanding Telecommunications Network, R Cooper (University of Western Sydney, Australia), G Madden (Curtin University of Technology, Australia), G Coble-Neal (Curtin University of Technology, Australia)
9. Dynamic Aspects of US Telecommunications Productivity Measurement, M Nadiri (New York University, USA), B Nandi (AT&T Laboratories, USA)

Part III. DEMAND AND PRICING

10. Korean Wireless Data Communication Markets and Consumer Technology Choice, S Byun (Seoul National University, Korea), J Lee (Seoul National University, Korea), J Lee (Seoul National University, Korea), J Ahn (Seoul National University, Korea)
11. WTP Analysis of Mobile Internet Demand, P Rappoport (Temple University, USA), L Taylor (University of Arizona, USA), J Alleman (University of Colorado, USA)
12. Asymmetry in Pricing Information Goods, Y Sohn (Chonnam University, Korea)

Part IV. MARKET GROWTH AND REGULATION

13. Measuring Network Effects for Telecommunications Systems, G Madden (Curtin University of Technology, Australia), A Banerjee (NERA Economic Consultants, USA), G Coble-Neal (Curtin University of Technology, Australia)
14. Broadband Markets and Open Access Policy, G Woroch (University of California Berkeley, USA)

15. Spectrum Management and Mobile Telephone Service Markets, J Bauer (Michigan State University, USA)

Part V. DEVELOPMENT IMPERATIVE

16. North African Information Networks, A Kavanaugh (Virginia Tech, USA)

17. OECD Broadband Market and Developments, D Ypsilanti (OECD, France), S Paltridge (OECD, France)

18. Understanding the Evolving Digital Divide, R Cooper (University of Western Sydney, Australia), G Madden (Curtin University of Technology, Australia)

RESEARCH OUTPUT

PUBLICATION—BOOKS

1. Cooper R, Madden G (2005) *The Industrial Dynamics of Network Electronic Markets. New Dimensions in Networks Series*. Edward Elgar, Cheltenham, forthcoming
2. Cooper R, Lloyd A, Madden G, Schipp M (eds) (2005) *The Economics of ICT Networks. Contributions to Economics Series*. Physica-Verlag, Heidelberg, forthcoming
3. Cooper R, Madden G (eds) (2004) *Frontiers of Broadband, Electronic and Mobile Commerce. Contributions to Economics Series*. Physica-Verlag, Heidelberg, pp 340 + xiii

PUBLICATION—BOOK CHAPTERS

4. Cooper R, Madden G (2005) *ICT, the New Economy and Growth: The Potential for Emerging Markets*. In: K Donaghy (ed) *Globalisation and Regional Economic Modelling*. Springer, New York, forthcoming
5. Cooper R, Madden G (2005) *The Digital Divide: Regional Implications of Rapid Technological Change in ICT*. In: K Donaghy (ed) *Globalisation and Regional Economic Modelling*. Springer, New York, forthcoming
6. Cooper R, Madden G (2005) *Telecommunications Productivity Measurement for a Regulated Monopoly in an Era of Major Technological Change*. In: T Coelli, D Lawrence (eds) *Performance Measurement and Regulation of Network Utilities*. Edward Elgar, Cheltenham, forthcoming
7. Madden G, Schipp M, Tan J (2005) *Mobile Telephony and Internet Growth: Impacts on Consumer Welfare*. In: E Brousseau, N Curien (eds) *Internet Economics*. Cambridge University Press, Cambridge, forthcoming
8. Cooper R, Madden G (2004) *Understanding the Evolving Digital Divide*. In: R Cooper, G Madden (eds) *Frontiers of Broadband, Electronic and Mobile Commerce. Contributions to Economics Series*. Physica-Verlag, Heidelberg, pp 315-31
9. Cooper R, Madden G (2004) *Rational Explanations of ICT Investment*. In: R Cooper, G Madden (eds) *Frontiers of Broadband, Electronic and Mobile Commerce. Contributions to Economics Series*. Physica-Verlag, Heidelberg, pp 267-84

10. Cooper R, Madden G, Coble-Neal G (2004) Measuring Total Factor Productivity for an Expanding Telecommunications Network. In: R Cooper, G Madden (eds) *Frontiers of Broadband, Electronic and Mobile Commerce. Contributions to Economics Series*. Physica-Verlag, Heidelberg, pp 111-32
11. Madden G, Banerjee A, Coble-Neal G (2004) Measuring the Network Effect in Telecommunications Services. In: R Cooper, G Madden (eds) *Frontiers of Broadband, Electronic and Mobile Commerce. Contributions to Economics Series*. Physica-Verlag, Heidelberg, pp 195-220
12. Madden G, Coble-Neal G (2004) OECD Growth Blocs and the Role of ICT. In: E Bohlin, S Levin, N Sung, C Yoon (eds) *Global Economy and Digital Society*. Elsevier Science, Amsterdam, pp 71-88

