NET Institute
Conference on
Network Economics

April 20, 2007

Co-sponsored by
The Berkley Center for Entrepreneurship
Stern School of Business
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NET Institute

The Networks, Electronic Commerce and Telecommunications (“NET”) Institute http://www.NETinst.org is a non-profit institution devoted to research on network industries, electronic commerce, telecommunications, the Internet, cable television, “virtual networks” comprised of computers that share the same technical standard or operating system, financial networks including credit card and ATM networks, and on network issues in general. Of particular interest is research on innovation and introduction of new technology in network industries. The NET Institute functions as a world-wide focal point for research and open exchange and dissemination of ideas in these areas. The NET Institute competitively funds cutting edge research projects in these areas of research. It organizes conferences and seminars on these issues.

The following distinguished academics sit on the NET Institute’s board of directors:
1. Professor Kenneth Arrow, Economics Department, Stanford University
2. Dr. Vinton G. Cerf, Chief Internet Evangelist, Google
3. Professor Nicholas Economides, Stern School of Business, New York University (Executive Director)
4. Dr. Nathan Myhrvold, CEO, Intellectual Ventures
5. Professor Ariel Pakes, Economics Department, Harvard University

The NET Institute gratefully acknowledges the generous financial support of the AT&T Foundation and Microsoft.

NET Institute Activities

In 2006, its fourth year of operation, the NET Institute funded thirty four research projects through its summer grants program in a number of network industries though a competitive process in which a large number of proposals were submitted. The research papers are listed at http://www.netinst.org/2006_grants.html. In a similar manner, the NET Institute funded twenty three research projects in 2005, listed at http://www.netinst.org/2005_grants.html and on page 51, twenty research projects in 2004, listed on page 53 and at http://www.netinst.org/2004_grants.htm, and thirteen projects during 2003, its first year of operation, listed on page 55 and at http://www.netinst.org/2003_grants.htm. The funded research work include a number of very important contributions in the analysis and understanding of competition, pricing, innovation, market structure and profitability in network industries ranging from telecommunications, banking networks, software and computers, video games, and airlines, among others. The full papers are downloadable as part of the working papers series of the NET Institute at http://www.netinst.org/NET_Working_Papers.html. A number of the summer 2006 research papers are featured in this year’s NET Institute conference. The NET Institute continues its summer grants program during the year 2007, and expands its support of research activities, conferences, and scientific meetings. See the call for proposals at http://www.netinst.org/call_for_proposals_2007.htm.
NET Institute Conference on Network Economics

Co-sponsored by the NET Institute, http://www.NETinst.org/ and the Berkley Center for Entrepreneurial Studies, Stern School of Business

April 20, 2007

Stern School of Business, NYU, 44 West 4th Street, New York [MAP]

Preliminary Program (also at http://www.NETinst.org/2007_conference.htm)

8:30-9:00  Continental Breakfast

9:00-9:15  Introductory Remarks
Nicholas Economides, Executive Director, NET Institute and Stern School of Business, NYU
Ariel Pakes, Director, NET Institute, Harvard University and NYU
William Baumol, Academic Director, Berkley Center for Entrepreneurial Studies, Stern School of Business, NYU

9:15-10:45  Electronic Commerce
Chairman: Brian Viard, GSB, Stanford University
Discussant: Evan Rawley, UC Berkeley

Discussant: Michal Grajek, European School of Management and Technology

3. Yongmin Chen and Chuan He, University of Colorado at Boulder, “Paid Placement: Advertising and Search on the Internet.”
Discussant: Yossi Spiegel, Tel Aviv University

10:55-12:55  Platform Competition
Chairman: Heski Bar-Isaac, Stern School of Business, NYU
Discussant: Ke-Wei Huang, Stern School of Business, NYU
2. **Ravi Mantena**, Simon Graduate School of Business Administration, University of Rochester, **Ramesh Sankaranarayanan**, School of Business, University of Connecticut, and **Siva Viswanathan**, Smith School of Business, University of Maryland, “Exclusive Licensing in Complementary Network Industries.”
   Discussant: **Anirban Sengupta**, Texas A&M University

   Discussant: **Jeremy Fox**, University of Chicago

   Discussant: **Jake Kendall**, UC Santa Cruz

12:55 to 2:05 **Keynote Lunch**  
**David Heiner**, Microsoft

2:15-4:15 **Software Competition**  
Chairman: **Ignacio Esponda**
   Discussant: **Bin Gu**, McCombs School of Business, University of Texas at Austin

2. **Abraham Seidmann**, Simon School of Business, University of Rochester, and **Jennifer Zhang**, College of Business Administration, University of Toledo, “Selling and Leasing Software with Network Externality.”
   Discussant: **Mingdi Xin**, Stern School of Business, NYU

3. **Stephen Ryan** and **Catherine Tucker**, MIT, “Heterogeneity and the Dynamics of Network Technology Adoption.”
   Discussant: **Arun Sundararajan**, Stern School of Business, NYU

   Discussant: **Benjamin Chiao**, University of Michigan

4:15-5:15 **Reception**
Abstracts Of Papers In The Conference In Presentation Order

Geography and Electronic Commerce:
Measuring Convenience, Selection, and Price\(^1\)

Chris Forman  
Tepper School of Business, Carnegie Mellon University

Anindya Ghose  
Stern School of Business, New York University

Avi Goldfarb  
Rotman School of Management, University of Toronto

Abstract

We develop a formal model of online-offline retail channel substitution to identify three factors that drive consumers to purchase online: convenience, selection, and price. This model builds hypotheses on how features of offline retail supply impact online purchasing. We then examine how the local availability of offline retail options drives use of the online channel and consequently how the convenience, selection, and price advantages of the online channel may vary by geographic location. In particular, we examine the effect of local store openings on online book purchases in that location. We explore this problem using data from Amazon on the top selling books for 1501 unique locations in the US for 10 months ending in January 2006. In addition to this data, we use information on changes in local retail competition as measured by openings of large bookstores such as Borders or Barnes & Noble and discount stores such as Wal-Mart or Target. We show that even controlling for product-specific preferences by location, changes in local retail options have substantial effects on online purchases. We demonstrate how the convenience, selection, and price benefits of the Internet are different for consumers in different types of locations. More generally, we show that geography significantly impacts the benefit that consumers derive from electronic markets.

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\(^1\) Financial support from the NET Institute www.NETinst.org is gratefully acknowledged.
The Geography of Trade on eBay and MercadoLibre

Ali Hortacsu
University of Chicago and NBER

F. Asis Martinez-Jerez
Harvard Business School

Jason Douglas¹

Abstract

We analyze geographic patterns of trade using transactions data from eBay and MercadoLibre, two large online auction sites. We find that distance continues to be an important deterrent to trade between geographically separated buyers and sellers, though at a lesser extent than has been observed in studies of non-Internet commerce. We also find a strong “home bias” towards trading with counterparties located in the same city. Further analyses suggest that cultural factors and the possibility of direct contract enforcement in case of breach are the main reasons behind the same city bias.

