

NET Institute

Conference on

Network Economics

April 21, 2006



Co-sponsored by

Center for Digital Economy Research
Stern School of Business

NET Institute 2006 Conference

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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. 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 2005, its third year of operation, the NET Institute has funded through its summer grants program twenty three projects in a number of network industries through a competitive process in which a large number of proposals were submitted. The 2005 successful proposals are listed at http://www.netinst.org/2005_grants.html and on page 38. In 2004, the NET Institute funded through its summer grants program twenty research proposals in a number of network industries through the same competitive process. The 2004 successful proposals are listed on page 40 and at http://www.netinst.org/2004_grants.htm. Similarly, during 2003, its first year of operation, the NET Institute has funded through the same process number of research proposals. The successful projects for summer 2003 are listed on page 42 and at http://www.netinst.org/2003_grants.htm. The funded research work includes a number of very important contributions in the analysis and understanding of competition, pricing, 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 2005 research papers are featured in this year’s NET Institute conference. The NET Institute continues its summer grants program during the year 2006, and expands its support of research activities, conferences, and scientific meetings. See the call for proposals at http://www.netinst.org/call_for_proposals_2006.htm.

NET Institute Conference **on Network Economics**

Co-sponsored by the NET Institute, <http://www.NETinst.org/>
and the [Center for Digital Economy Research](#), Stern School of Business

April 21, 2006

[Stern School of Business, NYU](#), 44 West 4th Street [[MAP](#)]

Preliminary Program (also at http://www.NETinst.org/2006_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 and Harvard University, visiting NYU
[Vasant Dhar](#), Director, Center for Digital Economy Research, Stern School of Business
- 9:15-10:45 **Pre-announcements, Patents, and Search in Markets with Network Effects**
Chairman: [Cristian Dezso](#), Stern School of Business
1. [Jay Pil Choi](#), Michigan State University, [Eirik Gaard Kristiansen](#), Michigan State University, and [Jae Nahm](#), HKUST, Hong Kong
“[Strategic Product Pre-announcements in Markets with Network Effects](#).”
Discussant: [Nikolaos Georgantzis](#), Universitat Jaume I, Spain

2. [Marc Rysman](#), Boston University, and [Tim Simcoe](#), University of Toronto, “[Patents and the Performance of Voluntary Standard Setting Organizations](#).”
Discussant: [Michael Ward](#), University of Texas

3. Animesh Animesh, Vandana Ramachandran, and [Siva Viswanathan](#), Robert H Smith School of Business, University of Maryland, “[Quality Uncertainty And Adverse Selection In Sponsored Search Markets](#).”
Discussant: [Carolyn Gideon](#), Tufts University
- 10:55-12:25 **Open Source, Databases and Other Strategic Issues**
Chairman: [Barak Y. Orbach](#), University of Arizona

1. [Yossi Spiegel](#), Tel Aviv University, “[The Incentive To Participate In Open Source Projects: A Signaling Approach.](#)”

Discussant: [Matthew Nagler](#), City University of New York

2. [Kai Suelzle](#), Ifo Institute for Economic Research (University of Munich) & Dresden University of Technology, “[Stable and Efficient Electronic Business Networks: Key Players and the Dilemma of Peripheral Firms.](#)”

Discussant: [Heski Bar-Isaac](#), Stern School of Business, NYU

3. [Tobias Kretschmer](#), London School of Economics, “[Competing Technologies in the Database Management Systems Market.](#)”

Discussant: [V. Brian Viard](#), GSB, Stanford University

12:35 to 1:35 **Lunch; Discussion of Current Topics and Open Questions on Network Economics**

[Nicholas Economides](#), Executive Director, NET Institute and Stern School of Business, NYU

[Ariel Pakes](#), Director, NET Institute and Harvard University, visiting NYU

1:45-3:45 **Electronic Retail Markets**

Chairman: [Yannis Ioannides](#), Tufts University

1. Sudip Bhattacharjee, Ram D. Gopal, Kaveepan Lertwachara, James R. Marsden, School of Business, University of Connecticut, and [Rahul Telang](#), H John Heinz III School of Public Policy and Management, Carnegie Mellon University, “[The Effect of P2P File Sharing on Music Markets: A Survival Analysis of Albums on Ranking Charts.](#)”

Discussant: [Mingdi Xin](#), Stern School of Business, New York University

2. 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.](#)”

Discussant: [Evangelos Katsamakas](#), GSB, Fordham University

3. [Anindya Ghose](#), Stern School of Business, NYU, “[Used Good Trade Patterns: A Cross-Country Comparison of Electronic Secondary Markets.](#)”

