

# Dr. Chris Doyle

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An economist with over twenty years' academic and economic consulting experiences serving clients mainly in the telecommunications and related sectors. Strong knowledge base in microeconomics with relevance to network industries, spectrum management and competition cases. I have managed teams of junior consultants and currently work in a senior capacity in various consortia serving clients globally. I hold a PhD for research in game theory and industrial organization. I present lectures in industrial organization to undergraduate and postgraduate students at Warwick University and engage in research.

## Education

**1988** PhD Economics, University of Warwick

**1986** MA, University of Cambridge

**1982** MA Economics, University of Warwick

**1981** BSc. (Econ) Hons. First Class, Cardiff University

**1971-78** Xaverian College, Manchester 7 O levels, 4 A levels

## Skills

**Microeconomics:** Theory and empirical

**Computing:** MS Office suite (highly proficient in Word, PowerPoint and Excel), Scientific Word (LaTeX front-end), various web-based applications

**Client relationship management:** Successfully managed many clients since 1992

**Financial modelling:** Applications and use of Excel

## Experience – Economic Consulting

**May 2002 – present**

### **Independent economic consultant (Apex Economics)**

- *Delivered services to 53 distinct clients since 2001*
- *High-level advice on pricing, regulation and competition issues*
- *Numerous expert reports and many presentations to senior personnel*

**August 2000 – April 2002**

### **Vice President, Charles River Associates (UK) Ltd**

- *Member of senior management, responsible for recruitment*
- *Managed a small telecoms team re-located from London Economics*
- *7 key clients*
- *Auction software development*
- *Engaged with partners at leading law firms and investment banks*
- *Expert testimony and cross-examination including before International Court of Arbitration in New York for Elektrim s.a.*

**October 1999 – July 2000**

### **Director of Telecoms Team, London Economics**

- *Managed a group of 5 consultants*
- *Headhunted from London Business School*
- *Tasked with repositioning business after key personnel left to form DotEcon and Frontier*

**1992 – September 1999**

### **Independent Economic Consultant**

- *First client Bell South Corporation (Appendix II in [FCC Filing](#))*
- *Major clients included BT, Worldcom, HM Treasury*
- *Numerous presentations and expert reports*

## Experience – Academia

- September 2012 – present**      **Principal Teaching Fellow, Department of Economics, Warwick University**
- *Industrial Organisation lectures (BSc and MSc)*
  - *MSc Industrial Organisation Workshop convener*
  - *Alumni Relations Director*
- July 2004 – August 2012**      **Associate Fellow, Department of Economics, Warwick University**
- *Industrial Organisation lectures (BSc)*
- March 2007 – September 2011**      **Associate Fellow, Warwick Business School**
- *MBA Managerial Economics elective*
- July 2004 – February 2007**      **Senior Research Fellow, Warwick Business School**
- *Centre for Management Under Regulation*
  - *Director: Professor Martin Cave*
- January 1996 – September 1999**      **Senior Research Fellow, London Business School**
- *The Regulation Initiative*
  - *Director: Professor David Currie*
- October 1992 – December 1995**      **Senior Research Officer, Department of Applied Economics, University of Cambridge**
- *ESRC Network Economics Project*
  - *Director: Professor David Newbery*
- October 1989 – September 1992**      **Senior Research Officer, Department of Applied Economics, University of Cambridge**
- *ESRC Network Economics Project*
  - *Director: Professor David Newbery*
- October 1986 – September 1991**      **Fellow in Economics, Gonville and Caius College, Cambridge**
- *Tutor and Assistant Director of Studies*
  - *Member of College Finance Committee*
- October 1985 – September 1987**      **Junior Research Officer, Department of Applied Economics, University of Cambridge**
- *ESRC Risk Project*
  - *Director: Professor Frank Hahn*
  - *Second year mathematical economics*
- October 1984 – September 1985**      **Lecturer in Economics, University of Essex**
- *Third year microeconomics, statistics*

## Experience – Visiting Positions Academia

- January 2003 – June 2003**      **Visiting Lecturer, London School of Economics**
- *Lectures on telecommunications regulation*
- January 1999 – March 1999**      **Adjunct Professor, INSEAD, France**
- *MBA Microeconomics core course (locum for Professor Lars Hendrik-Roller)*
- September 1991 – March 1992**      **Visiting Professor, CERGE, Charles University, Prague**
- *MSc Microeconomics lectures*
- January 1989 – May 1989**      **Visiting Assistant Professor, Queen’s University, Canada**
- *Microeconomics lectures*
- October 1988 – September 1989**      **Affiliated Lecturer, Faculty of Economics, University of Cambridge**
- *Mathematical Economics*
  - *Game Theory MSc*
- October 1985 – September 1986**      **College Supervisor, St. John’s College, University of Cambridge**
- *Tutor in Economics*