¹ We thank seminar participants at the University of Chicago, Northwestern, Harvard Business School, Berkeley and at the FTC Internet Auctions Roundtable for valuable comments. Financial support from the NET Institute (www.netinst.org) is gratefully acknowledged.
Paid Placement: Advertising and Search on the Internet

Yongmin Chen and Chuan He
University of Colorado at Boulder

Abstract

Paid placement, where advertisers bid payments to a search engine to have their products appear next to keyword search results, has emerged as a predominant form of advertising on the Internet. This paper studies a product-differentiation model where consumers are initially uncertain about the desirability of and valuation for different sellers’ products, and can learn about a seller’s product through a costly search. In equilibrium, a seller bids more for placement when his product is more relevant for a given keyword, and the paid placement of sellers by the search engine reveals information about the relevance of their products. This results in efficient (sequential) search by consumers and increases total output.

Keywords: Paid placement, Advertising, Auction, E-commerce, Search.

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1 We thank Ruqu Wang for helpful comments. Partial funding for this research is provided by the Net Institute.
Tying in Two Sided Markets with Multi-Homing\textsuperscript{1}

Jay Pil Choi  
Michigan State University

Abstract

This paper analyzes the effects of tying arrangements on market competition and social welfare in two-sided markets when economic agents can engage in multi-homing, that is, they can participate in multiple platforms in order to reap maximal network benefits. The model shows that tying induces more consumers to multi-home and makes platform-specific exclusive content available to more consumers, which is also beneficial to content providers. As a result, tying can be welfare-enhancing if multi-homing is allowed, even in cases where its welfare impacts are negative in the absence of multi-homing. The analysis thus can have important implications for recent antitrust cases in industries where multi-homing is prevalent.

JEL Classification: L1, L4.  
Keywords: tying, two-sided markets, (indirect) network effects, multi-homing.

\textsuperscript{1} This research was partially funded by the NET Institute whose financial support is gratefully acknowledged.
Exclusive Licensing in Complementary Network Industries

Ravi Mantena
William E. Simon Graduate School of Business Administration,
University of Rochester

Ramesh Sankaranarayanan
School of Business, University of Connecticut

Siva Viswanathan
Robert H. Smith School of Business, University of Maryland

Abstract

We explore the indirect network effect in the market for home video games. We examine the video game console makers’ strategic choice between increasing demand by lowering console price and by encouraging the growth of software variety. We also explore the existence of an applications barrier to entry in the console market, and find that there is little evidence for such a barrier. Finally, we assess the applicability of the model to out-of-sample situations, to look at whether our model and previous similar models can generalize to other markets for purposes of marketing or antitrust inquiry. We find that the model generalizes reasonably well to the Japanese market for the same generation of gaming systems, but poorly to previous generations in the US market.

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1 We are grateful to Nick Economides and the NET Institute for generous financial assistance. We would also like to thank the participants at the Workshop on Information Systems Economics for their insightful suggestions and feedback.
An Empirical Analysis of Indirect Network Effects in the Home Video Game Market¹

James E. Prieger
Pepperdine University

Wei-Min Hu
University of California, Davis

Abstract

We explore the indirect network effect in the market for home video games. We examine the video game console makers’ strategic choice between increasing demand by lowering console price and by encouraging the growth of software variety. We also explore the existence of an applications barrier to entry in the console market, and find that there is little evidence for such a barrier. Finally, we assess the applicability of the model to out-of-sample situations, to look at whether our model and previous similar models can generalize to other markets for purposes of marketing or antitrust inquiry. We find that the model generalizes reasonably well to the Japanese market for the same generation of gaming systems, but poorly to previous generations in the US market.

¹ We gratefully acknowledge financial support from the NET Institute for this project.
Strategic Incompatibility in ATM Markets

Christopher R. Knittel
University of California, Davis and NBER

Victor Stango
Tuck School of Business, Dartmouth College

Abstract

We test whether firms use incompatibility strategically, using data from ATM markets. High ATM fees degrade the value of competitors’ deposit accounts, and can in principle serve as a mechanism for siphoning depositors away from competitors or for creating deposit account differentiation. Our empirical framework can empirically distinguish surcharging motivated by this strategic concern from surcharging that simply maximizes ATM profit considered as a standalone operation. The results are consistent with such behavior by large banks, but not by small banks. For large banks, the effect of incompatibility seems to operate through higher deposit account fees rather than increased deposit account base.

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1 Financial support from the Net Institute is gratefully acknowledged. Thanks to seminar participants at the 2005 IIROC conference, DOJ, and the 2006 Tuck Winter IO Conference for helpful comments. Carrie Jankowski and Kaushik Murali provided excellent research assistance.
Lock-In and Unobserved Preferences in Server Operating System Adoption: 
A Case of Linux vs. Windows

Seung-Hyun Hong
University of Illinois

Leonardo Rezende
PUC-Rio and University of Illinois

Abstract

This paper attempts to distinguish state dependence (or lock-in) from unobserved preferences in the decision to adopt Linux or Windows as the operating system for computer servers. To this end, we use detailed survey data of over 100,000 establishments in the United States. Without accounting for unobserved heterogeneity in establishment-specific preferences for operating systems, we find a strong positive correlation between the current choice and the previous choice, suggesting potentially high switching costs and lock-in. To account for unobserved preferences for either operating system, we impose weak identifying assumptions and employ recently developed dynamic discrete choice panel data methods (Arellano and Carrasco 2003). The results show little or no evidence of state dependence, implying that unobserved preferences, rather than switching costs and lock-in, are more important factors in the adoption decision. Once taste heterogeneity is taken into account, we additionally find little evidence of network effects between server operating systems and non-server operating systems.

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1 We appreciate the NET Institute for financial support. We thank George Deltas, Mark Jacobsen, Roger Koenker, and Zhongjun Qu for helpful discussion and comments. All remaining errors are our responsibility.
Selling and Leasing Software with Network Externality

Jennifer Zhang
College of Business Administration, University of Toledo

Abraham Seidmann
William E. Simon School of Business, University of Rochester

Abstract

Previous studies suggested that a monopoly durable goods seller can use leasing to effectively avoid the time-inconsistent problem raised by Coase Conjecture. This paper extends those previous works by examining the monopoly seller’s selling and leasing strategy for a special type of durable good --- software. We look at a software vendor that can sell (at a posted price) or lease his product where as a lesser he guarantees that the lessees will always have the latest version of the software. We address some of the specific issues of implementing the selling and/or leasing policies at the packaged software market, including the impact of network externality, upgrade compatibility, and commitment on pricing in a dynamic environment. We show that by properly defining their pricing structure, software vendors can segment the market and second-degree price discriminate the consumers. We also demonstrate how software vendors can manage the trade-offs of selling and leasing to achieve a higher profit as well as the corresponding welfare effect on the consumers.

Keywords: Software licensing, Coarse Conjecture, Price discrimination, Network externality, Commitment, Upgrade, Compatibility, Risk.