Discussant: [Jeremy Fox](#), University of Chicago

4. [Anindya Ghose](#) and [Arun Sundararajan](#), Stern School of Business, NYU, “[Versioning and Quality Distortion in Software? Evidence from E-Commerce Panel Data.](#)”

Discussant: [Jose Canals-Cerda](#), University of Colorado at Boulder

4:00-5:00

Keynote Speaker

Vint Cerf, Chief Internet Evangelist, Google, and Director, NET Institute,
“The Internet: Opportunities and Challenges that Lie Ahead”

Abstracts Of Papers In The Conference In Presentation Order

Strategic Product Pre-announcements in Markets with Network Effects

Jay Pil Choi*, Eirik Gaard Kristiansen**, and Jae Nahm***

September 2005

Abstract

It is a widely adopted practice for firms to announce new products well in advance of actual market availability. The incentives for pre-announcements are stronger in markets with network effects because they can be used to induce the delay of consumers' purchases and forestall the build-up of rival products' installed bases. However, such announcements often are not fulfilled, raising antitrust concerns. We analyze the effects of product pre-announcements in the presence of network effects when firms are allowed to strategically make false announcements. We also discuss their implications for consumer welfare and anti-trust policy.

JEL Classification: L1, D8.

Keywords: product pre-announcements, network effects, cheap talk, reputation.

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This research was partially funded by the NET Institute whose financial support is gratefully acknowledged.

Patents and the Performance of Voluntary Standard Setting Organizations

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Tim Simcoe
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October 11, 2005

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Abstract

This paper measures the technological significance of voluntary standard setting organizations (SSOs) by examining citations to patents disclosed in the standard setting process. We find that SSO patents are cited far more frequently than a set of control patents, and that SSO patents receive citations for a much longer period of time. Furthermore, we find a significant correlation between citation and the disclosure of a patent to an SSO, which may imply a marginal impact of disclosure. These results provide the first empirical look at patents disclosed to SSOs, and show that these organizations not only select important technologies, but may also play a role in establishing their significance.

Financial support for this research was provided by CITRIS, the Intel Robert Noyce Memorial Scholarship and the NET Institute. Useful comments were received from Kevin Lang, Josh Lerner, David Mowery, Bronwyn Hall, Avi Goldfarb and the seminar audience at the NBER Productivity Lunch.

Quality Uncertainty and Adverse Selection in Sponsored Search Markets*

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ABSTRACT

Sponsored search mechanisms, where advertisers bid for placement to be as close to the top in the listing of search results, are the fastest growing among online search models. Sponsored search in popular search services such as Google and Yahoo! employ an auction mechanism wherein firms can bid, for a better placement in the (sponsored) search results, on relevant keywords used by consumers in their search process. This provides an unprecedented opportunity to test some of the predictions of earlier research relating quality and advertising, in the online setting. While sponsored search mechanisms have been gaining popularity, they can potentially introduce a bias in the listing of search results. In particular, sponsored search mechanisms that enable low quality bidders to be placed at the top of the search listings can adversely affect consumer welfare. Our study uses data from online sponsored search auctions to examine the relationship between advertisers' quality and their bidding strategies. Specifically we seek to understand if advertisers' bidding strategies differ across products characterized by different degrees of quality-uncertainty. Our results indicate that there are significant differences in the bidding strategies of sellers of *search* goods as compared to sellers of *experience* and *credence* goods, and that there is significant adverse selection in product categories characterized by greater uncertainty. We discuss the implications of our findings for consumers, advertisers, and intermediaries and provide directions for future research in this emerging context.

Keywords: sponsored search, keyword advertising, pay-for-performance, search, credence, experience

* The authors are grateful to the NET institute (<http://www.NETInst.org>) for generous financial support.

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The Incentive to Participate in Open Source Projects: A Signaling Approach*

Yossi Spiegel**

Current draft: October 30, 2005

Abstract

This paper examines the incentives of programmers to contribute to open source software projects on a voluntary basis. In particular, the paper looks at this incentive changes as (i) performance becomes more visible to the relevant audience, (ii) effort has a stronger impact on performance, and (iii) performance becomes more informative about talent. In all three cases, it is shown that whether we start from a stable interior equilibrium or an unstable interior equilibrium.

*The financial support of the NET institute (<http://www.NETinst.org>) is gratefully acknowledged. For helpful discussions, I thank Jean Tirole.

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Stable and Efficient Electronic Business Networks: Key Players and the Dilemma of Peripheral Firms*

Kai Suelzle**

Ifo Institute for Economic Research at the University of Munich
& Dresden University of Technology

October 2005

Abstract

This paper studies a spatial model of electronic business network formation where firms build links based on a cost-benefit analysis. Benefits result from directly and indirectly connected firms in terms of knowledge flows, which are heterogeneous: a “key-player” (e.g. a firm providing an exchange platform in a business-to-business network) provides a higher level of knowledge flows than “peripheral” firms (e.g. tier 3 suppliers in a vertically differentiated industry). For intermediate cost values of link formation, stable and efficient network structures comprise only a subset of the total set of firms, excluding peripheral firms which are most distantly located to the key player. When link formation implies a certain degree of network congestion, the stable and efficient network size is smaller than in a model with bilateral decisions upon link formation between two firms.