PUBLICATION—REFEREED JOURNALS

13. Madden G, Coble-Neal G (2005) Australian Residential Telecommunications Consumption and Substitution Possibilities. *Review of Industrial Organization* 25, forthcoming
14. Madden G, Coble-Neal G (2005) Forecasting International Bandwidth Capability. *Journal of Forecasting* 24, forthcoming
15. Madden G, Coble-Neal G (2005) Internet Traffic Dynamics. *Teletronikk* 100, forthcoming
16. Cooper R, Madden G (2005) Regional Development and Business Prospects for ICT and Broadband Networks. *Telecommunications Policy* 29(2-3): 97-100
17. Madden G, Coble-Neal G (2004) A Cost of Living Index Incorporating a Network Effect. *Applied Economics* 36(19): 2231-5
18. Madden G, Coble-Neal G (2004) Economic Determinants of Global Mobile Telephony Growth. *Information Economics and Policy* 16(4): 519-34
19. Madden G, Coble-Neal G, Savage S (2004) United States Internet Penetration. *Applied Economics Letters* 11(9): 529-32
20. Madden G, Coble-Neal G, Dalzell B (2004) A Dynamic Model of Mobile Telephony Subscription Incorporating a Network Effect. *Telecommunications Policy* 28(2): 133-44

PUBLICATION—CONFERENCE PROCEEDINGS

21. Madden G, Truong T, Schipp M (2004) Entrant and Incumbent Firm Virtual Market Performance. In: R Stockdale (ed), *Proceedings of the 5th International We-B Conference: Enterprise Value from e-Business*, Edith Cowan University, Perth, November
22. Cooper R, Madden G (2005) A 'Model Consistent' Approach to Productivity Measurement. In: J Pincus (ed), *Proceedings of the Productivity Commission Conference Quantitative Tools for Microeconomic Policy Analysis*, Australian Government Publishing Service, Canberra, forthcoming

PUBLIC SERVICE

23. Madden G, Schipp M (2004) An Opinion as to the Adequacy of the Australian Bureau of Statistics *Wage Cost Index—Australia* to Guide WA Politician and Senior Public Servant Salary Settings. WA Salaries and Allowances Tribunal, March

WORKING PAPERS

24. Cooper R, Madden G (2004) Technological Barriers to Regional Development, Differential Uptake of ICT and Potential for Regional Convergence. Draft
25. Madden G, Rappoport P, Mokdad T (2004) Residential Information Technology Migration in the United States: The Case of Broadband Internet. Draft
26. Madden G, Tan J (2004) Forecasting International Bandwidth Capacity using Linear and ANN Methods. *International Journal of Forecasting*. Under review
27. Madden G, Tan J (2004) Obsolescence in Telecommunications. *Telecommunications Policy*. Under review
28. Madden G, Tan J (2004) The Impact of ICT on Economic Growth. Draft
29. Cooper R, Madden G (2004) Development Traps Due to ICT-human Capital Interdependencies. Draft
30. Fildes R, Madden G, Tan J (2004) Switching among Stock Price Forecast Methods through Logit Selection Protocols. Draft
31. Madden G, Schipp M (2004) Exact Consumer Surplus and Valuing Telecommunications Service in North Western Australia. Draft
32. Madden G, Truong T, Schipp M (2004) Entrant and Incumbent Firm Virtual Market Performance. Draft
33. Madden G, Truong T, Schipp M (2004) Competition and Market Growth Post Virtual-Market Entry. Draft
34. Madden G, Truong T, Tan J, Schipp M (2004) Competition and Beyond: Recent Evolution of Australian Telecommunications Markets. Draft
35. Cooper R, Madden G (2003) Network Externalities and the Internet. Draft
36. Cooper R, Madden G (2003) Telecommunications Carrier Investment Behaviour: Real Options and General Purpose Information Technology. Draft

PRESENTATIONS AT PROFESSIONAL GATHERINGS

37. Cooper R: 'The Digital Divide: Regional Implications of Rapid Technological Change in ICT', Regional Science Association International World Conference, Port Elizabeth, South Africa, April