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1 The authors thank the Net Institute’s support in this research project.
Heterogeneity and the Dynamics of Network Technology Adoption

Stephen Ryan
MIT and NBER

Catherine Tucker
Sloan School of Business, MIT

Abstract

This paper analyzes the role of heterogeneity and forward-looking expectations in the diffusion of network technologies. Using a detailed dataset on the adoption of a new videoconferencing technology within a firm, we estimate a structural model of technology adoption and communications choice. We allow for heterogeneity in network benefits and adoption costs across agents. We find that ignoring heterogeneity in the interplay between adoption costs and network effects will underpredict the size of the steady-state network size by almost 50 percent. We develop a new “simulated sequence estimator” to measure the extent to which agents seek diversity in their calling behavior, and characterize the patterns of communication as a function of geography, job function, and rank within the firm. We find that agents have significant welfare gains from having access to a diverse network, and that a policy of strategically targeting the right subtype for initial adoption can lead to a faster-growing and larger network than a policy of uncoordinated or diffuse adoption.

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1 Financial support from the Net Institute is gratefully acknowledged. We would also like to thank Dan Ackerberg, Amy Finkelstein, Shane Greenstein, and seminar participants at the 2006 International Industrial Organization Conference, Boston University, University of Mannheim, and Central European University.
Bandwidth Allocation in Peer-to-Peer File Sharing Networks

Albert Creus Mir
Universitat Politecnica de Catalunya

Ramon Casadesus-Masanell
Harvard Business School

Andres Hervas-Drane
Universitat Autonoma de Barcelona

Abstract

We present a model of bandwidth allocation in a stylized peer-to-peer file sharing network. Given an arbitrary population of peers composed of sharers and freeriders, where all peers interconnect to maximize their allocated bandwidth, we derive the expected bandwidth obtained by sharers and freeriders. We show that sharers are always better off than freeriders and that the difference decreases as the size of the network grows. This paper constitutes a first step towards providing a general analytical foundation for resource allocation in peer-to-peer networks.

Keywords: Peer-to-Peer, Network formation, Resource allocation, Congestion

1 Casadesus-Masanell and Hervas-Drane are grateful for financial support from the HBS Division of Research, the Net Institute, Fundacion BBVA and the FPU program of the Spanish Ministry of Education and Science.
Short Biographies of Speakers, Discussants, and Session Chairmen

HESKI BAR-ISAAC is an Assistant Professor in the Department of Economics, Stern School of Business and holds an affiliation with the Department of Economics at the Graduate School for Arts and Sciences at New York University. Professor Bar-Isaac earned a BA in Mathematics from Oxford University and a Masters in Economics from the London School of Economics. Before returning to the London School of Economics for his Ph.D., he spent a couple of years as a consultant, working on a range of anti-trust and regulatory issues. His research focuses on theoretical models of information and reputation. His recent work spans applications from the internal structure of illegal organizations to firm's marketing decisions. Professor Bar-Isaac has published in leading economics journals and he has also visited economics departments at Tel Aviv University and Harvard University and taught at the Kellogg School of Management and Università Boconni.

WILLIAM J. BAUMOL is the Harold Price Professor of Entrepreneurship and Academic Director of the Berkley Center for Entrepreneurial Studies in the Stern School of Business at New York University; and the Joseph Douglas Green, 1895, Professor of Economics Emeritus and Senior Economist, Princeton University. Born in New York City in 1922, he received his education at the College of the City of New York and the University of London. He has been president of the American Economic Association and three other professional economics societies, is an elected member of the U.S. National Academy of Sciences and the American Philosophical Society, and is the recipient of eleven honorary degrees. The author of more than 35 books and hundreds of professional articles, his fields of specialization include economic growth, entrepreneurship and innovation, industrial organization, antitrust economics and regulation, and economics of the arts. Some of his relatively recent books include: Global Trade and Conflicting National Interests (with Ralph E. Gomory), The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism, Downsizing in America: Reality, Causes, and Consequences (with Alan S. Blinder and Edward N. Wolff) and Entrepreneurship, Innovation, and the Growth Mechanism of the Free-Enterprise Economies (ed. with Eytan Sheshinski and Robert J. Strom).

RAMON CASADESUS-MASANELL joined the Harvard Business School faculty in 2000. He has taught the required MBA Strategy course, an elective course of Competitive Dynamics, and Ph.D. courses on strategy and game theory. Casadesus-Masanell received his Ph.D. in Managerial Economics and Strategy from the Kellogg Graduate School of Management, Northwestern University. He received his BA in Economics from Universitat Autonoma de Barcelona, Spain. Casadesus-Masanell's fields of specialization are management strategy, managerial economics, and industrial organization. Casadesus-Masanell studies competition between organizations with different business models. He is also interested in the limits to contracting and the role of trust for management strategy. He has published in Management Science, the Journal of Economics and Management Strategy, the Journal of Law and Economics, the Journal of Economic Theory, the USC

**YONGMIN CHEN** is Professor of Economics at the University of Colorado. His field of specialization is industrial organization, with research and publications in areas including vertical organization, oligopoly price discrimination, markers with search and/or switching costs, product differentiation, the economics of innovation, and the organization of international trade. He holds a PhD in economics from Boston University, as well as degrees from two universities in China: MA in industrial economics from Renmin University and BS in Engineering from Zhejiang Institute of Technology. He is an Associate Editor of the *European Economic Review* and an Associate Editor of the *Journal of Industrial Economics*. He is also an Editorial Advisor to the *Canadian Journal of Economics*. The complete C.V. of Professor Yongmin Chen is available at [http://spot.colorado.edu/~cheny/](http://spot.colorado.edu/~cheny/).

**BENJAMIN CHIAO** is a doctoral candidate at the School of Information, University of Michigan. His general fields are the economics of information technology, intellectual property, and experimental methods. Specifically, his specialties are open-content economics, and economic solutions to spam. He has worked on open source and communism, non-price coordination experiments and optimal liability rules in open content production, standard-setting organizations, patent pools, and using uncensored communication channels to curbing spam. Over the last few years, he has involved in the establishment of two new behavioral labs in Hong Kong University of Science and Technology (HKUST) Business School, and Faculty of Arts and Sciences & Department of Economics at New York University. He is currently an active member in the Incentive-Centered Design and the Socio-Technical Infrastructure for Electronic Transactions groups at the University of Michigan. Previously, he was Visiting Scholar at HKUST and Research Scientist/Director of Operations at NYU, both in the labs. His website is [http://benjaminchiao.org](http://benjaminchiao.org).

**JAY PIL CHOI** is Professor of Economics at Michigan State University where he has taught since 2000. Prior to his appointment at Michigan State University, he served on the faculties of Columbia University and Seoul National University. He is also Co-Editor of *International Journal of Industrial Organization* and Editor of a book entitled *Recent Developments in Antitrust: Theory and Evidence* published by the MIT Press in 2006. He has authored or co-authored more than forty articles in a variety of areas in economics. Those articles have appeared in leading scholarly and professional journals, including the *American Economic Review*, the *Quarterly Journal of Economics*, the *Review of Economic Studies*, and the *Rand Journal of Economics*. Many of his articles consider economic issues related to network effects, tying arrangements, and intellectual property rights.

**FRANCISCO DE ASÍS MARTÍNEZ-JEREZ**, Assistant Professor of Business Administration at Harvard Business School, is a member of the Accounting and Management Unit and teaches “Competing and Winning through Customer Information,” a second-year course in the elective MBA curriculum that he developed. In 2005, he received the MBA Class Award for excellence in teaching. His research focuses on
information and control systems that drive revenue growth, incentives and use of discretion by customer-facing employees, drivers of customer value, as well as issues related to corporate governance and its interaction with accounting information. Before his HBS faculty appointment, he worked as an international associate for La Suisse Assurances in Lausanne, Switzerland, and as a consultant for McKinsey & Company in Europe and South America.