JEL-classification numbers: C70, D85, L22

Keywords: Network Formation, Business-to-Business, Spatial Model

*The author thanks Arun Sundararajan, Tom Kiessl, Klaus Wohlrabe and seminar participants at the Ifo Institute, Munich and the Dresden University of Technology for helpful discussions. Further thanks for comments are due to participants of EARIE, Porto 2005, IEA World Congress, Marrakech 2005, 5th ZEW Conference on the Economics of ICT, Mannheim 2005, and Kiel-Munich Workshop on the Economics of Information and Network Economics, Munich 2005.

Financial support of the NET institute (<http://www.NETinst.org>) is gratefully acknowledged.

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Competing technologies in the database management systems market*

Tobias Kretschmer**

London School of Economics and CEP

Abstract

In this paper, we study the dynamics of the market for Database Management Systems (DBMS), which is commonly assumed to possess network effects and where there is still some viable competition in our study period, 2000 – 2004. Specifically, we make use of a unique and detailed dataset on several thousand UK firms to study individual organizations' incentives to adopt a particular technology. We find that there are significant internal complement effects – in other words, using an operating system and a DBMS from the same vendor seems to confer some complementarities. We also find evidence for complementarities between enterprise resource planning systems (ERP) and DBMS and find that as ERP are frequently specific and customized, DBMS are unlikely to be changed once they have been customized to an ERP. We also find that organizations have an increasing tendency to use multiple DBMS on one site, which contradicts the notion that different DBMS are near-perfect substitutes.

Keywords: Database software, indirect network effects, technology adoption, microdata.

JEL Codes: L86, O33.

* Preliminary; comments welcome. This research has been supported by a grant from the NET Institute (<http://www.netinst.org>), and purchase of the data has been financed by the ESRC, the Anglo-German Foundation, and the Interdisciplinary Institute of Management at the LSE. I thank Benedikt Gamharter for excellent research assistance.

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**The Effect of P2P File Sharing on Music Markets:
A Survival Analysis of Albums on Ranking Charts***

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Rahul Telang (Contact Author)
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Abstract

Recent technological and market forces have profoundly impacted the music industry. Emphasizing threats from peer-to-peer (P2P) technologies, the industry continues to seek sanctions against individuals who offer significant number of songs for others to copy. Yet there is little rigorous empirical analysis of the impacts of online sharing on the success of music products. Combining data on the performance of music albums on the Billboard charts with file sharing data from a popular network, we: 1) assess the impact of recent developments related to the music industry on survival of music albums on the charts, and 2) evaluate the specific impact of P2P sharing on an album's survival on the charts. In the post P2P era, we find significantly reduced chart survival. The second phase of our study isolates the impact of file sharing on album survival. We find that sharing does not seem to hurt the survival of albums.

Keywords: peer-to-peer, digitized music, online file sharing, survival.

*Financial support from the NET Institute (<http://www.NETinst.org>) is gratefully acknowledged

E-commerce and the Market Structure of Retail Industries*

Ä Onsel Emre, University of Chicago
Ali Hortaçsu, University of Chicago and NBER
Chad Syverson, University of Chicago and NBER

September 30, 2005

Abstract

While a fast-growing body of research has looked at how the advent and discussion of e-commerce has affected prices, much less work has investigated e-commerce's impact on the number and type of firms operating in an industry. This paper theoretically and empirically takes up the question of which producers most benefit and most suffer as consumers switch to purchasing products online. We specify a general industry model involving consumers with differing search costs buying products from heterogeneous-type producers. We interpret e-commerce as having created reductions in consumers' search costs. We show how such shifts in the search cost distribution reallocate market shares from an industry's low-type producers to its high-type businesses. We test the model using data for two industries in which e-commerce has arguably decreased consumers' search costs considerably: travel agencies and bookstores. We found evidence in both industries of the market share shifts predicted by the model. Interestingly, while both industries experienced similar changes, the specific mechanisms through which e-commerce induced them were different. For travel agencies, the shifts reflected aggregate changes driven by airlines' reductions in agent commissions as consumers started buying tickets online. For bookstores, on the other hand, industry-wide declines in small book stores reflected aggregated market-specific impacts, evidenced by the fact that more small-store exit occurred in those local markets where consumers' use of e-commerce channels grew fastest.

