

**E-commerce**

A modern statistical approach to modelling the dynamics of online auctions raises—and answers—new questions

**RESEARCH BY**

*Galit Shmueli, Wolfgang Jank*

**Finance**

Empirical evidence that some underwriters use underpricing as a profit-maximizing strategy

**RESEARCH BY**

*Gerard Hoberg*

**The Global Economy**

Resource allocation patterns in multinational corporations contradict the common wisdom about outsourcing

**RESEARCH BY**

*Susan Feinberg, Gordon Phillips*



**ROBERT H. SMITH**  
SCHOOL OF BUSINESS

**Leaders** for the Digital Economy

3570 Van Munching Hall  
University of Maryland  
College Park, MD 20742-1815

*Address Service Requested*

NON-PROFIT ORG.  
U.S. Postage  
PAID  
Permit No. 311  
Dulles, VA

**Modeling the Dynamics of Online Auctions**  
continued from page 1

but it is difficult to compare hundreds or thousands of bidding sequences across multiple auctions because the bidding sequences are not of the same length. Statistical methods used in the field of online auctions also tend to aggregate the available data over the auction duration, over auctions, or both. Though convenient for summarizing data, aggregation loses the richness of the information available.

Jank suggested using Functional Data Analysis, a state-of-the-art statistical method that turns out to be well suited to auction data. "It's impossible to extract all the useful information using traditional statistical methods," says Jank. Functional Data Analysis uses functions—curves—as the basis for statistical analysis. Each bid sequence is represented by a curve; the curves are then plotted and their overall features characterized. Cluster analysis is used for learning about the natural groupings of auctions and functional regression can be used to study the effect of bidder, seller and auction characteristics on the auction dynamics. In order to illustrate each method, Shmueli and Jank used a collection of data on 353 closed auctions that took place on eBay.com during November-December 2003.

Shmueli and Jank imagine consumer applications being developed from their work that would allow buyers to make more informed bidding decisions. "Understanding the dynamics of an auction would let you decide if it was worthwhile to stay in a certain auction," says Jank. "A software program could track the bidding curves of hundreds of auctions and make recommendations based on the curves. You could see which auctions were going to end with a price that was too high, and go to a different one."

Shmueli's and Jank's research into online auctions continues in collaboration with colleagues from the Smith School, University of Connecticut, University of Iowa, and Florida State University. "Modeling the Dynamics of Online Auctions" will appear as a chapter in "New Empirical Methods in E-Commerce," edited by Robert Kauffman (forthcoming). Shmueli may be reached by e-mail at [gshmueli@rhsmith.umd.edu](mailto:gshmueli@rhsmith.umd.edu); Jank may be reached by e-mail at [wjank@rhsmith.umd.edu](mailto:wjank@rhsmith.umd.edu).

For more information on this study and other work sponsored by the Smith School's Center for Electronic Markets and Enterprises, visit <http://www.rhsmith.umd.edu/ceme/>.

Research@Smith  
Volume 5, Number 2

DEAN  
Howard Frank

DIRECTOR OF RESEARCH  
Michael Ball

EDITOR  
Rebecca Winner

DESIGN  
Cynthia Mitchel

*Research@Smith* is published three times a year by the Robert H. Smith School of Business, University of Maryland; 3570 Van Munching Hall, College Park, Maryland 20742. [www.rhsmith.umd.edu](http://www.rhsmith.umd.edu)

We'd like to put Research@Smith directly into the hands of those who are interested in learning about the latest research conducted by Smith School faculty. To request a copy of this publication or make an address correction, contact Rebecca Winner via e-mail, [editor@rhsmith.umd.edu](mailto:editor@rhsmith.umd.edu), or phone, (301) 405-9465.

Visit the Smith Research Network:  
[www.rhsmith.umd.edu/smithresearch/](http://www.rhsmith.umd.edu/smithresearch/).