NICHOLAS ECONOMIDES is Professor of Economics at the Stern School of Business of New York University and Executive Director of the NET Institute, http://www.NETinst.org. His fields of specialization and research include the economics of networks, especially of telecommunications, computers, and information, the economics of technical compatibility and standardization, industrial organization, the structure and organization of financial markets and payment systems, antitrust, application of public policy to network industries, strategic analysis of markets and law and economics. He has published over one hundred articles in top academic journals in the areas of networks, telecommunications, oligopoly, antitrust, product positioning, and on liquidity and the organization of financial markets and exchanges. He holds a Ph.D. and a M.A. in Economics from the University of California at Berkeley, as well as a B.Sc. (First Class Honors) in Mathematical Economics from the London School of Economics. He has previously taught at Columbia University (1981-1988) and at Stanford University (1988-1990). He is editor of the Netnomics, The Quarterly Journal of Electronic Commerce, The Journal of Financial Transformation, The Journal of Network Industries, on the Advisory Board of the Social Science Research Network, editor of Economics of Networks Abstracts by SSRN, and past editor of the International Journal of Industrial Organization. His web site on the Economics of Networks at http://www.stern.nyu.edu/networks/ has been ranked as one of the top four economics sites worldwide by The Economist magazine. He is advisor to the U.S. Federal Trade Commission, the governments of Greece, Ireland, New Zealand, and Portugal, major telecommunications corporations, a number of the Federal Reserve Banks, the Bank of Greece, and major Financial Exchanges. He serves on the Advisory Board of the Economist Intelligence Unit. The complete C.V. of Prof. Nicholas Economides is available at http://www.stern.nyu.edu/networks/cvnoref.html.

IGNACIO ESPONDA is an Assistant Professor in Economics at NYU Stern School of Business. He received his Ph.D. from Stanford University in 2006 and his primary areas of research are microeconomic theory and industrial organization. Part of his work focuses on understanding strategic interactions of market participants that suffer from specific biases in behavior, such as the failure to account for adverse selection or the failure to take into account the winner's curse effect in auction settings. Lately, he has been studying entry, participation, and bidding decisions of firms in procurement markets.

CHRIS FORMAN is an Assistant Professor in Information Systems at the Tepper School of Business, Carnegie Mellon University. His research interests include the geography of IT use, electronic commerce, diffusion of IT innovations, IT strategy, and services outsourcing and offshoring. His articles have appeared or are forthcoming in
places such as Management Science, MIS Quarterly, the Journal of Urban Economics, Information Economics and Policy, as well as conference volumes and edited book volumes. He holds a Ph.D. in Managerial Economics and Strategy from Northwestern University, and a B.A. from the University of Pennsylvania. He is an Associate Editor at Information Systems Research, and is a recipient of a 2007 Sloan Industry Studies Fellowship. Further information about his research is available at www.andrew.cmu.edu/~cforman.

JEREMY FOX is an assistant professor at the Department of Economics of the University of Chicago. Fox's specialty is in empirical industrial organization. Currently he is working on how to explain the observed sorting patterns in interfirm relationships, as modeled by matching and network games. He is also examining the dramatic consolidation in the mobile phone industry, and examining the role of government regulation as well as the economies of operating scale and geographic scope in that process. Finally, he develops statistical methods for estimating models of consumer demand and firm behavior.

ANINDYA GHOSE is an Assistant Professor of Information, Operations and Management Sciences at the Leonard Stern School of Business, New York University. He received his Ph.D. from Tepper School of Business, Carnegie Mellon University in 2004. His primary research interests include the economics of electronic markets and internet-based institutions, technology based price discrimination, and the economics of information security and information goods. Most recently, he received the prestigious NSF CAREER Award from the National Science Foundation for his research on identifying and empirically estimating the value of information in electronic markets. He is also a winner of the highly competitive 2007 Microsoft Virtual Earth and the 2006 Microsoft Live Labs awards for his work on combining econometrics with text mining techniques to examine to value of textual and spatial information on the Internet. His research has won best paper nominations in several top tier conferences and his dissertation was awarded the 2005 ACM SIGMIS Doctoral Dissertation award. He has published in Management Science, Information Systems Research, Statistical Science and Journal of Management Information Systems. His research has been widely covered by press outlets such as The New York Times and Forbes. Before joining NYU Stern, Dr. Ghose worked in Finance with GlaxoSmithKline, as a product manager in HCL-Hewlett Packard, and as a senior e-Business consultant with IBM.

AVI GOLDFARB is Assistant Professor of Marketing at the Rotman School of Management, University of Toronto. He received his Ph.D. from Northwestern University in 2002 and his B.A.H from Queen's University in 1997. His research focuses on the impact of information technology on marketing, on universities, and on the economy. He has published over 15 articles in a variety of outlets, including the Journal of International Economics, the Journal of Economics and Management Strategy, Quantitative Marketing and Economics, the Journal of Urban Economics, Statistical Science, and the International Journal of Industrial Organization. His complete C.V. is available at http://www.rotman.utoronto.ca/~agoldfarb/vita.pdf.
MICHAŁ GRAJEK is Assistant Professor at ESMT – European School of Management and Technology, http://www.esmt.org/en/home. Previously he worked as a Research Fellow in the unit “Competitiveness and Industrial Change” of the Social Science Research Center Berlin (WZB). In addition he has conducted research in the Humboldt-University based project sponsored by the German Federal Ministry of Education and Research titled “Internet Economy”. His research area is Empirical Industrial Organization and includes topics such as technology choice, network dynamics, and market conduct and performance in the context of information and communication technologies. He presented his research at numerous international conferences and won a Summer Research Grant from NET Institute at the Stern School of Business, NYU, in 2006. He received his Doctorate degree in Economics with honors (summa cum laude) from Humboldt University in 2004. His dissertation, “Network Effects, Compatibility, and Adoption of Standards: Essays in Empirical Industrial Economics,” tackled issues of identification network effects and compatibility between competing standards. He also holds M.A. in Economics (with honors) from Warsaw University and a diploma in Undergraduate Economics from Columbia University and Warsaw University.

BIN GU is an assistant professor in the Department of Information, Risks and Operations Management at the McCombs School of Business of University of Texas at Austin. His fields of research include electronic commerce, digital piracy and virtual communities. Specifically, his research has been concerned with the role of the internet in facilitating competition and information sharing in online markets and networks, its impact on the strategic behavior of consumers and organizations and its influence on market structure and industry organization. His recent research focuses on the development of virtual communities and other consumer-to-consumer communication networks, and their strategic implications for financial markets, e-commerce markets and digital piracy networks. His research has appeared in Information Systems Research, Journal of Management Information Systems, and Journal of Financial Services Research. He holds a Ph.D. and a M.A. in Operations and Information Management from the University of Pennsylvania, as well as B.Sc. in International Business and B.Sc. in Computer Science from Shanghai Jiaotong University. The complete C.V. of Prof. Bin Gu is available at http://www.mccombs.utexas.edu/faculty/Bin.Gu.