*We gratefully acknowledge financial support for this research from the NET Institute (www.NETinst.org) and the NSF (award no. SES-0242031). The authors can be contacted at the Department of Economics, University of Chicago, 1126 E. 59th Street, Chicago, IL 60637

**Used Good Trade Patterns:
A Cross-Country Comparison of Electronic Secondary Markets**

Anindya Ghose*

Abstract

A series of recent papers have investigated the nature of trading and sorting induced by the dynamic price mechanism in a competitive durable good market with adverse selection and exogenous entry of traders over time. These models are dynamic versions of Akerlof's (1970) seminal work. The general set up consist of identical cohorts of durable goods, whose quality is known only to potential sellers, enter the market over time and a common result is that there exists a cyclical equilibrium where all goods are traded within a finite number of periods after entry. Market failure is reflected in the relationship between product quality (and product reliability) and the length of waiting time before trade as well as on the relationship between average price decline and extent of trade of used goods. Based on a unique 9-month dataset collected from Amazon' secondary market across multiple countries, and multiple product categories we provide empirical evidence of trade patterns and the presence of adverse selection. We show how used good quality and product reliability affect resale turnaround times in an electronic secondary market. We find some empirical evidence that is consistent with theoretical predictions existing in the literature.

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**Versioning and Quality Distortion in Software?
Evidence from E-Commerce Panel Data**

Anindya Ghose & Arun Sundararajan

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NET Institute Working Paper

September 2005

Abstract

We present a framework for measuring software quality using pricing and demand data, and empirical estimates that quantify the extent of quality degradation associated with software versioning. Using a 7-month, 108-product panel of software sales from Amazon.com, we document the extent to which quality varies across different software versions, estimating quality degradation that ranges from as little as 8% to as much as 56% below that of the corresponding flagship version. Consistent with prescriptions from the theory of vertical differentiation, we also find that an increase in the total number of versions is associated with an increase in the difference in quality between the highest and lowest quality versions, and a decrease in the quality difference between "neighboring" versions. We compare our estimates with those derived from two sets of subjective measures of quality, based on CNET editorial ratings and Amazon.com user reviews, and discuss competing interpretations of the significant differences that emerge from this comparison. As the first empirical study of software versioning that is based on both subjective and econometrically estimated measures of quality, this paper provides a framework for testing a wide variety of results in IS that are based on related models of vertical differentiation, and its findings have important implications for studies that treat web-based user ratings as cardinal data.

Keywords: software quality, vertical differentiation, price discrimination, quality distortion, information goods, Internet, electronic commerce, economics of IS.

This research was supported by a grant from the NET Institute.

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 design of debt contracts to the internal structure of organized crime groups. 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 Bocconi.

Jose J. Canals-Cerda is an Assistant Professor in the Department of Economics of the University of Colorado at Boulder. His teaching and research interests include econometrics, labor economics, empirical Industrial Organization and applied microeconomics. He conducts research in identification and estimation of structural and reduced form econometric models and semi-parametric and non-parametric econometrics. Some of his current research work is in the area of online auction markets. In particular, he is developing new methodologies to analyze these markets and studying the effects of reputation, search, congestion and pricing.

Vinton G. Cerf is vice president and chief Internet evangelist for Google. In this role, he is responsible for identifying new enabling technologies to support the development of advanced, Internet-based products and services from Google. Cerf is the former senior vice president of Technology Strategy for MCI. In this role, Cerf was responsible for helping to guide corporate strategy development from the technical perspective. Previously, Cerf served as MCI's senior vice president of Architecture and Technology, leading a team of architects and engineers to design advanced networking frameworks including Internet-based solutions for delivering a combination of data, information, voice and video services for business and consumer use. Widely known as one of the "Fathers of the Internet," Cerf is the co-designer of the TCP/IP protocols and the architecture of the Internet. In December 1997, President Clinton presented the U.S. National Medal of Technology to Cerf and his colleague, Robert E. Kahn, for founding and developing the Internet. Kahn and Cerf were named the recipients of the ACM Alan M. Turing award in 2004 for their work on the Internet protocols. The Turing award is sometimes called the "Nobel Prize of Computer Science." In November 2005, President George Bush awarded Cerf and Kahn the Presidential Medal of Freedom for their work. The medal is the highest civilian award given by the United States to its citizens. Prior to rejoining MCI in 1994, Cerf was vice president of the Corporation for National Research Initiatives (CNRI). As vice president of MCI Digital Information Services from 1982-1986, he led the engineering of MCI Mail, the first commercial email service to be connected to the Internet. During his tenure from 1976-1982 with the U.S. Department of

Defense's Advanced Research Projects Agency (DARPA), Cerf played a key role leading the development of Internet and Internet-related packet data and security technologies.

