Fall 2001 Research@Smith

WELCOME to Research@Smith, an informative look at some of the leading-edge research going on at the Robert H. Smith School of Business.
The Smith School's faculty research interests encompass a broad, dynamic mix of functional and netcentric economy issues. The Smith School has numerous research projects ongoing, and Research@Smith is the medium to keep you informed about many of these projects.

IN THIS ISSUE

Corporate Finance
What drives companies to sell or purchase assets? How do the acquired assets fare after purchase?
RESEARCH BY: Vojislav Maksimovic and Gordon Phillips

Information Security
NSA-funded study provides an economic perspective on protecting corporate information.
RESEARCH BY: Lawrence A. Gordon and Martin P. Loeb

Consumer Research
Use of the Internet as an information source can aid consumer decision making.
RESEARCH BY: Brian T. Ratchford

KNOWLEDGE SHARING

Recent books by Robert H. Smith School of Business faculty.

Redefining the Corporation: Stakeholder Management and Organizational Wealth by James E. Post, Lee Preston, and Sybille Sachs. *Stanford University Press, forthcoming 2002*. Preston, emeritus professor at the Smith School, and co-authors Post (Boston University) and Sachs (University of Zurich) describe how three major companies have employed stakeholder-oriented management policies to achieve financial and market success. The book is the culminating product of a five-year, Sloan Foundation project, "Redefining the Corporation."

Strategies for Electronic Commerce and the Internet by Henry C. Lucas. *MIT Press, 2001*. In his latest book, Lucas, the Robert H. Smith Professor of Information Systems, presents an approach for analyzing and developing business strategy for electronic commerce and the Internet.

Driving Customer Equity by Roland Rust, Valarie Zeithaml, and Katherine Lemon. *The Free Press, 2000*. Rust, holder of the David Bruce Smith Chair in Marketing, Zeithaml (University of North Carolina), and Lemon (Boston College) offer a framework for basing corporate strategy on customer lifetime value. Since its publication, the book has been translated into Dutch, Portuguese, and Chinese (traditional and simplified), with a Japanese edition forthcoming this fall (Diamond Publishing, Tokyo).

Labor Standards in the Global Trading System by Peter Morici with Evan Schulz *(Economic Strategy Institute, 2001)*. Morici, Smith School professor of international business and adjunct Senior Fellow at the Economic Strategy Institute, utilizes economic theory supported by empirical research to urge consideration of a multilateral labor rights and trade agreement by the World Trade Organization.

WORKING PAPERS

Gurdip Bakshi, Dilip Madan, and Frank (Xiaoling) Zhang. *"Investigating the Sources of Default Risk: Lessons from Empirically Evaluating Credit Risk Models"*

P. K. Kannan and Sanjay Jain. *"Pricing of Information Products on Online Servers: Issues, Models, and Analysis"*

Joshua Newberg. *"Technology Licensing Under Japanese Antitrust Law"*

James Peters and Jefferson Davis. *"The Development of a Prototype Decision Aid for Selecting Key Internal Controls"*

S. Raghavan, Michael O. Ball, and Vinai S. Trichur. *"Bicriteria Product Design Optimization"*

Violina Rindova and S. Kotha. *"Building Reputation Stocks Through Strategic Action Flows: Lessons From Amazon.com and Its Competitors in Internet Retailing"*

Wesley Sine, Scott Shane, and Dante Di Gregorio. *"The Halo Effect and Technology Licensing: The Influence of Institutional Prestige on the Licensing of University Inventions"*

KUDOS

Ritu Agarwal, associate professor of information systems, has been appointed senior editor of *MIS Quarterly*.

Dilip Madan, professor of finance, has been appointed co-editor of Mathematical Finance. Madan is president of the Bachelier Finance Society, the international association of *Mathematical Financial* researchers.

Nagpurnanand Prabhala, assistant professor of finance, has been appointed associate editor of the *Review of Financial Studies*. In addition, he received the journal's Outstanding Referee Award at the annual meeting of the Western Finance Association in June 2001.

Scott Shane, professor and chair of entrepreneurship, and co-author Rakesh Khurana of the Harvard Business School, received the 2001 Best Paper Award from the Organization and Management Theory Division of the Academy of Management. Their paper, "Career Experience and Firm Founding," examines how prior firm formation experience increases the likelihood that academic researchers will establish firms to exploit their inventions.