38. Cooper R: 'Telecommunications Adoption versus Adjustment Costs in an Era of Major Technological Change', Australasian Meeting of the Econometric Society, Melbourne, Australia, July
39. Cooper R: 'Telecommunications Productivity Measurement for a Regulated Monopoly in an Era of Major Technological Change', Asia-Pacific Productivity Conference, Brisbane, Australia, July
40. Cooper R: 'Technological Barriers to Regional Development, Differential Uptake of ICT and Potential for Regional Convergence', 28th Annual Australia and New Zealand Regional Science Association International, Wollongong, Australia, September
41. Cooper R: 'A Model-consistent Approach to Productivity Measurement', Productivity Commission Conference, Canberra, Australia, November
42. Madden G: 'Switching Among Stock Price Forecast Methods through Logit Selection Protocols', 24th International Symposium on Forecasting, Sydney, Australia, July
43. Madden G: 'ICT, the New Economy and Growth: The Potential for Emerging Markets', Regional Science Association International World Conference, Port Elizabeth, South Africa, April
44. Madden G: 'Australian Residential Telecommunications Consumption and Substitution Possibilities', 15th Biennial Conference International Telecommunications Society, Berlin, Germany, September
45. Schipp M: 'Entrant and Incumbent Firm Virtual Market Performance', 5th International We-B Conference, Perth, November
46. Tan J: 'Forecasting International Bandwidth Capacity using Linear and ANN Methods', 24th International Symposium on Forecasting, Sydney, Australia, July

CONFERENCE ORGANIZATION

47. Madden G: Organizing Committee, 15th Biennial Conference International Telecommunications Society, Berlin, Germany, September
48. Madden G: Programme Committee, 24th International Symposium on Forecasting, Sydney, Australia, July

RESEACH GRANTS

49. ARC Discovery Project (DP0555882) 2005-7 \$135,000
50. ARC Discovery Project (DP0559922) 2005-7 \$84,000

RESEARCH STUDENTS

Lesame Z, DLitt et Phil thesis title: 'Telecommunications and Economic Development in the Republic of South Africa,' University of South Africa

Mokdad T, Honours thesis title: 'US Residential Demand for Internet Access: An Ordered Logit Approach', Curtin University of Technology

Tan J, PhD thesis title: 'The Impact of Idiosyncratic Risk in Event Studies', Curtin University of Technology

INSTITUTIONAL AND PROFESSIONAL RECOGNITION

CEEM: Australian Expert Group for Industry Studies
CEEM: Center for Research on Telecommunications Policy
CEEM: Economics of Networks, Stern Business School, New York University
CEEM: Global Development Network
CEEM: ICT Global Research Team, The World Bank Group

G. Madden: Associate Editor, Information Economics and Policy
G. Madden: Board of Directors, International Telecommunications Society
G. Madden: CBS Article of the Year
G. Madden: Co-editor, Special Issue, Telecommunications Policy
G. Madden: Editorial Board, Journal of Media Economics
G. Madden: Scientific Committee, Communications and Strategies
G. Madden: Chair, Publications Committee, International Telecommunications Society
G. Madden: Referee, Contemporary Economic Policy
G. Madden: Referee, International Journal of Advanced Media and Communication
G. Madden: Referee, International Journal of Forecasting
G. Madden: Referee, Journal of Comparative Economics
G. Madden: Referee, Journal of Institutional and Theoretical Economics
G. Madden: Referee, Journal of Media Economics
G. Madden: Referee, Review of Industrial Organization
G. Madden: Referee, Telecommunications Policy
G. Madden: Special Consultant, NERA Economic Consultants

M. Schipp: Referee, Telecommunications Policy
M. Schipp: Referee, 5th International We-B Conference, Perth

THE YEAR AHEAD

Year 2005 is set to provide several opportunities to expand and deepen the research agenda at CEEM. Joachim Tan's appointment at CEEM is funded by an ARC Discovery Project, 'Theoretically-motivated Long-term Internet Network Adoption Based on Short Time-series: Understanding the Diffusion of an Enabling Network Technology'. The funding is for the triennium 2005-7. Co-investigators are Russel Cooper (University of Western Sydney) and Robert Fildes (Lancaster University). Among its many potential applications, this work will improve the forecasting of new innovation adoption. The CEEM team was also awarded ARC Discovery Project funding for the study, 'Modelling the APEC Digital Divide'. Investigators are Gary Madden, Russel Cooper (University of Western Sydney) and M. Ishaq Nadiri (Stern

School of Business, New York University, USA). Again, funding is for the triennium 2005-7. This project is an extension of the theoretical work undertaken by Cooper and Madden on the dynamics of asymmetric stochastic volatility. Michael Schipp (Curtin University of Technology), Truong Truong (University of New South Wales) and Gary Madden are to estimate several models based on data collected from an Australia-wide e-commerce survey of 1,000 Small and Medium enterprises. The survey from which these data are drawn is the culmination of a three-year effort funded by the ARC. Joachim Tan (Curtin University of Technology), with Gary Madden and Robert Fildes (Lancaster University, UK) are to continue their joint work on the selection of optimal univariate forecast methods based on the time-series properties of data. Paul Rappoport (Temple University, USA) and Tanya Mokdad (Commonwealth Department of Finance and Administration) are to further examine US residential data from an information technology use survey of 40,000 households. Also, Lester Taylor (University of Arizona, USA) is to visit CEEM with a view to further develop Gary's analysis of network effects based on a compensating variations approach within a dynamic setting. This analysis generalizes the earlier approach by applying a more flexible dynamic demand specification. The research will ultimately lead to a more clear assessment of the realised benefit from Universal Service Programs.

