

Communiqué

Spring 2008

UNIVERSITY OF MISSOURI

DEPARTMENT OF ECONOMICS

Experimenting in Economics

Hands-on learning environment is popular with students and instructors

By Melody Galen

Ron Harstad, J. Rhoads Foster Professor in the Economics of Regulated Industries, has been experimenting on his students. With his students. That is to say — students in his large microprinciples of economics classes do lab experiments at the end of the week rather than having a recitation class and rehashing what they'd learned earlier.

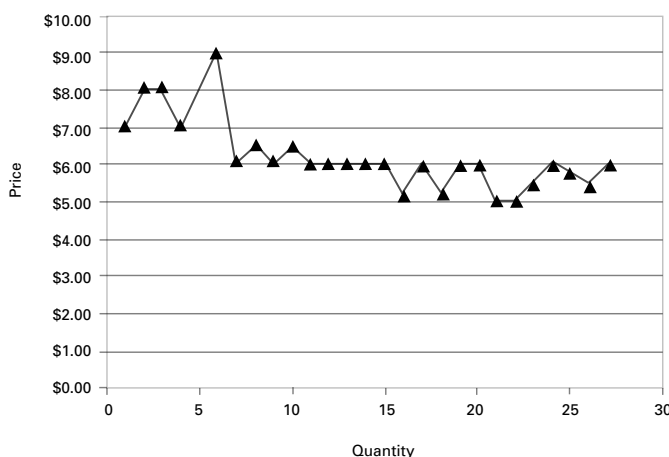
Computer technology makes it possible to teach difficult-to-grasp economics principles in a more concrete way, and Harstad is taking advantage of that with larger classes than ever before. For 30 years he has been involved with the research side of laboratory economics, studying whether economic theories are correct. Recently he tried using computer experiments with his 500-student classes, when previously such teaching methods had only been used with much smaller classes — maybe 12 people.

“These labs are getting higher attendance than recitations, and the teaching assistants like doing them more. This is a more hands-on approach,” Harstad says. “They’re taking part in carefully designed economies that show them what they’re learning.”

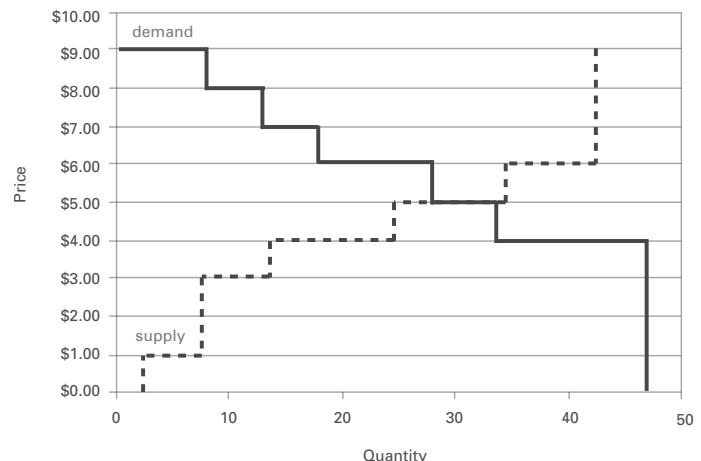
Generally, the students do experiments that have been well studied for research purposes, and the expected outcome is known. The difference here is that Harstad is using 500 people. He and his teaching assistants began trying this method in spring 2005 using pencil-and-paper experiments, then in spring 2007 they tried using computer labs for their work. Two things are happening: economists can see whether real people’s behavior is consistent with theory, and they’re expanding the teaching experience.

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Time Path of Contracts



Supply and Demand



The left panel shows, trade by trade, the prices at which a student acting as a buyer bought from one acting as a seller. The right panel compiles the values buyers were willing to pay and costs sellers had to incur. While no student knew this information, the right panel yields the “supply and demand” prediction that about 30 trades will occur at a price of \$5. Over time, the actual trades come close.



From the Department Chair

By David Mandy



It has been several years since the department's last newsletter. This issue is dedicated to reconnecting with friends and alumni by updating you on the many exciting changes that have swept through the department. We want to hear from you as well and hope you will write or e-mail us with your current activities.