## Publications, Filings and Reports

### **Your call: eBay and demand for the iPhone 4**

*International Journal of Business and Economics*, 2012 19(1), 119-141  
with Mike Waterson

### **The need for a conservative approach to the pricing of radio spectrum and the renewal of radio spectrum licences**

4 December 2010 advocacy for AMTA (Australian Mobile Telecommunications Association)

### **800MHz Band Auction Design: Externalities require a change to the auction design**

25 November 2010 advocacy for Tele2 Sweden

### **Consultation on Draft Unified Licences**

December 2009 for BTRC (Bangladesh Telecommunications Regulatory Commission)  
with David Butcher Associates and HB Consultants

### **Review of spectrum pricing with reference to fixed links and trunked radio frequencies and services**

17 May 2010 for the IDA (Infocommunications Development Authority) Singapore.  
with Martin Cave

### **Unbundling and the regulation of access – a brief outline of economic principles**

November 2009 for OTA, Greece.  
with Martin Cave

### **Calculating LRAIC for FMIC in the HKBN vs. MNOs case under determination by OFTA: The case for using HKBN company accounts to compute FMIC**

16 July 2009 expert opinion for HKBN Hong Kong  
with Martin Cave

**Regulatory Reform for 21st Century Broadband: Arguments in favour of the Structural Separation of Telstra**  
2 June 2009 advocacy for Optus Australia

**The Proposed Merger of Hutchison and Vodafone: Why divestiture of some of the combined radio spectrum assets is desirable**  
1 June 2009 advocacy for Optus Australia

**The 2GHz MSS bands, CGC and AIP: A Critique of Ofcom's Proposals and an Alternative Policy Proposal**  
1 December 2008 Ofcom filing for Solaris Mobile

**Analysis of functional separation and the impact on investment in the telecommunications sector of Poland, A report for Telekomunikacja Polska S.A.,**  
3 September 2008, advocacy for TPSA

**Structural separation and investment in the National Broadband Network Environment**  
June 2008 Advocacy paper for Optus Australia

**Contracting across separated networks: lessons from theory and practice**  
*Communications and Strategies* 2007, no. 68, 21  
with Martin Cave

**Essentials of Modern Spectrum Management** [book]  
August 2007 Cambridge University Press (also Thai and Korean editions)  
with William Webb and Martin Cave

**Market prices boost efficiency**  
*Policy Tracker, Spectrum*, March 2007, 10-12

**Collective Dominance, Market Analysis and the 2002 EU Framework Directive:  
The case of mobile access and call origination in Ireland**  
*Digital Economic Dynamics: Innovations, Networks and Regulations*, edited by Paul J.J. Welfens and Mathias Weske, chapter 7 pp. 141-170, Springer Press 2007.

**Where are we going? Technologies, markets and long-range policy issues in European communications**  
*Information Economics and Policy*, 2006, 242-255  
with Martin Cave and Luigi Prosperetti

**Convergence and Spectrum Licensing**  
*Trends in Telecommunications Regulation*, chapter 6, ITU Geneva, December 2004

**On the design of the GSM auction in Nigeria – the world's first ascending clock auction**  
*Telecommunications Policy*, vol. 27 (5-6), 383-405, June-July 2003  
with Paul McShane

**Licensing of 3G mobile systems: Chairman's report**  
*ITU News*, Issue 9, 2001, Geneva, September 2001

**Local loop unbundling and regulatory risk**  
*Journal of Network Industries*, June 2000, vol. 1, no. 1

**Liberalisation of utilities and evolving European regulation**  
*Economic Outlook*, April 2000, vol. 24, no. 3, 18-26  
with David Coen

**London's growth sectors: telecommunications – ahead but watch out for Amsterdam**  
*The New Statesman*, April 10, 2000 (London Supplement)

### **Vodafone-Mannesmann is just the beginning**

*The Wall Street Journal*, editorial features, February 11, 2000

### **Virtual moves in mobile markets**

*Telecommunications*, February 2000, pp. 55-57

### **A European Market for Electricity?**

*Monitoring European Deregulation*, Annual Report Number 2, published by CEPR/SNS, November 1999. Multi-author study. Introductory chapter.  
with Martin Siner

### **Bandwidth and minutes exchanges**

*European Telecommunications Intelligence Bulletin*, November 1999 vol. 1, no. 1, 12-13  
with Toby Robertson

### **Designing economic regulatory institutions for European network industries**

*Current Politics and Economics of Europe*, 1999, vol. 9, no. 4, 83-106  
with David Coen.

### **The Economics of the Media: The Convergence of the Transition Countries with EU Member States**

Research Centre of the Slovak Foreign Policy Association, Bratislava, May 1999. Book of 211 pages.  
with Martin Cave, Zdeněk Hrubý and Anton Marcincin

### **Market structure in mobile telecommunications: the receiver pays principle and qualified indirect access**

*Information Economics and Policy*, 1998 vol. 10, no. 4, 471-488  
with Jennifer C Smith.