CHUAN HE is Assistant Professor of Marketing at the Leeds School of Business of University of Colorado at Boulder. His fields of specialization and research include advertising, search, pricing strategies, channel contracts, and Internet marketing. He has published in Marketing Science and Marketing Letters. He holds a Ph.D. in Marketing from Washington University in St. Louis and a M.A. in Economics from the University of Toronto.

DAVID A. HEINER is Vice President and Deputy General Counsel at Microsoft Corporation, where he heads up the legal department’s Antitrust Group. Mr. Heiner is responsible for antitrust counseling, representation of the company before antitrust agencies and compliance with agency rulings. Since joining Microsoft in 1994, Mr. Heiner has played a leading role in Microsoft’s response to government antitrust

**ANDRES HERVAS-DRANE** holds a Bachelor's degree in Business Administration and a Master's degree in Economic Analysis. A Ph.D. Candidate in Economics at Universitat Autònoma de Barcelona, Andres has performed research at London Business School as a Visiting Ph.D. Student, and more recently at Harvard Business School as a Visiting Fellow at Harvard University. His work focuses on telecommunications and the impact of technology on business models and market structure.

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**ALI HORTACSU** is Professor of Economics at the University of Chicago. His research focuses on analyzing economic behavior in auctions and the design of market clearing mechanisms, with applications in e-commerce, financial markets and energy markets. He is a co-editor of the International Journal of Industrial Organization, an associate editor of the Journal of Industrial Economics, an Alfred P. Sloan Research Fellow, and an NBER faculty research fellow. He received his Ph.D. in Economics from Stanford University in 2001.

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information, and developing data-driven pricing models to bridge the gap between existing empirical and theoretical models. Prior to joining the doctoral program at NYU, he has served as a financial information officer for two years (mandatory military service) and as a software developer at Computer Associates for one year. He got his BS in electrical engineering and MBA in finance (with honor) from National Taiwan University, and a MS degree in Information Systems from NYU (with honor).

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On the Impact of Practical P2P Incentive Mechanisms on User

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Abstract

In this paper we report on the results of a large-scale measurement study of two popular peer-to-peer systems, namely BitTorrent and eMule, that use practical and lightweight incentive mechanisms to encourage cooperation between users. We focus on identifying the strategic behavior of users in response to those incentive mechanisms. Our results illustrate a gap between what system designers and researchers expect from users in reaction to an incentive mechanism, and how users react to those incentives. In particular, we observe that the majority of BitTorrent users appear to cooperate well, despite the existence of known ways to tamper with the incentive mechanism, users engaging in behavior that could be regarded as cheating comprised only around 10% of BitTorrent’s population. That is, although we know that users can easily cheat, they actually do not currently appear to cheat at a large enough scale. In the eMule system, we identify several distinct classes of users based on their behavior. A large fraction of users appears to perceive cooperation as a good strategy, and openly share all the files they obtained. Other users engage in more subtle strategic choices, by actively optimizing the number and types of files they share in order to improve their standing in eMule’s waiting queues; they tend to remove files for which downloading is complete and keep a limited total volume of files shared.

1 Financial support from the NET Institute www.NETinst.org is gratefully acknowledged.
Bundling and Collusion in Communications Markets

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Abstract

This paper deals with competition in communications markets between an incumbent and an entrant. We analyze the effect of bundling strategy by a firm who enters an incumbent market. This market dimension has profound implications on the sustainability of collusion in an infinitely repeated game framework. We show that the bundling strategy of the entrant might hinder collusion. Furthermore, we consider a setting in which the entrant uses a one-way access that the incumbent possesses. In such situation, we show that when the entrant bundles its products, a low access charge for call termination on the incumbent network might increase the feasibility of collusion. This result has an important policy implication.

Keywords: Bundling, Collusion, Differentiation.

JEL Classification: D43, L13, L9,

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1 This research was partially funded by the NET Institute whose financial support is gratefully acknowledged.
Platform Competition: The Role of Multi-homing and Complementors

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University of Southern California

Abstract

In this paper we present a model of platform competition in which two firms offer horizontally differentiated platforms and a group of complementors offers products that are complementary to each platform. Consumers can buy either or both platforms (single- or multihoming) and complementors can produce for either or both platforms (single- or multi-production). We first characterize the pricing structure and find that, in equilibrium, consumers are more likely to multihome as the differentiation of platforms decreases or as the number of complementors for either platform increases. We show that the platform and its complementors always benefit from an increase in the number of complementors in their own platform. When single-homing arises in equilibrium, the platform and its complementors suffer from an increase in the number of complementors in the rival platform. We also study the incentives of the platform to integrate with its complementors, to charge them a royalty or give a subsidy, and to sell its own complementary products to the rival platform.

Keywords: Platform competition, multi-homing, complementor, royalty and subsidy

1 We thank seminar participants at Beijing University, University of Southern California, and University of Washington for helpful comments. We also thank Microsoft Corporation, the NET Institute, and USC for research support.
Using Uncensored Communication Channels to Divert Spam Traffic

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Abstract

We offer a microeconomic model of the two-sided market for the dominant form of spam: bulk, unsolicited, and commercial advertising email. We adopt an incentive-centered design approach to develop a simple, feasible improvement to the current email system using an uncensored communication channel. Such a channel could be an email folder or account, to which properly tagged commercial solicitations are routed. We characterize the circumstances under which spammers would voluntarily move much of their spam into the open channel, leaving the traditional email channel dominated by person-to-person, non-spam mail. Our method follows from observing that there is a real demand for unsolicited commercial email, so that everyone can be made better off if a channel is provided for spammers to meet spam demanders. As a bonus, the absence of filtering in an open channel restores to advertisers the incentive to make messages truthful, rather than to disguise them to avoid filters. We show that under certain conditions all email recipients are better off when an open channel is introduced. Only recipients wanting spam will use the open channel enjoying the less disguised messages, and for all recipients the satisfaction associated with desirable mail received increases, and dissatisfaction associated with both undesirable mail received and desirable mail filtered out decreases.

1 We appreciate comments from Nat Bulkley, Zhuoran Chen, Nick Economides, Michael Hess, Peter Honeyman, Paul Resnick, Doug Van Houweling, Michigan China Fellows, the members of the Incentive Centered Design Lab (especially Greg Gamette, Lian Jian, Kil-Sang Kim, John Lin, Anya Osepayshvili, Toinu Reeves, Ben Stearns, and Rick Wash), and participants at the STIET workshop in May 2006 and at the Telecommunications Policy Research Conference. We gratefully acknowledge financial support from the NET Institute and from NSF grants IIS-0414710 and IGERT-0114368.
ICT Use in the Developing World
An Analysis of Differences in Computer and Internet Penetration

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Abstract

Computer and Internet use, especially in developing countries, has expanded rapidly in recent years. Even in light of this expansion in technology adoption rates, penetration rates differ markedly between developed and developing countries and across developing countries. To identify the determinants of cross-country disparities in personal computer and Internet penetration, both currently and over time, we examine panel data for 161 countries over the 1999-2004 period. We explore the role of a comprehensive set of economic, demographic, infrastructure, institutional and financial factors in contributing to the global digital divide. We find evidence indicating that income, human capital, the youth dependency ratio, telephone density, legal quality and banking sector development are associated with technology penetration rates. Overall, the factors associated with computer and Internet penetration do not differ substantially between developed and developing countries. Estimates from Blinder-Oaxaca decompositions reveal that the main factors responsible for low rates of technology penetration rates in developing countries are disparities in income, telephone density, legal quality and human capital. In terms of dynamics, our results indicate fairly rapid reversion to long run equilibrium for Internet use, and somewhat slower reversion for computer use, particularly in developed economies. Financial development, either measured as bank lending or the value of stocks traded, is also important to the growth rate of Internet use.