Perhaps the most immediately apparent change is the faculty. Relatively recent retirements include Charles Geiss, Whitney Hicks, Walter Johnson, Maw Lin Lee, David Loschky, Carmen Menezes, Don Schilling and Richard Wallace. These longtime standard-bearers are greatly missed and, indeed, the department continues to rely on Carmen to teach the mathematical reasoning proficiency version of introductory microeconomics, Don to help administer the undergraduate programs and Richard to maintain contact with friends and alumni. More than half of the current 21 full-time faculty members joined the department in the past five years. These new faculty members are conducting path-breaking research and excellent teaching. Please take a few minutes to learn about them in the Meet the Faculty section.

As the J. Rhoads Foster Professor in the Economics of Regulated Industries, Ron Harstad is our first endowed professor. His pioneering explorations into the use of economic experiments as a research and teaching device are featured in the cover story.

Another feature story explores Mike Podgursky's continuing research into the economics of teacher pay and education finance. Mike is one of a handful of economists across the country leading the charge to quantify the outcomes of elementary and secondary education. After 10 years of dedicated service as department chair, he is enjoying the time to participate on multiple grants totaling \$500,000 this year through the National Center on Performance Incentives at Vanderbilt University, the Urban Institute's Center for Analysis of Longitudinal Data in Education Research, and the Missouri departments of

higher education and elementary and secondary education to support this research. A conference in October 2007, titled From Equity to Adequacy to Choice: Perspectives on School Finance and School Finance Litigation, brought many of the leading researchers in the area of education finance to campus for a day of discussion and collaboration.

The momentum in faculty development will continue because of the generous support of Central Banccompany Chairman and former University of Missouri Curator Sam B. Cook. Cook announced in October 2007 his endowment of the Sam B. Cook Chair in Economics through a large gift to the department. We are excited to begin recruiting for this prominent position, and we are deeply indebted to Mr. Cook for his unwavering support and deep commitment to quality teaching and research. Support from friends and alumni like him is critical in these lean budget times to maintain competitiveness for student scholarships, research and teaching expenses and faculty hiring.

So many exciting developments are under way that it is difficult to summarize them in one column. Dedication of the Walter Johnson Memorial Auditorium is one example. Many of you remember Walter's engaging Economics 1051 (formerly Economics 51) lectures in Middlebush Auditorium, where he taught for two decades. In memory of Walter, the auditorium was renovated and officially renamed in a dedication ceremony on Oct. 21, 2005. Economics alumna Sonja Steptoe, BA '82, a 1994 Arts and Science Distinguished Alumni Award and 2005 Mizzou Alumni Association Award recipient, delivered the dedication address.

A second example is the renaissance of economics as a popular undergraduate major. The number of students has more than doubled in the past five years, a result, in large part, of the efforts of Director of Undergraduate Studies Myoung Lee's promotion of the major. Myoung organizes an undergraduate open house each fall to provide an opportunity for students to meet the faculty and learn about economics as a degree program and career option.

Our graduating seniors posted an average score in the 85th percentile on the Educational Testing Service's Major Field Test in economics last spring. Our role as provider of introductory economics education to the campus continues to grow as well. The number of undergraduates enrolled in economics courses has increased by more than 50 percent in the past 10 years.

Yet another development is a significant revision to the graduate curriculum that is set to begin in fall 2008. The curriculum features a new initial year, designed to better transition doctoral students into advanced study and provide more applied options for master's students, followed by more advanced courses and research training for doctoral candidates. Director of Graduate Studies Xinghe Wang is guiding the graduate program through the transition. Xinghe assumed the duties of director in January 2007, following Ron Ratti's 13 years of exemplary service.

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The department appreciates hearing from alumni and friends. Send announcements or milestones to the address listed above.

From the Department Chair

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The department was honored to co-sponsor, along with the Show-Me Institute, a luncheon honoring the legacy of Milton Friedman in July. William Poole, a former Friedman student and president of the Federal Reserve Bank of St. Louis, delivered the keynote address.