Vint Cerf serves as chairman of the board of the Internet Corporation for Assigned Names and Numbers (ICANN). Cerf served as founding president of the Internet Society from 1992-1995 and in 1999 served a term as chairman of the Board. In addition, Cerf is honorary chairman of the IPv6 Forum, dedicated to raising awareness and speeding introduction of the new Internet protocol. Cerf served as a member of the U.S. Presidential Information Technology Advisory Committee (PITAC) from 1997 to 2001 and serves on several national, state and industry committees focused on cyber-security. Cerf sits on the Board of Directors for the Endowment for Excellence in Education, Avanex Corporation and the ClearSight Systems Corporation. Cerf is a Fellow of the IEEE, ACM, and American Association for the Advancement of Science, the American Academy of Arts and Sciences, the International Engineering Consortium, the Computer History Museum and the National Academy of Engineering.

Cerf is a recipient of numerous awards and commendations in connection with his work on the Internet. Cerf holds a Bachelor of Science degree in Mathematics from Stanford University and Master of Science and Ph.D. degrees in Computer Science from UCLA. He also holds honorary Doctorate degrees from the Swiss Federal Institute of Technology (ETH), Zurich; Lulea University of Technology, Sweden; University of the Balearic Islands, Palma; Capitol College, Maryland; Gettysburg College, Pennsylvania; George Mason University, Virginia; Rovira i Virgili University, Tarragona, Spain; Rensselaer Polytechnic Institute, Troy, New York; the University of Twente, Enschede, The Netherlands; Brooklyn Polytechnic; and the Beijing University of Posts and Telecommunications.

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* that will be published by the MIT Press in 2006. He has authored or co-authored more than thirty 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.

Cristian Dezsó is a 2006 graduate of the Economics Department at Stern School of Business, New York University. He will be joining the Washington, D.C. office of Cornerstone Research. His research in empirical corporate finance focused on the role of anti-takeover provisions as a mechanism that protects inferior CEOs. His industrial organization research with Luis Cabral focused on technology adoption with multiple and evolving designs. Cristian received his BA in economics, from the "Babes-Bolyai"

University, Cluj, Romania and his MA in economics from the Central European University, Budapest, Hungary.

Dr. Vasant Dhar is Professor and Chairman of the Information Systems Group at New York University's Stern School of Business and co-director for the Center for Digital Economy Research (CeDER). He authored the first book on Business Intelligence in 1996. At NYU since 1983, Professor Dhar also served as a Principal at Morgan Stanley in New York from 1994 to 1997, where he founded the Data Mining group, focusing on automated trading models, sales force management, and customer profiling. He also advised the Venture Capital group on emerging technologies in data mining and warehousing. He was a Visiting Scientist in the Artificial Intelligence Laboratory at the Microelectronic Computer Consortium (MCC) in Austin, Texas in 1988 and 1989. Dr. Dhar's research focuses on the analysis of large amounts of time series data for predictive decision making. Professor Dhar pioneered the application of machine learning methods on Wall Street for problems ranging from market prediction to customer profiling and relationship management. More broadly, Dhar seeks solutions to creating organizations with high "information liquidity" through better design and use of data repositories, business processes, and governance. Professor Dhar received his Ph.D. from the University of Pittsburgh in 1984.

Nicholas Economides is Professor of Economics at the Stern School of Business of New York University and Executive Director of the NET Institute at <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, application of public policy to network industries, and strategic analysis of markets. He has published widely 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 5 economics sites worldwide by The Economist magazine. He is advisor to the U.S. Federal Trade Commission, the governments of Greece, Ireland, Portugal, and New Zealand, 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. A complete CV is available at <http://www.stern.nyu.edu/networks/cvnoref.html>.

Jeremy Fox is an assistant professor in the Department of Economics at the University of Chicago. He joined Chicago after completing his PhD at Stanford University in 2003. He

specializes in the field of industrial organization. Recent work funded by the NET Institute has focused on the mobile phone industry. He has studied both competition within FCC spectrum auctions, and reasons for the tremendous merger activity in the wireless industry.

Nikolaos Georgantzis is an Associate Professor of Economic Theory, Economics Department, Universitat Jaume I. He holds a PhD from the European University Institute, Florence-Italy. He has held positions at EC Commission-DGIV and the Universitat Jaume I (Castellón-Spain), and visiting professor positions at Universidade Nova de Lisboa, University of Crete, University Paris II. He is Director of Graduate Studies and of the Laboratori d'Economia Experimental (LEE) at the Universitat Jaume I (Castellón, Spain). Associate researcher of LINEEX (Univ. of Valencia). His research interests are in Industrial Organization, Behavioral Economics, Risky Decision Making, Experimental Economics, Law and Economics, Environmental Economics and Labor Economics. He has published in the *Journal of Economic Behavior and Organization*, the *International Journal of Industrial Organization*, *Journal of Economics and Management Strategy*, *Regional Science and Urban Economics*, *Environmental and Resource Economics*, *Ecological Economics*, *International Review of Law and Economics*, *Review of Industrial Organization*, *European Journal of Law and Economics*, etc. He is Associate Editor of the series *Advances in Ecological Sciences* (WIT Press, Southampton).