**CALL FOR PAPERS****Second Annual Forum on Cyber Security**

Papers are requested for the second annual Forum on Cyber Security, titled *Financial Information Systems and Cyber Security: A Public Policy Perspective*. The forum will be held at the Smith School of Business in cooperation with the Center for Public Policy and Private Enterprise, University of Maryland School of Public Affairs, on May 26, 2005. Papers for the forum should be submitted by **February 1, 2005** to conference organizers Lawrence Gordon, [lgordon@rhsmith.umd.edu](mailto:lgordon@rhsmith.umd.edu), or Martin Loeb, [mloeb@rhsmith.umd.edu](mailto:mloeb@rhsmith.umd.edu). Authors of papers submitted for the forum will be notified as to whether their papers have been accepted for presentation by April 1, 2005. Papers selected for presentation at the forum will automatically receive consideration for publication in a forthcoming special issue of the *Journal of Accounting and Public Policy*.



FALL 2004: Volume 5, Number 2

## Modeling the Dynamics of Online Auctions

Research by  
Galit Shmueli, Wolfgang Jank

THE EXPLOSIVE GROWTH OF ONLINE AUCTIONS HAS INSPIRED A PLETHORA OF RESEARCH—MOST OF IT IN THE AREA OF ECONOMICS AND INFORMATION SYSTEMS. STATISTICIANS, THOUGH, WERE OFTEN SIDELINED BECAUSE THEY LACKED THE TOOLS NECESSARY TO MINE THIS RICH WORLD OF DATA. BUT WITH THE HELP OF SOME EXPERT COLLEAGUES, SMITH SCHOOL STATISTICIANS ARE WEIGHING IN WITH A NEW TAKE ON AUCTION DATA ANALYSIS.

Galit Shmueli, assistant professor of decision and information technologies, and Wolfgang Jank, assistant professor of decision and information technologies, investigate the bidding dynamics of auctions in their paper “Modeling the Dynamics of Online Auctions: A Modern Statistical Approach.” Shmueli and Jank describe the process as similar to that of studying a NASCAR race. Rather than focusing solely on the winner’s score, they look at route, speed, acceleration and other dynamic characteristics.

In an auction context, the dependent variable is not a static point like the end price, but the bidding curve throughout the auction. This provides answers to questions like: How fast do bids arrive at different stages of the auction? How fast does the bidding curve move toward the final price? Which dynamics are common and which are different across various auctions?

Understanding auction dynamics is important for understanding and evaluating the information gained by other methods of analysis. For example, Jank and Shmueli’s research reveals that auctions are not homogenous, even when the exact same product is being offered over an identical time frame. “Even if the end price is the same, they may have gotten to that end price very differently,” says Shmueli.

Despite the wealth of data available (in the case of eBay, for free), auction dynamics received scant attention from statisticians. Data collection has been the primary problem. E-commerce data is obtained using software agents called spiders, the code for which is written by the research team for a specific purpose. These spiders can capture the hundreds of bids and time stamps within a single auction and can do so for several thousand auctions at a time. But statisticians are often unaware of the software programs needed to collect data from electronic commerce.

Close collaboration with their information systems colleagues in the Smith School’s Center for Electronic Markets and Enterprises gave Shmueli and Jank access to data-collecting experts. “No one knew how to get these data,” says Shmueli. “Statisticians are data-poor, so we benefit from the data-collection expertise of our information systems colleagues.”

The problem of modeling auction dynamics is not limited to the difficulties in extracting the raw data. Traditional methodology such as regression and time-series models are inadequate because of the nature of the information involved. For example, a single bidding sequence in a particular auction forms a time series,

continued on page 4

# A New Look At The Debate Over Sending Jobs Overseas

Research by  
Susan Feinberg, Gordon Phillips

OFF-SHORING. OUT-SOURCING. THESE ARE FIGHTING WORDS IN THE PUBLIC POLICY ARENA, WHERE THE CRY IS OFTEN HEARD TO “STOP SENDING AMERICAN JOBS OVERSEAS!” SMITH RESEARCHERS HAVE FOUND EVIDENCE THAT CONTRADICTS THE COMMON WISDOM ABOUT THIS HOT TOPIC. SURPRISINGLY, IT’S NOT AN EITHER/OR SITUATION. IT’S OFTEN A WIN/WIN SITUATION.