The final development I will mention here is the annual Missouri Economics Conference, held on campus during spring break. This conference was initiated by Joseph Haslag shortly after his appointment to our faculty,

and it is now in its eighth year. Generous ongoing support from the Federal Reserve Bank of St. Louis and the campus has expanded the conference to a major regional event, with speakers attending from as far away as Europe, South America, Africa and China.

We hope you enjoy this issue of the newsletter and learn more about our activities in the following pages. Please take an opportunity soon to tell us about yourself.

Student Update

Graduate Students

Thirty-five master's and 23 doctoral candidates graduated from the Department of Economics between 2004 and 2007. Thirteen of the master's candidates moved on to pursue doctoral degrees or other advanced studies at institutions such as Washington University in St. Louis, Vanderbilt University, the University of Maryland, College Park, and the University of Melbourne in Australia. Several graduates took college teaching positions, including one as assistant professor at the University of Nebraska-Lincoln. The majority of the graduates now work in government and industries, including four directors and four deputy directors at government ministries in Korea, data analysts at the U.S. Census Bureau and the Federal Trade Commission, a research analyst at the FDIC and a project manager at Yahoo-China.

Undergraduates

During 2006-07, 21 students received bachelor's of arts degrees and 11 received bachelor's of science degrees in economics, and 45 received bachelor's of science degrees in business administration with a concentration in economics. Recent students have supplemented their studies with internships at the SAS Institute in Raleigh/Durham, North Carolina; The Federal Reserve Bank of Kansas

City; the Kauffman Foundation in Kansas City; the Show-Me Institute in St. Louis; the Missouri Attorney General's Office; the Missouri legislature; and the U.S. Embassy in Paris, France to name just a few. Others are actively involved in teaching as peer learning assistants or tutors. *Adam Thomas Swadley*, *Alyssa A. Stinson* and *Alan Simpson* collaborated with faculty under earned competitively awarded Arts and Science research mentorship awards during 2006-07.

The generosity of our friends and alumni has made several scholarships available to economics majors based on academic achievement. *Gregory Kistner*, *Jonathan Mills*, *John Owsley* and *Erika Thomas* received Clay J. Anderson Memorial Scholarships during the 2006-07 Arts and Science Week. *Samantha Jo Dalton* and *Swadley* received the second annual John Charles Willett Memorial Scholarships. The Elmer Wood Memorial Scholarship was awarded to *Stinson*, the Allan and Barbara Soshnik Memorial Scholarship was awarded to *Andrew Shepler* and *Katleen Navin* received the David Loschky Memorial Scholarship.

Three economics majors earned College of Arts and Science Scholarships. *Kistner* received the Arts and Science Development Scholarship, *Valeska Araujo* received the Harryette J. Campbell Scholarship and *Dalton* received the Willis V. Shepard Memorial Scholarship.

In Memoriam

Floyd K. Harmston (Sept. 22, 1917-June 22, 2007), PhD '66. MU economics faculty 1966-1983 (retirement).

Walter L. Johnson (April 13, 1938-Nov. 20, 2001). MU economics faculty 1965-1998 (retirement).

Kenneth L. Lay (April 15, 1942-July 5, 2006). AB '64; MA '65.

David J. Loschky (June 24, 1932-Sept. 8, 2005). AB '56. MU economics faculty 1967-1998 (retirement).

Paul E. Smith (July 19, 1926-March 2, 2005). MU economics faculty 1968-1991 (retirement).

Pinkney C. Walker (Nov. 2, 1917-Aug. 29, 2003). MU Economics faculty 1940-1975 (retirement).

John Charles Willett (Nov. 29, 1971-Sept. 11, 2001). BA '95. A victim of the attack on the World Trade Center.

Meet the Faculty



Saku Aura received bachelor's and master's degrees in economics from the University of Helsinki and a doctorate from the Massachusetts Institute of Technology in 2001. His research focuses on applied microeconomics and public economics.

Recently he has worked on topics relating to taxation of land and real estate, household decision making, discrimination and tax theory. His work has been published in prominent academic journals including *The American Economic Review* and the *Journal of Public Economics*.

