Building a better auction

Susan Athey creates theories, tools to impact real worlds

By Alvin Powell
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When Susan Athey was a junior at Duke University in 1990, her adviser suggested she do a thesis on government timber auctions, a subject she agreed to only reluctantly because she thought the topic would be too tedious.

Today, government auctions are at the heart of Athey's research, and she's now an adviser to the British Columbian government as it reforms its system for auctioning timber, an industry that makes up 20 percent to 25 percent of the province's economy. The reforms are critical to the government because it hopes to both gain more income from the auctions and reduce criticism that it is subsidizing the timber industry, a bone of contention with the United States and a major justification cited by the U.S. for tariffs on British Columbian timber.

"My adviser suggested I work on these auctions, but I thought they were too boring," Athey
said. "Now I've decided they're incredibly exciting. Who would have thought I'd be involved in billion-dollar international trade disputes over timber auctions?"

Athey, an economics professor, is an expert in industrial organization and microeconomic theory. Her work spans a variety of topics - she typically has three or four projects going at once - but the theory, application, and economic tools used to analyze auctions have been central to her work throughout her career.

In recent years, Athey has analyzed the theory of collusion and price-fixing in auctions, research that also has practical applications.

Collusion is illegal cooperation between bidders that results in artificially low prices for public resources such as timber or minerals.

In order for collusion to work efficiently, the colluding bidders not only have to agree to keep prices low, but they also need to reveal their internal valuations to each other so that the most efficient company wins the auction. The challenge for the colluding bidders is to provide incentives for a firm to admit that it is not the most efficient at a particular auction. These incentives are difficult to provide when side payments or bribes among firms could land them in jail. In some cases, Athey finds that the bidders do best by ignoring efficiency and simply taking turns winning the auction. This eliminates the need for ongoing communication or complex incentives. In other cases - as when there is a small group of colluding bidders and the auctioneer makes all of the bids public at the end of each auction - the firms can achieve efficiency without resorting to side payments. To do this, companies that admit their inefficiency at today's auction are repaid by gaining an advantage in the cartel's selection of the designated winner in future auctions.

From a purely economic standpoint, Athey said, the latter type of "sophisticated" collusion isn't necessarily bad, as it can result in the most efficient company winning most of the time, something that also happens under competition. Simpler "taking turns" schemes are worse, since allocation is inefficient. In both cases, however, winning bids are too low, leading, for example, the government to receive less than it might for a publicly owned resource.

Unusual among economists, Athey's work has spanned theory, application, and econometrics, in which economists develop new statistical tools to analyze economic data. The result is that she has examined auctions from theory to application, which creates demand for her expertise.

In addition to working for the Canadian government, Athey has worked with the Australian government, also on timber. In addition, she has worked with bidders for another government resource: airwave frequencies used for cellular telephone service. She is also a principal in a firm called Market Design Inc., which advises governments on the design of auctions for items as varied as public resources, pollution permits, and the procurement of electricity.

Athey got her start in economics when she was a computer-science major at Duke, working for a company that sold computers to the government at auction. An economics professor there picked her out for a research project on those auctions.

Athey was young - she went to Duke when she was just 16 - but she did a good job on the project. When she was a junior, her adviser suggested she take her first look at timber auctions.

After these early exposures to economics research, Athey was attracted to the power of economics to influence public policy.

"Economics lets you rigorously analyze something and come back with insights and
answers you didn't have before," she said. "I will sometimes go into a topic very deeply and abstractly, but eventually there's going to be a link to changing the world in some way, even if it's sometimes indirect.

Athey received a bachelor's degree with three majors - in economics, mathematics, and computer science - from Duke in 1991 and went on to Stanford University to do her graduate work in economics. She received her doctorate in 1995, at age 24. She was an assistant and an associate professor of economics at the Massachusetts Institute of Technology from 1995 to 2001, and then returned to Stanford in 2001 as a tenured associate professor of economics.

She was named Holbrook Working Professor of Economics at Stanford in 2004 and came to Harvard as professor of economics in July. Since 2001, she has been a research associate at the National Bureau of Economic Research.

Athey, on maternity leave this fall following the birth of her second child, plans to teach a graduate class on industrial organization in the spring and is developing a new undergraduate class in market design for the fall of 2007.

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