Multinational corporations are an increasingly important source of production and employment in industrialized countries. These firms have higher accounting profits, higher stock market valuations and higher advertising and R&D than firms that only produce and sell domestically. In their paper, “Growth, Capital Market Development and Competition for Resources within MNCs,” Susan Feinberg, assistant professor of international business, and Gordon Phillips, professor of finance, look at the factors that affect the growth of these firms. For the past two years, they have been working on an empirical study of the resource allocation patterns in multinational corporations (MNCs). They were particularly interested in whether MNCs systematically grow by allocating resources away from divisions in some countries to expand in others.

Feinberg and Phillips examined the association between the employment growth of a unit of the MNC and the attractiveness of the MNC’s growth opportunities in other markets. “There’s an assumption that there is a substitution effect—that more jobs overseas means fewer jobs in the United States,” says Phillips. “In fact, we find just the opposite. When U.S.-based MNCs have more attractive growth opportunities in their overseas subsidiaries, they experience higher growth in the parent company in the U.S.”

These findings are based on a statistical analysis of U.S.-based MNCs and their foreign affiliates from the Benchmark and Annual Surveys of U.S. Direct

Investment Abroad, administered by the Bureau of Economic Analysis, U.S. Department of Commerce. Containing detailed financial and operating data, these surveys produce the most comprehensive data available on the activities of U.S.-based MNCs and their foreign affiliates. The data used in this study included 864 U.S. MNC parents and more than 8,400 foreign affiliates from 1983 to 1996.

Employment change in U.S. MNC parents and their foreign affiliates was used as a measure of growth. Since Feinberg and Phillips examine MNC growth in more than 40 countries, they needed to use a measure of growth that was less directly affected by changes in exchange rates than measures such as sales or assets. The researchers were surprised at the turn their findings took.

“When we examine the employment growth of foreign affiliates, we find that overall, there is less growth in these divisions when MNCs have attractive opportunities in the U.S. We call this ‘resource-constrained growth.’ In contrast, we find

“There’s an assumption that there is a substitution effect—that more jobs overseas means fewer jobs in the United States.”

that employment growth in U.S. parents increases when parents have attractive growth opportunities in their foreign affiliates. MNCs with an efficient network of foreign subsidiaries in high-growth countries experience more employment growth in the U.S. than MNCs with less efficient foreign subsidiaries in relatively slow-growth countries,” says Feinberg.

Feinberg and Phillips find evidence that financial and knowledge-based resources are important to an MNC’s ability to grow with minimal competition for resources between divisions. Foreign affiliates of MNCs with higher levels of R&D and greater financial resources grow with no apparent constraints.

“The negative relationship between foreign affiliate employment growth and the growth opportunities of U.S. parents exists only among affiliates of low-R&D MNCs and MNCs with relatively limited financial resources,” notes Feinberg.

Internal competition for resources within MNCs also varies with the characteristics of the host country in which an affiliate is located. “Affiliates in countries with small financial markets—where it’s harder to raise capital—face more resource constraints. Even in emerging markets, most of the affiliates raise capital in their local country, so if there isn’t much capital available, that represents a significant resource constraint,” says Phillips.

High capital market growth, on the other hand, allows affiliates to grow with no apparent resource constraints. As countries undergo capital market liberalization, affiliates face fewer internal constraints to growth, and their growth becomes more closely related to their own efficiency. In countries with less developed capital markets that do not undergo liberalization, affiliates continue to grow with resource constraints.

In future research, Feinberg and Phillips hope to examine how capital market development in an affiliate’s host country affects competition between affiliates and local firms, and the extent to which MNCs change their distribution of local costs and sales to hedge exchange rate exposure.

For further information, e-mail Susan Feinberg at [feinberg@glue.umd.edu](mailto:feinberg@glue.umd.edu) or Gordon Phillips at [gphillips@rhsmith.umd.edu](mailto:gphillips@rhsmith.umd.edu).

## KNOWLEDGE SHARING

CIO Forum  
October 8

*Robert H. Smith School of Business*

Join us for the seventh annual CIO Forum. Presented by the Smith School’s Center for Electronic Markets and Enterprises, in cooperation with the Capital Area Chapter of the Society for Information Management, the CIO Forum is a unique opportunity for executive IT managers to network with colleagues and hear about the latest research from Smith experts. Events are highly interactive and focus on the most important issues confronting technology strategists in the digital economy.