Emek Basker received a bachelor's degree from the University of North Carolina in 1996 and a doctorate from the Massachusetts Institute of Technology in 2002. Her research has focused on the economics of the retail sector, in particular the causes and consequences of the growth of the "big box" retail format. Her papers examining the causes and consequences of Wal-Mart's growth have been published in several refereed journals and most recently in the summer 2007 issue of the *Journal of Economic Perspectives*. Basker's research on Wal-Mart has also been widely cited in the popular press, including in the *Economist*, *Business Week*, *Newsweek*, the *Financial Times*, *The New York Times* and *The Wall Street Journal*.

Chao Gu received a doctorate from Cornell University in 2007. Her research interests are macroeconomics, money and banking and economic theory.



Ron Harstad joined the department in 2004 as the J. Rhoads Foster Professor in the Economics of Regulated



Industries. Harstad's study of auctions fits modern regulatory concerns; his research has focused on the flow and discerning of information during auctions when bidders behave strategically, in both game-theoretic models and laboratory tests. The U.S. Federal Communications Commission, in designing the first major airwaves

auction in 1993-94, cited only two scholarly articles as directly assisting with its design problems; Harstad co-wrote both. *Econometrica*, *The Review of Economic Studies*, the *Journal of Economic Theory*, the *Journal of Political Economy*, *Operations Research* and *Management Science* are among scientific journals publishing his research, which has been cited nearly 4,000 times in economics, law, math and computer science journals. Harstad has been awarded eight National Science Foundation research grants. His doctorate is from the Univer-

sity of Pennsylvania, and he has been a faculty member or visiting professor at Duke, Washington, Rutgers, Bonn, and Texas A&M universities and at the universities of Illinois, Virginia and British Columbia. Harstad has presented his research in invited seminars at top economics departments in 17 countries. He is also a confirmed oenophile and gourmand.



Joe Haslag started at Mizzou in fall 2000. He earned an MU bachelor's degree in business logistics in 1982 and a doctorate in economics from Southern Methodist University (SMU) in 1987. Prior to his appointment at MU, Haslag spent 12 years in the research department at the Federal Reserve Bank of Dallas. While there, he

concurrently taught graduate and undergraduate courses in the economics department at SMU from 1988 through 1998. Haslag's research principally focuses on several aspects of monetary economics. One interest is the effect of financial innovation on macroeconomic behavior, in particular, the effects of bank deregulation, and he has studied the impact of such deregulation on economic growth. In addition, he has researched various issues pertaining to monetary policy and its effects on the financial industry. His research has appeared in such prestigious academic journals as the *Journal of Monetary Economics*; the *Journal of Money, Credit, and Banking*; *The Review of Economics and Statistics*; the *International Economic Review*; and the *Review of Economic Dynamics*.

Cory Koedel received a doctorate in economics from the University of California, San Diego, in 2007. His research interests include the economics of education and labor economics. Koedel recently co-wrote a book, *Does School Choice Work? Effects on Integration and Achievement*, which evaluates the effects of school choice on student outcomes. His current work focuses on teacher value-added assessments and the measurement of teacher quality. In 2005, he received the Spencer Foundation's prestigious dissertation fellowship award.



Myoung Lee is a teaching assistant professor and serves as the director of undergraduate studies in the department. She received a doctorate in economics in 2003 at MU. Her research areas include post-secondary educational policy and its labor market impacts, health policy and tourism economics. She has worked as a researcher for the Coordinating Board of Higher Education in the state of Missouri and has researched



the effects of tobacco and alcohol tax policy on public health. She is also co-director of the Tourism Econom-

ics Research Initiative and has lately been working on a study of the economic impact on Missouri of the inaugural professional bike race, Tour of Missouri.



Oksana Loginova joined the MU faculty in fall 2005 after finishing a doctorate in economics at Duke University. A Russian native, Loginova received a master's in mathematics from Moscow State University and a master's in economics from the New Economic School in Moscow. Her research interests are in the fields of

industrial organization and microeconomics, in particular game theory, contract theory and e-commerce. She currently teaches quantitative economics and game theory.