Ken G. Smith, Ralph J. Tyser Professor of Business Strategy and chair of the management and organization department; Edwin A. Locke, professor emeritus; and Pino Audia, Ph.D. 2000 graduate, an assistant professor at the London Business School; received the 2001 Best Paper Award from the Organizational Behavior Division of the Academy of Management for their paper, "The Paradox of Success: An Archival and a Laboratory Study of Strategic Persistence Following Radical Environmental Change."

Oliver (Yuliang) Yao, Ph.D. student in logistics, was selected to participate in the doctoral consortium of the 2001 Americas Conference on Information Systems. Yao was chosen based on the potential significance of his proposed dissertation measuring the impact of electronic commerce on supply chain management.

When firms buy other firms, who gains and who loses?

Research by Vojislav Maksimovic and Gordon Phillips

THE SCALE OF CORPORATE RESTRUCTURINGS IN THE UNITED STATES IS TREMENDOUS, WITH UPWARDS OF FIVE PERCENT OF MAJOR MANUFACTURING PLANTS CHANGING HANDS EVERY YEAR. THERE HAS BEEN A GREAT DEAL OF ACADEMIC RESEARCH ARGUING THAT WHILE MANY OF THESE TRANSACTIONS INCREASE THE REVENUES OF THE BUYING FIRMS, AND MAY BENEFIT MANAGERS, THEY DO NOT LEAD TO INCREASED EFFICIENCY.

In research funded by the National Science Foundation, Smith School finance professors Vojislav Maksimovic and Gordon Phillips have taken another look at the data. Their conclusions challenge the conventional wisdom: “The record shows that corporate acquisitions and plants sales tend to be consistent with profit maximization, and that they lead to higher efficiencies,” asserts Maksimovic.

Given the prevailing view that most mergers and acquisitions may not benefit shareholders, the professors’ research attained a very high level of visibility and national interest. They were invited to present their research at more than 40 leading business schools and academic conferences including faculty seminars at Carnegie Mellon, University of Chicago, Harvard, MIT, Stanford, and Wharton, and meetings of the National Bureau of Economic Research, the American Finance Association, and the Western Finance Association. In addition, their research resulted in three Journal of Finance articles, including one that will be featured as the lead article in the December 2001 issue.

Why did Maksimovic and Phillips reach different conclusions? “One major reason was that we had better data. Most researchers rely on published financial statements. We used data from the U.S. Bureau of Census,” says Phillips. The Bureau of Census has data on each individual plant owned by every corporation in the United States. The professors were able to use this data to “look inside” corporations and benchmark each corporation’s plants against industry standards. Then, when a plant was sold or the firm merged, they could compare each plant’s efficiency before and after the transaction, and discover whether there was a gain or a loss. “Usually corporate finance researchers work with samples of a few hundred firms,” Maksimovic points out. “We were working with samples of several hundred thousand plant-level observations. Thus, we could track individual plant sales between corporations, and this gives our results greater precision.”

Maksimovic and Phillips also took issue with the way that previous research had measured gains from transactions. “In calculating gains from mergers, you have to be careful not to compare apples with oranges,” Phillips notes. “You shouldn’t just measure changes in a plant’s efficiency over time, because a plant’s efficiency might change for all sorts of reasons. Instead, we compared the change in efficiency after a merger with the change that we would have expected to observe in the absence of a merger. And this in turn, depends on how firms allocate investment funds.”

Maksimovic and Phillips developed a profit-maximizing, neoclassical model of optimal firm size and growth across different industries. Their construct, named the MP model, is based on differences in industry fundamentals and firm productivity. It predicts how conglomerate firms will allocate resources across divisions over the business cycle and how their responses to industry shocks will differ from those of single-segment firms.

The MP model shows that profit-maximizing firms with a comparative advantage in producing within an industry have a higher growth rate and attain a larger size in that industry. They also acquire more plants from other firms in the industry. Firms that do not have a comparative advantage limit their growth within the industry and expand in other industries.

Maksimovic and Phillips' findings challenge the prevailing consensus in corporate finance scholarship that conglomerate firms waste resources because investment decisions are not made in the interests of shareholders.

A second study by Maksimovic and Phillips uses their model to test whether or not the pattern of sales and purchases across the U.S. manufacturing sector is consistent with profit maximization or whether there is evidence that firms waste resources by inefficient acquisitions.