JEL Classification: O30, L96

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1 Financial support form the NET Institute is gratefully acknowledged. Financial support from UW and UCSC faculty research funds was also provided. We thank Thomas Wu for helpful comments, Tanapong Potipiti for assistance in collecting and compiling data, and Hiro Ito for providing data.
Mobile Phone Mergers and Market Shares
Short Term Losses and Long Term Gains

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Abstract

The US mobile phone industry has dramatically consolidated through mergers. We investigate whether a merger increases the performance of a combined carrier over the sum of its constituent parts. We first directly compare the quantities of post-merger carriers to those of their pre-merger predecessors. This analysis considers only two years after a merger, as most carriers engage in new mergers after that time. To examine possible long run implications, we also explore the cross sectional relationship between outcomes and measures of firm size, as firm size is increased in a merger. We examine the market share of new subscribers. We also examine two measures of firm size: the amount of a carrier’s geographic coverage and its past subscriber count.

1 Financial support of the NET Institute is gratefully acknowledged. Research assistance has been provided by Edmund Cheng, Charles Kinzer, Alex Moore, Manasi Vydyanath as well as Amy Yung.
Search Costs, Demand Structure and Long Tail in Electronic Markets: Theory and Evidence¹

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Abstract

It is well known that the Internet has significantly reduced consumers’ search costs online. But relatively little is known about how search costs affect consumer demand structure in online markets. In this paper, we identify the impact of search costs on firm competition and market structure by exploring a unique theoretical insight that search costs create a kink in aggregate demand when firms change prices. The significance of the kink reflects the magnitude of online search costs and the kinked demand function provides information on how search costs affect competition in the online market. Using a dataset collected from Amazon and Barnes & Noble, we find that search costs vary significantly across online retailers. Consumers face low search costs for price information from Amazon.com. It leads to a higher price elasticity when the firm reduces prices than when it increases prices, increasing Amazon’s incentive to engage in price competition. On the other hand, consumers face relatively higher search costs for price information from Barnes & Noble. This leads to a lower price elasticity when Barnes & Noble reduces prices than when it increases prices, reducing Barnes & Noble’s incentive to engage in price competition. We also find that search costs decrease with the passage of time as the information about price changes dissipates among consumers, leading to increased price elasticity over time. Finally, we highlight that search costs are lower for popular books compared to rare and unpopular books. These findings have implications for the impact of the Internet on the Long Tail phenomenon.

Keywords: Electronic Markets, Search Costs, Kinked Demand Curve, Price Elasticity, Price Competition, Long Tail

¹ Financial support from the NET Institute is gratefully acknowledged.
Usage and Diffusion of Cellular Telephony, 1998-2004

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Abstract

In this paper, we study the dynamics of usage intensity of second-generation cellular telephony over the diffusion curve. We address two specific questions: First, does information about usage intensity over time allow us to draw conclusions about the underlying drivers of technology diffusion? Second, what effect does the existence and penetration of previous generations and other networks in the same generation on network usage intensity? Using an operator-level panel covering 41 countries with quarterly data over 6 years, we find that heterogeneity among adopters dominates network effects and that different technological generations are complements in terms of usage, but substitutes in terms of subscription.

Keywords: Cellular telephony, diffusion, usage intensity, network effects, consumer heterogeneity, fixed-mobile substitutability.

JEL Classification: L1, L52, O38.

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1 We are grateful to Dr Jan Krancke from T-Mobile International and Mark Burk from Informa Telecoms & Media for making the data available to us and to seminar participants at Munich University, WZB Berlin, LSE, HEC (Paris), the 2006 International Industrial Organization Conference (Boston), the Telecom Paris Conference on the Economics of ICT and EARIE 2006 (Amsterdam) for comments. Pedro Pita Barros, Jonathan Beck, Rafael Gomez, Pai-Ling Jin and Katrin Mühlfeld deserve special thanks for their insightful comments. Financial support from the NET Institute, www.NETinst.org is gratefully acknowledged. Michał Grajek gratefully acknowledges financial support from the German Federal Ministry of Education and Research (Project 01AK702A).
Merger Simulation in Mobile Telephony in Portugal\textsuperscript{1}

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Abstract

This article assesses the unilateral effects on prices of a merger in the Portuguese mobile telephony market. We use aggregate quarterly data from 1999 to 2005 and a nested logit model to estimate the price elasticities of demand and the marginal costs of subscription of mobile telephony. Given these estimates, we simulate the effects of the merger. We find that the available mobile telephony subscription products are close substitutes. The merger may cause substantial price increases, even in the presence of large cost efficiencies. On average, prices increase by 7% without cost efficiencies, and by about 6% with a 10% marginal cost reduction.

Keywords: mobile telephony, merger simulation, nested logit, network effects, lock-in

JEL Classification: L13, L43, L93

\textsuperscript{1} Financial support from the NET Institute and the CEPR RTN Competition Policy in International Markets is gratefully acknowledged. The opinions expressed in this article reflect only the authors' views, and in no way bind the institutions to which they are affiliated.
Flexible Investments in the Telecommunications Industry: Case Applications Using Real Options

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Lenos Trigeorgis
University of Cyprus and Massachusetts Institute of Technology

Venkata Praveen Tanguturi
Stevens Institute of Technology

Abstract

The telecommunications sector is one of the most innovative, high-growth, capital intensive yet volatile sector of the economy. This research addresses critical concerns of how, when, and why an enterprise or a service provider should undertake new investments. The study investigates the power of flexibility in investment decision making process, by applying the real options methodology. Five case applications are studied: a) investment decisions in next generation wireless networks; b) investing in integrated wireless networks; c) migration to wireless broadband internet services; d) valuing deployment of Wi-Fi networks in enterprise markets; and e) valuing Hosted VOIP services for enterprise markets. The case studies are analyzed both qualitatively and quantitatively.