David Mandy has been department chair since August 2005. His research interests are in applied microeconomic theory, especially the study of concentrated industries, and econometrics. Recent published research focuses on the incentives regulation places on sellers in the telecommunications industry. Current projects study the relationship between local politics and migration in response to economic incentives, and techniques for estimating econometric models when the unobserved variables have a moving average component. Mandy serves on the editorial board of the *Journal of Regulatory Economics*, the University of Missouri Research Board, and the College of Arts and Science Strategic Development Board. He teaches graduate microeconomic theory and microeconomics for MBA students. When away from work, he is often at a soccer tournament watching his 10-year-old son, Trevor, play or at a swim meet watching his 14-year-old daughter, Jill, compete.

Douglas Miller conducts research on information theory and econometrics and has co-written two books and several journal articles on applications of these tools to a wide range of research problems. He teaches graduate and undergraduate econometrics as well as undergraduate microeconomics. Miller earned a doctorate at the University of California, Berkeley, and is beginning his third year at MU. He was recently named a member of the International Scientific Advisory Committee for the Third International Conference on Computational Finance.



processes.

J. Isaac Miller joined the department in 2005 after completing a doctorate at Rice University. He specializes in time series econometrics. Research interests include cointegrating regressions with messy regressors, linear and nonlinear filtering of latent integrated processes, and panel vector autoregressions with cointegrated

Jeffrey Milyo earned a doctorate from Stanford University in 1994 and holds a joint appointment in the Department of Economics and the Truman School of Public Affairs. He arrived at Mizzou in 2004 and became a full professor in 2007; he is also a senior fellow at the Cato Institute in Washington, D.C. Milyo studies the effects of regulatory and political institutions; recent work has examined the effects of ownership on media markets,



the measurement of media bias, the efficacy of campaign finance regulations and social determinants of health. Milyo has published in several leading scholarly journals, including *The American Economic Review*, *The Quarterly Journal of Economics*, the *American Journal of Public Health*, and *The Journal of Law and Economics*. His work has been frequently cited in the national media, including *The New York Times*, *The Washington Post*, and on CNN and Fox News. Before coming to the department, Milyo was an assistant professor at Tufts University and, most recently, the University of Chicago; he was also a postdoctoral fellow in health policy at Yale University and in political economics at the Massachusetts Institute of Technology.



Peter Mueser received a doctorate from the University of Chicago in 1983 and joined the department two years later. Over the next 10 years, his work focused on internal migration and the role of amenities in explaining mobility trends: Why were people moving to the south? Why were urban and rural areas growing

at different rates? Beginning in the late 1990s, his work turned to the evaluation of welfare reform and job training programs for the economically disadvantaged. In fall 2007, he was on research leave in Washington, D.C., undertaking research for the U.S. Department of Labor. This work is preliminary to a study, extending for at least a year, that looks at the effects of the largest government-sponsored job training program in the U.S. (the Workforce Investment Act), bringing together administrative data for more than 20 states. Returning to his earlier work on migration, he also recently edited a special journal issue on interdisciplinary work in migration, and he completed a paper, co-written with David Mandy, on the efficiency and politics of city growth.

Shawn Ni received a doctorate in economics from the University of Minnesota in 1991 and has been teaching at Mizzou since 1990. He is professor of economics and adjunct research professor of statistics. Ni has published on a variety of topics in macroeconomics and econometrics. His recent research concerns empiri-



cal analysis of disaggregated data such as household consumption and teacher effects on student achievements. These problems involve analysis of dynamic panel data with limited numbers of observations on each unit (e.g., a household or a student) and measurement errors, an environment that renders conventional estimators deficient. Ni develops Bayesian approaches to these problems that produce sharper and more reliable inference on parameters of interest.



Michael Podgursky is professor of economics and served as department chair from 1995 to 2005. He has written many articles and reports on education policy, teacher quality and teacher compensation. His work on education has been supported by federal and state agencies as well as numerous private foundations. He

serves on the board of editors of *Education Finance and Policy* and on technical advisory boards for numerous education organizations including the National Center for Education Statistics, the National Research Council, the Institute for Education Sciences (IES), the National Center for Teacher Quality, American Board of Certification of Teacher Excellence and Mathematica Policy Research. He is a co-investigator at the National Center for Performance Incentives at Vanderbilt University and at the Center for Analysis of Longitudinal Data in Education Research at the Urban Institute, two IES-funded national research centers.