“The key prediction of our model is that the growth of an efficiently managed conglomerate firm across industries follows a certain pattern,” Maksimovic states. “Thus, by comparing actual with predicted growth of conglomerates in our sample, we can use our model to determine whether there is evidence that U.S. conglomerates are inefficiently managed.”

“We found that growth is related to fundamental industry factors and to the individual firm-segment relative productivity suggested by our simple neoclassical theory,” states Phillips. “Our results support the conclusion that assets change hands as prospects in the overall economy and in their other industries improve and their owners discover that they do not have a comparative advantage in running those assets.”

These findings challenge the prevailing consensus in corporate finance scholarship that conglomerate firms waste resources because investment decisions are not made in the interests of shareholders.

“Taken together, our results suggest that most transactions in the market for assets result in an increase in productive efficiency,” Maksimovic and Phillips conclude. “The majority of conglomerate firms exhibit growth across business segments that is consistent with optimal profit-maximizing behavior.”

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An Economic Perspective on Information Security

Research by Lawrence A. Gordon and Martin P. Loeb

INFORMATION SECURITY TRADITIONALLY HAS BEEN THE DOMAIN OF COMPUTER SCIENTISTS AND ENGINEERS WHO SEEK TO PREVENT HACKERS FROM ELECTRONICALLY PILFERING PRIVATE DATA. HOWEVER, THE INTERNET, TODAY'S HIGHLY COMPETITIVE GLOBAL MARKETPLACE, AND SOPHISTICATED TOOLS FOR ACQUIRING AND CREATING KNOWLEDGE HAVE COMBINED TO STIMULATE A BROADER AWARENESS OF THE ISSUE.

Professors Lawrence A. Gordon and Martin P. Loeb of the Robert H. Smith School of Business are currently involved in a major stream of research related to the economics of information security (also known as information assurance). Their work has been funded in part by a two-year, $320,000 grant from the National Security Agency's Laboratory for Telecommunications Sciences under the auspices of the University of Maryland Institute of Advanced Computer Studies.

"As applied economists focusing on managerial accounting issues, we are interested in the intersection of economics with accounting and other business areas," states Gordon, the Ernst & Young Alumni Professor of Managerial Accounting and director of the Ph.D. program at the Smith School of Business. According to Gordon, computer scientists and engineers are not the only professionals paying close attention to information security. "Accounting firms and accounting professors also have a long-standing interest in issues related to information security [assurance]," he notes. "The protection of an organization's assets, including its information, has long been of primary concern to accounting researchers and practitioners."

Gordon and Loeb's current research has its roots in their previous studies related to competitor analysis systems (CAS). After some thought-provoking conversations with Howard Frank, dean of the Smith School, they began to explore the "flip side" of CAS, focusing on the economic aspects of protecting an organization's data, knowledge, and information systems from falling into the hands of competitors. (Dean Frank is former director of the Information Technology Office at the federal Defense Advanced Research Projects Agency.) Gordon and Loeb began their research in the area in 1999 with a summer research grant from the business school. This work formed the basis for the subsequent NSA-funded study.

Loeb, who is professor of accounting and Deloitte & Touche Faculty Fellow, and Gordon have approached the issue from both a conceptual/theoretical perspective and an empirical perspective. Drawing on economic theory, they have developed a model that is intended to provide managers with a framework for analyzing the appropriate level of investment related to information assurance. This model takes into account a firm's risk exposure as well as the cost associated with reducing this exposure.

Based on this model, Gordon and Loeb discovered that the optimal level of investment in information assurance is only a small fraction of the expected loss associated with a firm's risk exposure. Furthermore, their model predicts that the greatest payoffs for investments in information assurance occur where the probability of a security breach is in the intermediate zone (i.e., where the probability of a security breach is not very close to zero or one). This model is now known as the GLEIS™ model.

Gordon and Loeb discovered that the optimal level of investment in information assurance is only a small fraction of the expected loss associated with a firm's risk exposure.

Results of their empirical study — a survey of more than 200 organizations, a subset of the Standard & Poor's 500 — indicate that firms use economic reasoning to determine the expenditure level for information security investments, although the extent to which it is used varies widely among firms. Currently, the professors are extending their understanding of this decision-making process by conducting a number of in-depth case studies.