This year’s conference features John Morgridge, chairman of the board at Cisco Systems, as the keynote speaker. Morgridge joined Cisco in 1988 as president and CEO. During his tenure as CEO the company grew from \$5 million in sales to over \$1 billion, and from 34 employees to over 2,260. In 1990 Morgridge took Cisco public and in 1995 was appointed chairman.

For more information, visit  
[www.rhsmith.umd.edu/ceme](http://www.rhsmith.umd.edu/ceme).

13th Annual  
Frontiers in Services Conference  
October 28-31

*Miami, FL*

The 2004 Frontiers in Services Conference is sponsored by the Smith School’s Center for Excellence in Service, the University of Miami School of Business and the American Marketing Association (AMA). Considered by many to be the world’s leading annual conference on service research, the conference draws attendees from more than 20 countries. The Frontiers in Services Conference features a unique international mix of business people and academics, and a cross-functional list of topics, including e-service, customer relationship management, service marketing, service operations, and service human resources.

For more information, visit  
[www.rhsmith.umd.edu/ces/](http://www.rhsmith.umd.edu/ces/).

## WORKING PAPERS

A selection of working papers by Smith School faculty currently available online at [www.rhsmith.umd.edu/smithresearch/](http://www.rhsmith.umd.edu/smithresearch/)

*Why Do People Suggest What They Don’t Want? Using Context Effects to Influence Others’ Choices,*  
Rebecca Hamilton (Marketing)

*Bank Competition, Financing Obstacles and Access To Credit,*  
Thorsten Beck, Aslı Demirgüç-Kunt and Vojislav Maksimovic (Finance)

*Stochastic Volatility for Lévy Processes,* Peter Carr, Hélyette Geman, Dilip B. Madan (Finance) and Marc Yor

*Optimal Pricing for Multiple Services in Telecommunications Networks Offering Quality of Service Guarantees,* Neil J. Keon and G. Anandalingam (Decision and Information Technologies)

*Ground Delay Programs: Optimizing Over the Included Flight Set Based on Distance,* Michael O. Ball (Decision and Information Technologies) and Guglielmo Lulli

# Strategic Underwriting in Initial Public Offers

Research by  
Gerard Hoberg

UNDERPRICING IS COMMON IN INITIAL PUBLIC OFFERINGS—TO A CERTAIN EXTENT, IT MAY BE DIFFICULT TO AVOID. BUT SOME FIRMS CONSISTENTLY SELL NEW STOCK ISSUES AT A MUCH GREATER DISCOUNT THAN OTHERS. IS THIS PHENOMENON DRIVEN BY PURELY COMPETITIVE FORCES, OR BY A SYSTEM THAT DOES NOT ADEQUATELY PROTECT IPO ISSUERS FROM PREDATORY UNDERWRITING PRACTICES?

Gerard Hoberg, assistant professor of finance, is one of many academicians exploring the lines between ethical and unethical conduct in the wake of the spectacular corporate scandals of recent times. In his paper, "Strategic Underwriting in Initial Public Offers," Hoberg examines IPO underpricing, partial adjustment phenomenon and underwriter persistence. His is believed to be the first study to document that some underwriters persistently experience initial returns that are higher than others—significantly higher, in fact. Hoberg found that underwriters who were in the highest quartile based on their past initial returns brought to market future IPOs with 32.1% initial returns, compared to just 17.4% for those in the lowest quartile.

His research indicates that some underwriters may use underpricing as a profit-maximizing strategy, to the detriment of the issuers, average investors and the engine that drives business development. Hoberg created a new measure of underwriter reputation based on each underwriter's initial past returns to quantify his results. Unlike existing measures, it is among the most significant predictors of future initial returns.

Though Hoberg started with seven logical hypotheses to explain why certain underwriters persistently discount stock prices to a far greater extent than their fellows, he quickly eliminated five of them. Underwriter prestige, industry specialization, or short-term hot IPO markets clearly could not explain persistent under-

pricing. Nor did it seem to be a way to compensate underwriters for providing better services to issuers, or a simple matter of habitual, behavioral underpricing by some underwriters.