1 This work is partially funded by the NET Institute. We gratefully acknowledge their financial support.
Pricing Digital Goods: Discontinuous Costs and Shared Infrastructure

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Abstract

We develop and analyze a model of pricing for digital products with discontinuous supply functions. This characterizes a number of information technology-based products and services for which variable increases in demand are fulfilled by the addition of "blocks" of computing or network infrastructure. Examples include internet service, telephony, online trading, on-demand software, digital music, streamed video-on-demand and grid computing. These goods are often modeled as information goods with variable costs of zero, although their actual cost structure features a mixture of positive periodic fixed costs, and zero marginal costs. The pricing of such goods is further complicated by the fact that rapid advances in semiconductor and networking technology lead to sustained rapid declines in the cost of new infrastructure over time. Furthermore, this infrastructure is often shared across multiple goods and services in distinct markets. The main contribution of this paper is a general solution for the optimal nonlinear pricing of such digital goods and services. We show that this can be formulated as a finite series of more conventional constrained pricing problems. We then establish that the optimal nonlinear pricing schedule with discontinuous supply functions coincides with the solution to one specific constrained problem, reduce the former to a problem of identifying the optimal number of "blocks" of demand that the seller will fulfill under their optimal pricing schedule, and show how to identify this optimal number using a simple and intuitive rule (which is analogous to "balancing" the marginal revenue with average "marginal cost"). We discuss the extent to which using "information-goods" pricing schedules rather than those that are optimal reduce profits for sellers of digital goods. A first extension includes the rapidly declining infrastructure costs associated with Moore’s Law to provide insight into the relationship between the magnitude of cost declines, infrastructure planning and pricing strategy. A second extension examines multi-market pricing of a set of digital goods and services whose supply is fulfilled by a shared infrastructure.

Our paper provides a new pricing model which is widely applicable to IT, network and electronic commerce products. It also makes an independent contribution to the theory of second-degree price discrimination, by providing the first solution of monopoly screening when costs are discontinuous, and when costs incurred can only be associated with the total demand fulfilled, rather than demand from individual customers.

Keywords: digital goods, price discrimination, nonlinear pricing, screening, discontinuous costs, shared infrastructure, Moore’s Law

JEL Classification: D41, D82, L1

1 We thank seminar participants at New York University for their feedback. Financial support from the NET Institute is gratefully acknowledged.
Internet Kiosks in Rural India: What Influences Success? ¹

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Abstract

In this paper we investigate an example of a very widely applied model for the delivery of IT services to rural and poor populations. The model is one where limited intervention to support infrastructure and coordinate resources is combined with market-based delivery of IT services to the end user (what we call here the “sustainable franchise model”). Though this model has been deployed world-wide by governments, NGOs, and development institutions in the past few years, few researchers have studied the determinants of success in such a model. In this paper we examine the example of n-Logue, a franchise of over 1000 locally-owned, internet kiosks in rural villages in India. We seek to assess how this new sustainable franchise model has worked in practice by analyzing data from 74 of n-Logue’s kiosks. Among other things, we find that gender and education do not affect success, while location and other measures of social standing (age and caste) do. We also find that the uses that villagers have for IT services are not so different from those which first world users have. The lessons we draw from this example are that while local customs and practices must be taken into account (e.g. the caste system), it is not a foregone conclusion that social biases (e.g. against women) cannot be mitigated by good program design.

¹ The second author is grateful to the UCSC Academic Senate, Rajiv Gandhi Institute for Contemporary Studies, and International Development Enterprises (India) for financial support. Both authors are grateful to the NET Institute for their generous support of this project.
Consumers’ Dynamic Switching Decisions in the Cellular Service Industry\textsuperscript{1}

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Abstract

This paper develops an empirical framework to analyze consumer’s dynamic switching decision in the cellular service industry. It first incorporates the sequential problem of quantity, plan and firm subscription choice in the presence of switching costs into a dynamic structural model, which allows for fully heterogeneous consumers and multiple switching possibilities across networks. The model is estimated using the data set on the number of switching consumers and the evolution of observed plan/firm characteristics over time. Based on the BLP-style estimation methods, we combine a nested technique that uses parametric assumptions with the structural estimation algorithm. The magnitude of switching costs is estimated and it turns out that switching costs vary across networks. A dynamic model with restricted number of switching is likely to underestimate the switching costs. Lower switching costs encourage consumers to switch relatively early. Change in the variety of optional plans and plan characteristics also play a great role in the consumers’ switching decision.

\textsuperscript{1} I would like to thank Juan Esteban Carranza, Jack Porter and Jean-Francois Houde for helpful comments. Financial supports from NET Institute, www.NETinst.org is gratefully acknowledged.
Adoption and Usage of Online Services in the Presence of Complementary Offline Services: Retail Banking

Anja Lambrecht  
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Katja Seim  
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Abstract

The availability and variety of online services has increased dramatically in recent years. Many questions remain, however, regarding patterns of online service use, consumer preferences when using online services, and how consumers substitute between equivalent online and offline services. Using an extensive data set of consumer adoption and usage of the online banking service of a major German bank, this paper analyzes consumers’ adoption and usage of online banking over the period August 2001 to July 2003, including the effect of demographics and branch banking on usage of online banking. We also examine the relationship between Internet availability and channel choice as well as usage. Finally, we analyze the effect of channel usage on customer level and product-specific revenues earned by the bank and derive revenue implications of online banking.

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1 We are grateful to several data providers for access to their data: Acxiom Deutschland GmbH, Neusenburg for the zip-code level demographic data; Deutsche Bundesbank / Bearbeitung Acxiom Deutschland and Hoppenstedt Firmeninformationen GmbH for local banking directories; and Lutum + Tappert DV-Beratung GmbH Bonn for zip-code boundaries. This research was supported by the NET Institute.
When Proof of Work Works

Debin Liu and L. Jean Camp
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Abstract

Proof of work (POW) is a set of cryptographic mechanisms which increase the cost of initiating a connection. Currently recipients bear as much or more cost per connection as initiators. The design goal of POW is to reverse the economics of connection initiation on the Internet. In the case of spam, the first economic examination of POW argued that POW would not, in fact, work. This result was based on the difference in production cost between legitimate and criminal enterprises. We illustrate that the difference in production costs enabled by zombies does not remove the efficacy of POW when work requirements are weighted. We illustrate that POW will work with a reputation system modeled on the systems currently used by commercial anti-spam companies. We also discuss how the variation on POW changes the nature of corresponding proofs from token currency to a notational currency.

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1 Financial support from the NET Institute is gratefully acknowledged.
The Impact on Broadband Access to the Internet of the Dual Ownership of Telephone and Cable Networks\textsuperscript{1}

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Autoridade da Concorrencia, Portugal  

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Indera

Abstract

In Portugal, the telecommunications incumbent offers broadband access to the Internet, both through digital subscriber line and cable modem. In this article, we estimate the impact on broadband access to the Internet of the structural separation of these two businesses. We use a panel of consumer level data and a discrete choice model to estimate the price elasticities of demand and the marginal costs of broadband access to the Internet. Based on these estimates, we simulate the effect on prices and social welfare of the structural separation. Our results indicate that the structural separation would lead to substantial price reductions. For broadband clients, on average, each household would save 3.37 euros per month, or 14\% of the current price levels. Overall, on average, each household would save 2.73 euros per month, or 14\% of the current price levels. We test the robustness of our results in terms of: (i) the estimates of the demand elasticities, (ii) the strategic behavior of the firms, and (iii) the market share estimates. There is no evidence of collusion.