Gordon and Loeb have also developed a game-theoretic framework for using information security as a response to competitor analysis systems. Their original work in this area is discussed in a forthcoming paper in Communications of the ACM (September 2001). Preliminary insight from this new work indicates that the total amount spent by all firms for both competitor analysis systems and information security is independent of the distribution of market shares. A more rigorous development of their framework is nearing completion.

In addition to the above studies, Gordon and Loeb are looking at a variety of other aspects of the economics of information assurance including the economic impact of security breaches.

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The Role of the Internet in Consumer Purchase Decisions

Research by Brian T. Ratchford

ALTHOUGH IT IS UNIVERSALLY ACKNOWLEDGED THAT THE 'NET IS A PERMEATING INFLUENCE IN GLOBAL SOCIETY, LITTLE RESEARCH HAS BEEN DONE ON HOW AVERAGE "SURFERS" SHOP ONLINE. SMITH SCHOOL PROFESSOR BRIAN RATCHFORD STUDIES HOW CONSUMERS EMPLOY THE INTERNET TO GATHER INFORMATION ABOUT POSSIBLE PURCHASES.

Recent work by Ratchford, professor of marketing and holder of the PepsiCo Chair in Consumer Research at Smith, Debabrata Talukdar (State University of New York at Buffalo), and Myung-Soo Lee (Baruch College, City University of New York) lays key groundwork in understanding this issue. Their paper, "A Model of Consumer Choice of the Internet as an Information Source," was published in the International Journal of Electronic Commerce (Spring 2001).

"The use of the Internet as an information source can be conceptualized as one of the inputs into a production process in which the consumer combines sources that maximize the net benefit of search," Ratchford says. "Based on this premise, our model presents a general framework for predicting who will use the Internet, what type of information will be sought there, and what sources it might compete with."

To test the validity of the model, the researchers surveyed the search and process decisions of a sample of new car buyers in the Buffalo, N.Y., metropolitan area in July and August of 1999. Their findings may be viewed as the first evidence about the use of the Internet in the purchase of automobiles and other major durables.

Despite the accessibility of information on the Web, the researchers found that only 38 percent of respondents used the Internet to make a purchase decision. However, the numbers are increasing as the Internet's popularity escalates, Ratchford states. A recent study by J. D. Power and Associates found that 54 percent of consumers used the Internet in 2000 to assist in new car buying decisions. "Still," the professor says, "this means that only about half the population researches a car online prior to visiting the dealer."

Ratchford's survey respondents who used the Internet to research automobiles fit a certain profile. They tended to be computer-savvy, well-educated individuals, younger than 40, who earned higher than average wages. They were often dissatisfied with the car dealer they previously dealt with or had no preference on the manufacturer prior to searching. The researchers found that the Internet had very little value for new car purchases for older consumers or for younger consumers with a high school education or less.

New car buyers who used the Internet searched more thoroughly in general and tended to use all sources except advertising more extensively. Internet users and non-users were similar in their levels of previous car-buying experience. The Internet users did not obtain higher discounts than non-users, nor did they show any difference in their patterns of preference for functional attributes such as gas mileage.

In a current working paper, Ratchford, Talukdar, and Lee extend their general model to present a multivariate analysis of users and non-users of the Internet in searching for automobiles. They use product information search data collected from a sample of new car buyers in an identical setting before and after the Internet.

"Our empirical evidence indicates that the Internet leads to reduced search [for information] on average, and is most pronounced for groups that are likely to use the Internet..."

Before the Internet, car buyers had three options for information, Ratchford says: interpersonal, such as family and friends; non-advocate or neutral sources of print information, such as the magazine, Consumer Reports; and dealer/manufacturer sources. Now, online sources from manufacturers and dealers, third parties, and bulletin boards or chat rooms are competing with most non-Internet sources.

“Our empirical evidence indicates that the Internet leads to reduced search [for information] on average,” Ratchford says, “and is most pronounced for groups that are likely to use the Internet: car buyers who are under 40, with high education and high income.” The Internet users spent more time overall in search because they had the greatest incentives to search (for example, they buy more expensive cars) and relatively low amounts of prior information. But the results indicate that they would have searched even more in the absence of the Internet, Ratchford notes.

“According to our estimates, in addition to allowing users to spend less time searching than otherwise, the availability of the Internet led to both savings in search costs and better buys,” the researchers report. In addition, the evidence suggests that the Internet provides efficiency gains not only to consumers but also to new car dealers.

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