Ron Ratti continues to teach the large class in money and banking and a graduate class in monetary economics. During 2007 he had papers appearing in *Oxford Bulletin of Economics and Statistics* and forthcoming in *Economica*, and he presented a paper at a June conference at Trinity College, Dublin. In fall 2007 Ratti visited Australia and Taiwan. He presented seminars during September and early October at Sydney University; Macquarie University; the University of Western Sydney; National Tsing Hua University, Hsinchu; and National Chung Cheng University, Chiayi, Taiwan. Leaving Taiwan turned into an adventure when he was forced onto the HSR (a new high-speed train), which was the only operational public transit during typhoon Krosa, but it traveled at only one-third its normal speed. During his stay in Taiwan he met with MU economics alumni Lewis Liu, Judy Hsu, C.L. Chu, J.S. Chiou, Dong-Hyeon Kim, Myungsoo Kang and Ginny Ju-Ann Yang.



Neil Raymon is an associate professor who has been with the department since 1983. His research interests include macroeconomics and, more recently, topics in the econom-

ics of information. Raymon primarily teaches macroeconomics and monetary economics at the undergraduate level. He serves on the Research Council for the MU campus. Raymon has an abiding interest in chess, and recently has been spending time losing, more often than not, to his 13-year-old son, Daniel.

Sharon Ryan received an undergraduate economics degree from MU. She then moved to northern California to earn a doctorate in economics from the University of California, Davis, specializing in public economics and urban economics. After completing the doctorate, she returned to Mizzou and has been with the department since 1997.



Gunjan Sharma joined MU in 2006 after finishing her doctorate at the University of Maryland, College Park. Her research interests are in international trade and development. A lot of the research questions that she addresses are motivated by her own experiences as a citizen of a develop-

ing country and by the huge socioeconomic and cultural changes that economic growth and international integration bring with them.

Vitor Trindade is an associate professor who joined the department in fall 2005. He received a doctorate from the University of California, San Diego, in 2000, and was an assistant professor at Syracuse University from 2000 to 2005. His interests lie primarily in the area of international trade, with a side interest in economic development. Recently, his work has helped uncover the positive impact that the presence of ethnic Chinese in various countries has on international trade flows between those countries. This is intriguing because it shows indirectly that there are barriers to trade that are difficult to measure (the barriers that the ethnic Chinese help overcome). More recently, Trindade's work has centered on the role that the demand side plays in international trade. When not busy pushing back the frontier of knowledge in economics, Trindade enjoys relaxing with his wife, his 8-year-old son and his 6-year-old daughter.



Xinghe Wang received a doctorate in economics from the University of Iowa in 1990. He joined the department in the same year. His research area is microeconomic theory. He conducts research in the economics of peer-to-peer markets, standardization and network effects, and multiproduct oligopoly. Wang was

promoted to professor in 2006 and serves as director of graduate studies.

The Economics of Education

MU professor challenges some entrenched practices in K-12 education

By Melody Galen

Since the early '90s Professor Michael Podgursky, a labor economist by trade, has studied teacher quality, teacher pay and teacher markets. Though the findings of economists haven't always been well received on these issues, Podgursky believes that the teacher labor market is at last showing signs of accepting what they have to say.

Economists look at teacher markets through the lens of the most basic of economic principles: supply and demand. What they have seen is that there is inefficiency associated with teacher pay scales and with the way they are licensed.

Podgursky boils it down to three areas of weakness: the suppression of differentials by field, school-based differentials and failure to differentiate on quality of performance. These problems have been illustrated in numerous studies and in markets all over the nation.

Teacher markets typically suppress differentials by field. For example, on average, a high school math teacher has more remunerative non-teaching opportunities than a second-grade teacher. Their training is very different, and, of course, what they do is different. The question of whether teachers are underpaid is looked at assuming that teachers are homogeneous. They are not — they have varying levels of education, experience and specialization.