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estimate demand and cost systems in different environments and then use the estimated parameters to analyze equilibrium responses to policy and environmental changes; empirical work which uses these techniques to analyze the implications of alternative events in different industries; and the development of a framework for the numerical and empirical analysis of dynamic oligopolies. The dynamic framework includes methodology for both estimating dynamic parameters and for computing dynamic equilibrium, and the numerical analysis includes models which allow for collusion and for asymmetric information. Pakes' recent empirical work includes an analysis of the impact of the break up of AT&T on productivity in the telecommunication equipment industry, an analysis of the impact of Voluntary Export Restrictions on the profits and consumer welfare generated by the sales of new cars, and an analysis of the impact of the entry and exit of goods on the price index for personal computers. Most recently Pakes has been involved in recent work by his students on ATM networks and HMO-hospital networks. His previous work outside of I.O. proper included the co-development of simulation estimators (in Econometric Theory), and the development of measures of the costs and returns to research and patenting activities (in Technological Change).

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Abstracts Of Papers That Received A Net Institute Grant In Summer 2005 But Could Not Fit In A One-Day Conference Program

THE FIRST DEAL MIGHT BE THE LAST: BUILDING LONG TERM RELATIONSHIPS IN THE VENTURE CAPITAL COMMUNITY

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September 15th, 2005

Abstract

Previous analysis of venture capital activity in Silicon Valley has highlighted the role of venture capital syndication as a mechanism through which venture capitalists (VCs) build trusting relationships within the investment venture capital community. But what are the dynamic properties of the resulting network? This paper analyzes the dynamics of syndicated deals in technology sectors. The results suggest that VCs build reputation by committing to provide future funds in a staged deal and honoring their commitment. Reputation increases cooperation, in terms of access to 'deal flow'. The commitment to provide future funding, however, is expensive in terms of the opportunity costs associated with a reduction in the number of new startups in which they can participate. The reputation system is enforced by established VCs, who have more exposure to the 'deal flow'.

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Congestion Pricing in an Internet Market¹

Jose Canals-Cerda

October 18, 2005

Abstract

This paper analyzes a unique dataset of art auctions on eBay. We study the behavior of buyers and sellers, demand and supply, by means of a novel structural estimation approach. Our empirical framework considers the process of arrival of new bidders as well as the distribution of bidder valuations of artworks being auctioned. We use this empirical framework to quantify the effect of market congestion, and congestion pricing strategies implemented by the market intermediary. Because we explicitly model the process of arrival of new bidders, we can estimate the effect of congestion pricing on the number of bidders, the distribution of bidders' valuations, and the final selling price. Using the structural model we can also measure the impact of congestion pricing on the revenues of the artists and the market intermediary, as well as its effect on consumer surplus. Our results indicate that the congestion pricing policy acts as a coordination mechanism that facilitates the match between buyers and sellers.

JEL CLASSIFICATION: C51, C72, D44, L11, L14.

KEYWORDS: English Auctions, Internet markets, Structural estimation.

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Consolidation in the Wireless Phone Industry

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November 5, 2005

Abstract

The initial wireless phone industry in the United States had many competitors, but due to mergers and acquisitions the industry has become highly consolidated. This paper documents the history of the consolidation. More importantly, I use the geographic path of consolidation to distinguish whether consolidation has been motivated by retail market power or efficiency explanations. One efficiency explanation is that consumers prefer national coverage areas. I use data on roaming agreements in the early cellular industry to analyze whether contracts can substitute for roaming agreements. Finally, in joint work with Patrick Bajari and Stephen Ryan we estimate the consumer valuation for national coverage areas using plan demand data.

Financial support of the NET institute (<http://www.NETinst.org>) is gratefully acknowledged. Research assistance has been provided by Edmund Cheng, Charles Kinzer, and Manasi Vydyanath.

Competing against simulated equilibrium price dispersions: An experiment on Internet-assisted search markets?

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Abstract

In a four-treatment experiment, we test some of the hypotheses in García-Gallego et al. (2004) concerning competition among a number of firms of which some (or all) are indexed by a price-comparison engine facilitating buyers' search process. In this paper, we isolate individual behavior from noise due to other players' actions and learning, facing each subject with simulated rivals whose prices are extracted from mixed strategy equilibrium distributions. We find systematic deviations from both theoretical distributions and previous data obtained in sessions where all players were human. Specifically, departures of experimental data from the corresponding theoretical predictions are enhanced in this setting as compared to our previous research in which all agents were represented by human players. This suggests that the divergence between theoretical and observed price reported there should not be attributed to noisy learning and strategic uncertainty due to subjects' interaction with other players. Furthermore, economic tests on players' risk attitudes organize pricing behavior in meaningful, although not always compatible, ways.