### **Liberalizing Europe's network industries: ten conflicting priorities**

*Business Strategy Review*, 1998 vol. 10, no. 1, 55-66  
Reprinted in Italian in *Management Publications*, Editiones PMP

### **Europe's Network Industries: Conflicting Priorities (Telecommunications)**

*Monitoring European Deregulation*, Annual Report Number 1, published by CEPR/SNS, September 1998. Book of 258 pages, plus xxii  
Lead author of Part 1 (140 pages), other authors: Lars Bergman, Damien Neven and Lars-Hendrik Röller. Co-author on part 2 with Jordi Gual, Lars Hultkranz and Len Waverman.

### **Social obligations and access pricing: telecommunications and railways in the UK**

Chapter 8 in *Opening networks to competition: the regulation and pricing of access*, edited by David Gabel and David F. Weiman, Kluwer Academic Press, 1998  
with Mark Armstrong.

### **Programming in a competitive broadcasting market: entry, welfare and regulation**

*Information Economics and Policy*, 1998 vol. 10, no. 1, 23-39

### **Self-regulation and statutory regulation**

*Business Strategy Review*, 1997 vol. 8, no. 3, 35-42

### **Promoting efficient competition in telecommunications**

*National Institute Economic Review*, 1997 no. 159, 82-91, January

### **Sectoral regulation: telecommunications in the EU**

*Journal of European Public Policy*, 1996 vol. 3, no. 4, 612-28

### **The access pricing problem: a synthesis**

*Journal of Industrial Economics*, vol. XLIV, no. 2, 131-150, June 1996  
Reprinted in *Economic Regulation*, edited by Paul L. Joskow, Edward Elgar Publishing Limited, 1999, chapter 24, pp. 673-692.  
with Mark Armstrong and John Vickers.

### **The pricing of access in networks: theoretical and practical issues**

*Rivista Internazionale di Scienze Sociali*, 1995 vol. 103, no. 1, 27-38

### **Some efficiency aspects of price regulation**

*European Transactions on Telecommunications*, 1995 vol. 6, no. 4, 415-420

### **Taxation of foreign multinationals: a sequential bargaining approach to tax holidays**

*International Tax and Public Finance*, 1994 vol. 1, no. 3, 211-225  
with Sweder van Wijnbergen

### **Do we really want an independent central bank?**

*Oxford Review of Economic Policy*, 1994 vol. 10, no. 3, 61-77  
Reprinted in the *Bulgarian National Bank Review*, no. 3, 23-38, December 1994  
with Martin Weale

### **Education, externalities, fertility and economic growth**

*Education Economics*, 1994 vol. 2, no. 2, 129-167  
with Martin Weale

### **Privatization under Mrs. Thatcher**

*The Cambridge Review*, 1994 no. 115, 13-17

### **Access pricing in network utilities: theory and practice**

*Utilities Policy*, 1994 vol. 4, no. 3, 181-189  
with Martin Cave.

### **Marshalling a plan for Russia**

*European Brief*, vol. 1, no. 5, April/May 1994

### **Battle lines**

*Parliamentary Brief*, vol. 2, no. 7, April/May 1994

### **Pacesetting in Prague**

*European Brief*, vol. 1, no. 4, March/April 1994

### **The economics of mobile telephony in East and Central Europe: The case of the Czech Republic**

*Telecommunications Policy*, 1993 vol. 17, no. 5, 331-340

### **The workers privatising Russia**

*European Brief*, vol. 1, no. 2, August 1993

### **On transition in Russia**

*Britain & Overseas*, vol. 23, no. 1, May 1993

### **Common carriage and the pricing of electricity transmission**

*The Energy Journal*, 1992 vol. 13, no. 3, 63-93  
with Maria Maher.

### **The Development of PCS in the U.K Lessons for the FCC**

FCC filing for Bell South, 1992

### **Different selling strategies in Bertrand oligopoly**

*Economics Letters*, 1988 vol. 28, 387-90

### **Intertemporal price discrimination, uncertainty and introductory offers**

*Economic Journal*, 1986 vol. 96, 71-82

## **Presentations from 2007**

### **Socio-Economic Assessment of Modern Mobile Telecommunication Systems**

Connection and Communication in a Safe Environment, Communications and Media Commission, Baghdad 3 December 2012

### **Valuing radio frequency spectrum: methods and examples**

Eighth Central European Radiocommunications Conference Bratislava, Slovakia 15-16 March 2012

### **Infrastructure Sharing: Economics and Competition Law Aspects**

EMERG/NATP-3 Workshop Infrastructure Sharing and Rights of Way hosted by ANACOM, Cascais, Portugal, 20-21 September 2011