Keywords: Broadband, Structural Separation, Prices

JEL Classification: L25, L51, L96

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\textsuperscript{1} Financial support from the NET Institute is gratefully acknowledged. We thank M. Armstrong and G. Biglaiser for useful comments. The opinions expressed in this article reflect only the authors' views, and in no way bind the institutions to which they are affiliated.
How Do Mobile Information Technology Networks Affect Firm Strategy and Performance? Firm Level Evidence from Taxicab Fleets

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Abstract

This paper examines how the adoption of mobile information technology networks impact firm strategy and performance in the U.S. taxicab industry. Using a rich, novel firm-level data set from the Economic Census, I test transaction cost economics’ prediction that adoption of mobile IT networks leads to shifts in the boundary of the firm toward increased fleet ownership of vehicles. I then exploit the homogeneity of the industry’s production function and exogenous variation in local market conditions to precisely measure the impact of adoption of mobile IT networks on productivity. I find strong evidence that firms respond to adoption of mobile IT networks by changing their organizational structure, shifting toward owning a greater fraction of vehicles in their fleets (as opposed to contracting with independent driver-owners for vehicles). I then use a precise and economically meaningful measure of firm performance to show that adoption of mobile IT networks causes firms to become more productive. The results suggest that adoption of mobile IT networks increases asset utilization by improving within-firm coordination but that firms must simultaneously shift toward a more highly vertically integrated structure to fully capture the benefits of mobile IT networks.

1 I thank Bronwyn Hall, Francine Lafontaine, Alex Mas, John Morgan, David Mowery, Tim Simcoe, Jason Snyder, Scott Stern and Chad Syverson for helpful comments, as well as participants in seminars at UC Berkeley and the Consortium on Competitiveness and Cooperation (CCC). This research was conducted while the author was a Census Bureau research associate at the California Census Research Data Center (CCRDC). Research results and conclusions expressed are those of the author and do not necessarily indicate concurrence by the Bureau of Census. This paper has been screened to insure that no confidential data are revealed. I gratefully acknowledge support for this work from the Fisher Real Estate Center and the Competition Policy Center at the University of California Berkeley; the Networks Electronic Commerce, and Telecommunications (NET) Institute at www.NETinst.org; and The Ford IT Grant to the University of California Berkeley, Haas School of Business
Airline Pricing, Price Dispersion and Ticket Characteristics
On and Off the Internet

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Texas A&M University

Abstract
This paper uses a unique individual transactions data set to investigate the effects of internet purchase on the prices paid for airline tickets. The analysis also investigates the effects of changes in the percentage of online transactions on both online and offline prices and on price dispersion. The analysis also uses these unique data to provide a more complete analysis of the factors affecting airline price levels and price dispersion, contributing more generally to our understanding of airline pricing. Our novel data set includes detailed transaction level data that includes ticket characteristics and restrictions, carrier, estimated flight level load factors, date of issue, departure date, other hedonic factors affecting prices, whether the ticket was purchased online or offline, and the share of online purchases for the city-pair. Controlling for numerous observed ticket characteristics, as well as carrier and route effects, the results show that online prices average about 13 percent less than offline prices. The analysis also shows that a ten percent increase in the online share of tickets sold on a route decreases average prices by an additional 5 percent, with more of this effect coming in the form of lower offline prices. The paper also finds evidence that an increase in online shares decrease price dispersion. The paper also uses these unique data to investigate the effects of hub dominance and high route shares on pricing. Due to data limitations previous investigations of these issues could not control for important ticket characteristics, load factors, and time of purchase in measuring the effects of concentration on price levels and dispersion. Our analysis controls for these factors while investigating the impact of market concentration on price levels and dispersion.

Keywords: Internet, search cost, online and offline

JEL Classification: L9, Industrial Organization

1Preliminary draft. Please do not cite or quote.
What’s It To You? A Survey of Online Privacy Concerns and Risk

Janice Tsai, Lorrie Cranor, Alessandro Acquisti, and Christina Fong
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Abstract

Finding information about privacy practices can be difficult: privacy policies often do not present this information in an accessible way. People typically do not know how or for what purpose their personal information, gathered online, will be used. When asked, people frequently express concerns about their privacy, but their behavior often does not reflect their concerns. We conducted an online survey to examine participants’ online privacy concerns, focusing especially on the online shopping context. We asked participants about several scenarios related to the privacy of personal information. We found that Privacy Finder, a P3P-enhanced search engine, provides information that addresses the scenarios that participants believe are most likely to occur. We also asked participants about a wide range of items for purchase online to evaluate which types of items are more likely to raise privacy concerns.
Recipients of grants from the NET Institute in Summer 2006 (in alphabetical order)


2. Yannis Bakos, Stern School of Business, NYU and Florencia Marotta-Wurgler, School of Law, NYU, “Online Contracts and Consumer Behavior.”


11. Kenneth S. Corts, Rotman School of Management, University of Toronto, and Mara Lederman, Rotman School of Management, University of Toronto,
“Software Exclusivity and Indirect Network Effects in the U.S. Home Video Game Industry.”


25. Ravi Mantena, Simon Graduate School of Business Administration, University of Rochester, Ramesh Sankaranarayanan, School of Business, University of Connecticut, and Siva Viswanathan, Smith School of Business, University of Maryland, “Exclusive Licensing in Complementary Network Industries.”


Recipients of grants from the NET Institute in Summer 2005 (in alphabetical order)


3. **Jay Pil Choi**, Michigan State University, “Strategic Product Pre-Announcements in Markets with Network Effects.”


8. **David Gabel**, Queens College, and **Carolyn Gideon**, Fletcher School, Tufts University, “Retail Prices and Facility-Based Entry into the Telecommunications Market.”

9. Onsel Emre, University of Chicago, **Ali Hortacsu**, University of Chicago and **Chad Syverson**, University of Chicago, “E-commerce and the Market Structure of Retail Industries.”


18. **Yossi Spiegel**, Tel Aviv University, “The Incentive To Participate In Open Source Projects: A Signaling Approach.”


23. **Michael Ward**, University of Texas, “Rationalizing the E-Rate: The Effects of Subsidizing IT in Education.”
Recipients of grants from the NET Institute in Summer 2004 (in alphabetical order)


4. Nataly Gantman and Yossi Spiegel, Tel Aviv University, “Adware, Shareware, and Consumer Privacy”


7. Austan Goolsbee, University of Chicago, GSB, and Chad Syverson, University of Chicago, “How Do Incumbents Respond to the Threat of Entry on Their Networks? The Case of the Major Airlines.”


14. Mark McCabe, Georgia Institute of Technology, and Christopher Snyder, George Washington University, “The Economics of Open-Access Journals.”


Recipients of grants from the NET Institute in Summer 2003 (in alphabetical order)

1. Fernando Beltran, Universidad de Los Andes, Colombia, “Effects of ISP Interconnection Agreements on Internet Competition: The Case of the Network Access Point as a Cooperative Agreement for Internet Traffic Exchange.”


4. Martha Garcia-Murillo, Syracuse University, “Assessing The Impact Of Internet Telephony On The Deployment Of Telecommunications Infrastructure.”

5. David Gilo and Yossi Spiegel, Tel Aviv University “Network Interconnection with Competitive Transit.”


7. Christian Hogendorn, Wesleyan University, “Excessive(?) Entry of National Telecom Networks.”

8. Jay P. Kesan, University of Illinois at Urbana-Champaign, and Andres A. Gallo, University of North Florida, “Internet Regulation: The Political Economy of ICANN and the Shaping of New Regulatory Regimes for the Internet.”


10. Marc Rysman, Boston University “Adoption Delay in a Standards War,” and “Differentiation Across Standards and Adoption Failure in 56K Modems.”