Keywords: Risky Decision Making, Internet, Price-Comparison Search Engines, Mixed Strategy Equilibrium, Experimental Economics.

JEL Codes: C91, D43, D83, L13.

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Retail Prices and Facility-Based Entry into the Telecommunications Market*

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Abstract

There is growing sentiment that rate rebalancing to eliminate cross subsidies between local business and local residential telephone markets is necessary to induce efficient entry in the residential market. If the elasticity of supply with respect to the relative prices for business and residential local service is high in both the local business and local residential markets, then the efficiency gains from rebalancing may be large. Alternatively, other factors related to differences in characteristics between business and residential local telephone markets, such as lower costs, lower elasticity of demand, and greater willingness-to-pay for quality or redundancy in the business segment of local telephone may be more important determinants of entry. In this paper we simultaneously measure the elasticity of supply in the business market with regards to the price of business services relative to the price of residential service, using entry, economic and demographic data at the wire center level. We find that business entry is driven by market demand and cost characteristics, and that the effect of cross subsidies in prices on entry is less clear.

* We gratefully acknowledge financial support from the NET Institute.

SOCIAL NETWORKING AND INDIVIDUAL OUTCOMES: INDIVIDUAL DECISIONS AND MARKET CONTEXT*

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Abstract

This paper examines social interactions when social networking is endogenous. It employs a linear-quadratic model that accommodates contextual effects, and endogenous local interactions, that is where individuals react to the decisions of their neighbors, and endogenous global ones, where individuals react to the mean decision in the economy, both with a lag. Unlike the simple $VAR(1)$ structural model of individual interactions, the planner's problem here involves intertemporal optimization and leads to a system of linear difference equations with expectations. It highlights an asset-like property of socially optimal outcomes in every period which helps characterize the shadow values of connections among agents. Endogenous networking is easiest to characterize when individuals choose weights of social attachment to other agents. It highlights a simultaneity between decisions and patterns of social attachment. The paper also poses the inverse social interactions problem, asking whether it is possible to design a social network whose agents' decisions will obey an arbitrarily specified variance covariance matrix.

Keywords: Social Interactions, Social Networks, Neighborhood Effects, Endogenous Networking, Social Intermediation, Econometric Identification, Strong versus Weak Ties, Value of Social Connections.

JEL classification codes: D85, A14, J0.

Ioannides NET Institute paper.tex September 30, 2005

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An economic analysis of enterprise adoption of open source Software⁺

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Abstract

The emergence of open source and Linux has burdened IT managers with the challenge of whether, when, and in what applications to adopt open source software in their firms. We characterize the conditions under which enterprises adopt open source software. We show that adoption depends crucially on network effects, the fit of software with the range of applications used by each firm, and the IT capabilities of a firm. Our model predicts that most firms will adopt a heterogeneous IT architecture that consists of open source and proprietary software. The equilibrium adoption is often socially inefficient. This is the first paper in the open source literature to model the enterprise adoption of open source.

Keywords: Open source software, Linux, IT management, IT architecture, IT capabilities, technology adoption.

⁺ The authors contributed equally and the names appear in alphabetical order. We thank Net Institute for supporting this research with a summer 2005 research grant.

Competing technologies in the database management systems market*

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Abstract

In this paper, we study the dynamics of the market for Database Management Systems (DBMS), which is commonly assumed to possess network effects and where there is still some viable competition in our study period, 2000 – 2004. Specifically, we make use of a unique and detailed dataset on several thousand UK firms to study individual organizations' incentives to adopt a particular technology. We find that there are significant internal complement effects – in other words, using an operating system and a DBMS from the same vendor seems to confer some complementarities. We also find evidence for complementarities between enterprise resource planning systems (ERP) and DBMS and find that as ERP are frequently specific and customized, DBMS are unlikely to be changed once they have been customized to an ERP. We also find that organizations have an increasing tendency to use multiple DBMS on one site, which contradicts the notion that different DBMS are near-perfect substitutes.

Keywords: Database software, indirect network effects, technology adoption, microdata.

JEL Codes: L86, O33.

* Preliminary, comments welcome. This research has been supported by a grant from the NET Institute (<http://www.netinst.org>), and purchase of the data has been financed by the ESRC, the Anglo-German Foundation, and the Interdisciplinary Institute of Management at the LSE. I thank Benedikt Gamharter for excellent research assistance.