### **Competition Policy and Spectrum Management**

Latin American Spectrum Conference 2011, Mexico City, 8 September 2011

### **ICT and the Digital Divide: Does it Matter?**

ESRC-CAGE Workshop on Inequality Session 4: Identity, Technology, Adoption and Inequality, University of Warwick, 6 July 2011

### **The socio-economic imperatives of achieving broadband for all**

Forum Europe Conference Every European Digital: the Challenge of Bridging the Broadband Gap, Brussels, 31 May 2011

### **Successful approaches to spectrum pricing**

Middle East Spectrum Conference 2011, Dubai, UAE, 30 March 2011

### **Reforming Radio Spectrum Management**

Successful Approaches to Spectrum Pricing Spectrum Regulation and Management Workshop, Keynote presenter, Communications Regulators' Association of Southern Africa South Africa (CRASA) in conjunction with the Independent Communications Authority of South Africa (ICASA), Johannesburg, 23-25 March 2011

### **The need for a conservative approach to the pricing of radio spectrum and the renewal of radio spectrum licences**

Department of Broadband Communications and the Digital Economy, Canberra, Australia, 4 December 2010

### **On Penalty Kicks: Mixed Strategies or Mixed up About Strategies?**

Department of Economics, University of Warwick, 7 July 2010

### **A Free Retail Market: What can European utilities learn from the Telecommunications sector?**

European Smart Metering Summit, The Hague, 8 June 2010



### **Network Sharing: Environmental Benefits versus Competition Costs**

International Conference of Radiocommunications on Health and Environment Prospective, Muscat, Oman, 31 January 2010

### **Building a Spectrum Auction Process**

Westminster eForum and Westminster Media Forum keynote seminar: Process of the Digital Switchover & Next steps for the Digital Dividend Review, London, 26 January 2010

### **Spectrum Auctions: Principles and Preparation**

The Middle East Spectrum Conference, Oman TRA, Muscat, Oman, 30 September 2009

### **Using Incentive Pricing in the Public Sector**

The Middle East Spectrum Conference, Oman TRA, Muscat, Oman, 30 September 2009

### **Unbundling of energy undertakings in relation to Corporate Governance Principles: A Case Example – BT Openreach**

Florence School of Regulation Workshop in cooperation with ERGEG Task Force on Unbundling, Reporting and Benchmarking (TF URB), Federal Network Agency (BNetzA), Berlin, 25 September 2009

### **Telecommunications in the Falkland Islands**

Chamber of Commerce, Stanley, Falkland Islands, 28 April 2009

### **Administered Incentive Pricing**

Ofcom, London, 9 March 2009

### **Seychelles ICT Market Analysis**

DICT Seychelles, 9 February 2009

### **Economic Consultancy**

Caius Economics Society, Cambridge, 3 February 2009

### **Digital Britain**

Opening presentation before Lord Carter, Minister of Communications, UK Government, London, 14 January 2009

### **Key issues in the mobile sector**

IBC 14th Annual Competition Conference, Brussels, 20 October 2008

### **Collective Dominance: Reflections Post-ECJ Judgment on Sony BMG case**

Ofcom, London, 17 October 2008

### **Digital Dividend Review and Switchover – Where are we now?**

Keynote presentation to Westminster eForum “After Whitehaven – Next Steps for the Digital Dividend Review” conference, London, 30 January 2008

### **Vertical separation and value**

Presentation to Telecom Separation – Regulatory & Financial Implications conference, Le Châtelain All Suite Hotel, Brussels, 17 October, 2007

### **The Liberalisation of Spectrum Management: What needs to be done?**

Presentation to GSM Association, 19 June 2007

### **Spectrum Policy changes in the UK and lessons for the Netherlands**

Presentation to Trends en ontwikkelingen in de ether WTC Rotterdam, 6 June 2007

### **Pricing Radio Spectrum**

Presentation to ARICEA meeting in Cairo for COMESA, Cairo, 22 May 2007

### **The Price of Radio Spectrum: Using Incentive Mechanisms to Achieve Efficiency**

Presentation to ITU Workshop Market Mechanisms for Spectrum Management, Geneva, 22-23 January 2007

## **Recent Training Programmes**

### **Spectrum Valuation and Pricing**

Telecommunications and Radiocommunications Regulator (TRR) Vanuatu, 19 & 20 November 2012

### **Spectrum Pricing**

1 day programme Latin America Spectrum Conference, Mexico City, 8 September 2011

### **Spectrum Pricing**

1 day programme Middle East Spectrum Conference, Dubai, UAE, 27 March 2011

### **Spectrum Auctions Masterclass**

with Policy Tracker, Farnham Castle, Surrey, 10-14 January 2011