Additionally, Gary accepted an invitation to Chair an International Telecommunications Society Africa-Asia-Australasia Regional Conference to be held on Bentley campus on August 28-30. The conference theme is, 'ICT Networks—Building Blocks for Economic Development'. As this conference is an enormous undertaking, Gary has enlisted help from a CBS 'Brain's Trust' of co-ordinators. The local co-ordination team is comprised of: Samir Chatterjee (Management), Heinz Dreher (Information Systems), Ashley Lloyd (Information Systems), Meher Manzur (Economics and Finance), Mohammed Quaddus (Graduate School of Business), Michael Schipp (Economics and Finance), Yu Chao Sun (Information Systems), Joachim Tan (Economics and Finance), Dave Western (Economics and Finance) and Bob Williams (Information Systems). Tracks include: B2B and B2C E-Commerce Markets; Current Development and the Prospects for Mobile Networks; Digital Divide; Global Corporate Strategy; Grid Computing and Networks of Innovation; Innovations in Electronic Banking and Financial Markets; Network Investment Evaluation and Real Options; Product Bundling and Lessons for the Internet; and Virtual Education and Digital Libraries.

Finally, Gary Madden and Michael Schipp are invited to make economic forecasting presentations to research scientists at the Korean Electronics and Telecommunications Research Institute (ETRI), which is located near Seoul. ETRI, established in 1976, is a non-profit government-funded research organization. The Institute has a global R&D partnership that currently includes 40 organizations spanning 16 nations. The Institute successfully developed the TDX-exchange, high-density semi-conductor microchips, the mini super-computer TiCOM, the digital mobile telecommunication system CDMA technology and WiBo technology. ETRI's mission is to combine in-house computer and telecommunications knowledge with world-best practice to discover multi-media and telecommunications applications and equipment. To position ETRI as globally competitive technology institute maintains an ongoing commitment to forecasting an ever-changing industry. During their visit to the facility Gary and Michael are to explain CEEM technology forecasting approaches and also discuss with Moon-Koo Kim, Senior Researcher at the Broadband Convergence Network Research Division, several opportunities for joint publication.

2005 TEAM

Russel Cooper:	Deputy Director, Professor of Economics (UWS) BA (Hons) Macquarie, PhD Monash
Gary Madden:	Director, Professor of Economics BEd (Hons) Macquarie, PhD Tasmania
Sha Nyunt:	Administration Assistant BCom (Accounting) Curtin (continuing)
Fleur Parra:	Research Assistant BCom (Management) Curtin (continuing)
Michael Schipp:	Research Associate BCom (Economics) Curtin (continuing)
Joachim Tan:	Research Associate BCom (Finance) Hons Curtin, PhD (Finance) Curtin (continuing)

ADVISORY BOARD

James Alleman, University of Colorado, USA
Martin Cave, University of Warwick, UK
Robert Fildes, Lancaster University, UK
Jerry Hausman, Massachusetts Institute of Technology, USA
Eli Noam, Columbia University, USA
M. Ishaq Nadiri, University of New York, USA
Paul Rappoport, Temple University, USA
Charles Steinfeld, Michigan State University, USA
Lester Taylor, University of Arizona, USA
Glenn Woroch, University of California, Berkeley, USA

ACKNOWLEDGEMENTS

CEEM wishes to acknowledge research support by the following institutions and persons that generously provided advice, data and other support:

Loretta Anania (Future and Emergent Technologies Officer, European Commission)
Aniruddha Banerjee (Vice President, NERA Economic Consultants)
Yves Gassot (Director-General, IDATE)
Tim Kelly (Head, Strategy and Policy Unit, ITU)
Hansuk Kim (President, Executive Board, Pacific Telecommunications Council)
Bruno Lanvin (Program Manager, Information for Development Program, World Bank)
Stuart Mathison (Program Officer, Foundation for Development Co-operation)
Michael Minges (Head, Telecommunications Management Group, Inc)
Sam Paltridge (Head, Information, Computer and Communications Policy, OECD)
Taylor Reynolds (Senior Analyst, Strategy and Policy Unit, ITU)
Bohdan Romaniuk (CEO, Navigata Communications Ltd)
Richard Simnett (Chief Scientist, Economics and Strategy, Telcordia Technologies)
Andy Stevenson (General Manager, Technology, Fujitsu Telecommunications Europe)
Dimitri Ypsilanti (Head, Telecommunications, OECD)