Rather, Hoberg's evidence supports two hypotheses. The first is that underwriters who discount more tend to serve institutional, rather than retail, investors.

When the price of a new issue is too low, the issue is often oversubscribed. Investors aren't able to purchase all of the shares they want, and underwriters can allocate shares among subscribers. Hoberg believes institutional underwriters like Goldman Sachs and Morgan Stanley benefit from consistent underpricing because they work with large industries, with whom they are able to organize profitable quid pro quo arrangements in exchange for preferment. Retail underwriters like Paine Webber or AG Edwards & Sons, on the other hand, work mainly with small investors and so don't have the same opportunity for quid pro quo benefits, according to Hoberg.

"Institutional underwriters persistently underprice because it is profitable for them," says Hoberg bluntly. "They would say that they choose the investors whose hands are the strongest, to build a stable investment base for the issuer. But these same institutional investors often sell their shares within days of the IPO, while the average investor holds on to stocks for a long time."

Hoberg acknowledges that his second hypothesis is controversial. He suggests that underwriters who persistently discount stock prices are better at identifying companies which are undervalued by the public and are able to take advantage of their own access to information not available to the public.

Existing academic work suggests that underwriters know how much an IPO firm is really worth at the time they set the IPO price. Hoberg's work suggests that underwriters treat good news and bad news regarding the firm's value differently. Underwriters reveal bad news because it gives them a reason to lower the IPO price, but they may deliberately conceal good news in order to avoid raising the IPO price. This allows them to extract the surplus value associated with this good news in the form of quid pro quos from the institutional investors to whom they allocate these deeply discounted shares. For underwriters, then, knowledge is definitely power—or at least profit.

The practice of persistently discounting stock prices in IPOs has a distinct downside. "There are two effective losers—the issuers and society," says Hoberg. "The issuers lose because they realize less capital on their IPO when their stock is underpriced. But society loses too, because of the wealth loss involved when that issuing company isn't able to grow as fast and create as many new jobs. It results in deadweight loss in the economy." Average investors also lose out when stocks are highly discounted, simply because they are unable to get shares in an oversubscribed offering.

Random allocation, Hoberg believes, would make it much less profitable for underwriters to persistently underprice. "If you take away an underwriter's ability to profit from allocation, then they would be relying simply on commission for profit. And competition will drive commissions to the right level."

*Hoberg is working on a second paper to discuss the theoretical and policy implications of this study. Hoberg may be reached by e-mail at [ghoberg@rhsmith.umd.edu](mailto:ghoberg@rhsmith.umd.edu).*

## KUDOS

**Roland Rust**, holder of the David Bruce Smith Chair in Marketing, chair of the marketing department and director of the Center for Excellence in Service, was named a panelist for *Fast Company* magazine's inaugural CustomerFirst Awards. He was also named to the Nominating Committee of the American Marketing Association.

**Lawrence Gordon**, Ernst & Young Alumni Professor of Managerial Accounting and Information Assurance, and **Martin Loeb**, Deloitte & Touche LLP Faculty Fellow, have received an additional \$170,000 in research funding from the National Security Agency for their research related to economic aspects of information security. This brings the total grant amount thus far, for the five years beginning in 2000, to \$830,000.

**Gilvan Souza**, assistant professor of management science, won the Wickham Skinner Early Career Research Accomplishments Award from the Production and Operations Management Society (POMS). It was announced at the annual meeting of the society in Cancun, Mexico. This award is given annually to young faculty (graduated in the past five years) with outstanding research in operations management, measured in terms of both quality and impact.

## NEW FACULTY

The Robert H. Smith School of Business is pleased to announce the addition of the following faculty members for 2004-2005.

**Wilbur Chung**, Logistics, Business and Public Policy

**Rachelle Sampson**, Logistics, Business and Public Policy

**Gerard Hoberg**, Finance

**Mark Loewenstein**, Finance

**Mark Taranto**, Finance

**Scott Turner**, Management and Organization

**Anne Marie Knott**, Management and Organization

**Donald Spero**, Management and Organization

**Natasha Foutz**, Marketing

**Wendy Moe**, Marketing

**Tor Andreassen**, Marketing

**Stephen Vargo**, Marketing