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An Empirical Analysis of Development Processes for Anticipatory Standards¹

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Abstract

There is an evolution in the process used by standards-development organizations (SDOs) and this is changing the prevailing standards development activity (SDA) for information and communications technology (ICT). The process is progressing from traditional SDA modes, typically involving the selection from many candidate, existing alternative components, into the *crafting* of standards that include a substantial design component (SSDC), or “anticipatory” standards. SSDC require increasingly important roles from organizational players as well as SDOs. Few theoretical frameworks exist to understand these emerging processes. This project conducted archival analysis of SDO documents for a selected subset of web-services (WS) standards taken from publicly available sources including minutes of meetings, proposals, drafts and recommendations. This working paper provides a deeper understanding of SDAs, the roles played by different organizational participants and the compliance with SDO due process requirements emerging from public policy constraints, recent legislation and standards accreditation requirements. This research is influenced by a recent theoretical framework that suggests viewing the new standards-setting processes as a complex interplay among three forces: sense-making, design, and negotiation (DSN). The DSN model provides the framework for measuring SDO progress and therefore understanding future generations of standards development processes. The empirically grounded results are useful foundation for other SDO modeling efforts.

Keywords: antitrust, design, intellectual property rights, negotiation, sense-making, standardization, standards development organizations,

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Adverse Network Effects, Moral Hazard, and the Case of Sport-Utility Vehicles

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October 2005

Abstract

The paper examines a class of phenomena that combine adverse network effects with moral hazard, using the motor vehicle market as an example to develop and illustrate the key concepts. It is hypothesized that consumers behave as if there is a network externality with respect to vehicle size: the more large vehicles there are on the roads, the greater a consumer's propensity to seek protection from them by driving a large vehicle herself. One consequence of this is that motor vehicle manufacturers are discouraged from making large vehicles less hazardous to other motorists. The paper measures the network effect and consequent moral hazard using disaggregate data on choice of vehicle type and related household characteristics, combined with a state-level measure of the incidence of traffic fatalities. The results show that for each 1 million light trucks that replace cars, between 961 and 1,812 would-be car buyers decide to buy a light truck instead, in reaction to the increased risk of death posed by the incremental light trucks. This network effect, when run in reverse, creates egregious incentives for vehicle manufacturers: for every life saved due to safety innovations that make light trucks less deadly to other motorists, manufacturers can expect to sell about 31 fewer light trucks.

I would like to thank William T. Dickens and Bradley Wimmer for helpful conversations. Financial support from the NET Institute (www.NETinst.org) is also gratefully acknowledged. All errors are mine alone.

JEL Codes: D00, D12, K10

Keywords: Network Externalities, Moral Hazard, Highway Safety, Discrete Choice Models

**PIGGYBACKERS AND FREELoadERS:
PLATFORM ECONOMICS
AND
INDIRECT LIABILITY FOR COPYRIGHT INFRINGEMENT**

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November 2005

Many, if not most, copyright cases of alleged indirect liability for copyright infringement arise in platform markets: One of the litigating parties is a market intermediary that connects members of different distinct groups. Indirect liability for copyright infringement is still controversial and frequently litigated. This paper develops an analytical framework that is applicable to many of the debated cases. The presented framework offers strong justifications for the imposition of indirect liability for copyright infringement in platform markets and offers tools to establish certain elements of indirect liability for copyright infringement.

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Cell Phone Demand and Consumer Learning – An Empirical Analysis

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Abstract

A structural model is used in this paper to analyze the demand and learning behavior in cell phone market. We assume that the cell phone consumption can be divided into a high-value part and a low-value part. The consumers are assumed to be uncertain about the exogenous shock of the need for high-value usage and also their preferences over the low-value usage. Meanwhile, we assume that the consumers' knowledge improves over time. As a result, the match between their plan choice and consumption pattern becomes better. Such a learning behavior is supported by the data set. Bayesian updating is used to represent the learning. The estimates of the parameters are obtained and compared to the benchmarks from previous research.

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“Rationalizing the E-Rate: The Effects of Subsidizing IT in Education”

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Abstract: Starting in 1998, the E-Rate program has provided \$2.25 billion to subsidize Internet access in schools and libraries serving low income populations in the US. I analyze the effect of E-Rate subsidies on educational outcomes for Texas high schools over the 1994-2003 time period. Consistent with previous economic analyses, I find few, if any, improvements in student achievements. I do find evidence that experienced teachers are reallocated within districts toward schools receiving E-Rate grants. I also find evidence that the pool of college entrance exam takers is affected by E-Rate grants such that relying on average scores could lead to incorrect conclusions.

JEL Codes: J22, L86, I22, H20

Keywords: Education, Internet, Subsidy

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