There is often an abundance of qualified applicants at the elementary level but relatively few secondary math and science applicants. The market-based solution to this would differentiate pay according to field — for instance, pay science and math teachers higher salaries, but this is suppressed. This, in turn, results in more high-quality elementary teachers but fewer qualified math and science teachers. They can go elsewhere to do a meaningful job and be rewarded with higher salaries.

Problem number two is school-based differentials. New York City has a huge system of about 1,100 schools, and they all use the same salary schedules throughout the system. Podgursky explains that regardless of the average level of pay, the lowest-achieving schools, the toughest ones, often have the least-experienced teachers. "Obviously, this is where you want your most experienced teachers, but those teachers with more seniority often want to be in the nicer buildings. School systems end up actually spending less money per student in those less-desirable buildings because that's where the newer, lower-paid teachers are," Podgursky says.

The third major problem Podgursky sees with the public education compensation system is that it fails to differentiate on quality of performance. Within the same

building, there will be some teachers who shine more brightly than others. Value-added studies, where students are tracked over time, are a tool designed to show, for example, which classrooms are more productive than others. "There is enormous variation in effectiveness of teachers as measured by test-score gains," Podgursky says. Those differentials get suppressed by fixed salary schedules, which is discouraging — if people don't get rewarded for their greater effort and effectiveness, they leave.

Concerns over school performance have prompted more people to ask why. Various experiments are under way, and one randomized experiment involves volunteer teachers in the middle-school grades. Half of the volunteers were randomly selected to be in a merit-pay program: if their students make certain gains, they'll get big bonuses at the end of the experiment; otherwise they

will receive the standard payment for participating in the experiment. Volunteers are being followed for two years.

Other non-experimental evaluations, here and abroad, suggest that schools usually get more of what they make an incentive, whether it's parent evaluations, attendance or test scores. The idea is that pay be based on something more than showing up for work. Congress believes in it enough to put \$500 million into a program called Teacher Incentive Fund to support these kinds of experiments.

"In the past there had been few rigorous evaluations of what works in K-12 and what doesn't. Now that students are being tested yearly, and we're building databases to track those results, we can compare across a state the effectiveness of various programs. With quantitative evidence showing that students in some schools, or even classrooms, are learning at a greater rate — an indicator of higher resource productivity — the climate is beginning to change," Podgursky says. Many who sneered when it was initially suggested that pay might better be based on performance are at least willing to stick a toe in the water.

Some schools are looking at performance-based pay for principals now. Podgursky asks, "If we can show that one school is producing dramatically better results, why should all principals get the same pay?" He thinks it's a modest, but important, step forward.

The depth and breadth of the issues surrounding teacher quality and teacher pay is immense, but changes in recent years in the national education system, for good or bad, have required school systems to re-evaluate their performance standards. Podgursky is pleased that the tenets of economics can be used to ultimately provide children with better educations.

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Experimenting in Economics

Continued from front page

One topic that often confounds students initially is the burden of a tax. If, for example, a tax is levied on gasoline, to what extent do the oil companies or their retail divisions incur the cost of that tax, and to what extent do drivers incur the cost of the tax? Harstad says this is an easy concept to illustrate in a lab.

Some of the students act as buyers and some as sellers of gasoline. They perform those actions for a few cycles, then a \$1-per-unit tax is introduced. The sellers have to pay the \$1 out of their profits. Participants see an increase of 60 cents in cost to the buyers and a decrease of 40 cents in profit to the sellers.

Students proceed that way for several minutes, then they switch so that the sellers don't pay the tax, but the buyers have to pay for a ration card that gives them the right to buy the gas — \$1 per unit for everything they buy goes straight to the government. Either way, the government collects its taxes. The buyers see the price fall by 40 cents so that after they buy the ration card they're still paying 60 cents more than they were before the tax was

instituted. This illustrates to the students that the impact is the same no matter which side pays the tax.

“And one of the toughest lectures in a principles class for the whole semester becomes one that students can grasp in an afternoon,” Harstad says. It pleases him that when they explain what they learned from the experiment, they use essentially the same concepts and words he would have used in teaching them.