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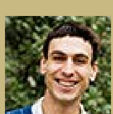

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Consistently Strong: Job Placement Remains Highly Successful

It was a year of disjointed market rounds, but our graduate students had excellent outcomes.

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Why gas prices vary so much from one place to the next

Many of India's Poor Turn to Private Schools

31 **31-June 3**

July 12 **Economics Roundtable: Barry Naughton, Professor, UC San Diego**

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ALUMNI SPOTLIGHT

Jerome Fons, Ph.D.

At the Front Line of the Financial Meltdown

By Alex Morales

There's no denying that the financial crisis of the late 2000s affected everyone on some level; however, the impact of the crisis was quite different for Jerome "Jerry" Fons, who was on the front line of the 2008 financial meltdown. In mid-2007, Fons left Moody's Investor Service right as things were starting to derail. He later testified before Congress against his former employer. He's since been interviewed by major news outlets, from BBC to Bloomberg, and appeared in the 2010 Academy Award-winning documentary film Inside Job.

Rating Countries and Financial Institutions

During his 17 years at Moody's, Fons was part of groups that rated countries as well as financial institutions, which he described as "one of the most complex things that anyone could rate." The process and analysis behind these ratings is extremely complicated. Rating countries involves interaction with the rated entity and dissemination of the results, while rating financial institutions follows a rating methodology, which prescribes factors indicative of credit risk.

Fons explained that when rating a large, complex financial institution, one would hope to have access to as much information as possible with financial reports that are as transparent as possible. Fons recognizes the difficulty of generating a reliable credit rating, prompting the question "Is the public, published information on large financial institutions detailed enough to come up with a reliable credit rating?" He notes that the answer is often no due to too much maneuvering of balance-sheet assets.

With so many factors at play, the ratings of complex institutions have not been on track in recent years. The mistakes of rating agencies — from AIG to Bear Sterns to MF Global — have all tallied up. Fons sees the legacy rating agencies as being at the eye of the crisis, "creating some of the toxic assets, in the form of structured securities, that wound up blowing up."

Fons now serves as executive vice president at Kroll Bond Ratings, which is a company that has two businesses: a subscriber-supported division rating financial institutions and an issuer-paid division in New York focused on rating bonds. Fons continues to rate bonds but in a new and different way. Though most of the company's business is in the structured finance area, rating commercial and residential mortgage-backed securities (few of which have been issued since the financial crisis), the company has also been hired to rate the bonds of major states.

When working through the rating process, Fons notes that "while there are few theoretical models of credit risk — Gambler's Ruin and the Merton Model — there is no real theory of credit risk that links the propensity to default to fundamental (nonmarket) variables." However, in the case of structure finance, Fons said that "we are able to rely to a certain extent on Monte Carlo techniques and the stressing of cash flows in order to see what would cause the transaction to fail."

Inspiration at UC San Diego

Fons' interest in banking and the financial system all started at UC San Diego in the early 1980s, during his time as a doctoral student in the Department of Economics. It was, in part, his experience as a

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teaching assistant — working with former Professor Herb Kaufman and others — that got him excited about finance as well as money and banking. Additionally, his work with Professor Ross Starr spurred his interest in the field of credit risk. Through a series of jobs at the Federal Reserve Bank of Cleveland, Federal Reserve Bank of New York and Chemical Bank in New York, Fons eventually found his way to Moody's.

With such a high-pressure job, there's certainly a question of how Fons relaxes while sitting ringside, watching the ratings of countries teeter and plunge. With a house in upstate New York in the country, Fons makes it a point to get out of New York City every weekend with his wife. His getaways to nature with deer, turkeys, coyotes, hawks and even bears provide an alternative to the urban financial jungle. Though he lives and works in the cultural and economic epicenter, Fons still considers San Diego a second home and UC San Diego as the beginning of his journey as an economist.

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CHAIR'S CORNER

Chair's Corner

In Memoriam: Hal White

This edition of Economics in Action begins on a very sad note. Distinguished Professor **Hal White** passed away on March 31, 2012, at the age of 61 following a long battle with cancer. Hal was a wonderful colleague whose intellectual leadership helped the UC San Diego Department of Economics rise to international prominence. His cheerfulness and intellectual curiosity invigorated the entire department. He advised and mentored many students over the years and was always generous with his time. As a testament to the affection and esteem in which he was held, last May a large group of his former students and colleagues gathered here at UC San Diego for a Festschrift in his honor.

Hal White's contributions to econometric theory and practice have been tremendous. He was one of the world's leaders in the field of econometrics, and the techniques he introduced are so ingrained in empirical research that they are now standard practice among applied economists. He also contributed fundamentally to numerous other areas, such as neural networks and medicine. As recently as early March, he and his co-authors published an article on the effects of chocolate consumption on weight that attracted widespread attention. Hal received numerous honors throughout his career. He was a Chancellor's Associates Distinguished Professor of economics and a Fellow of both the Econometric Society and the Academy of Arts and Sciences, and he recently began appearing on shortlists of those predicted to receive the Nobel Memorial Prize in Economic Sciences.

An insightful and energetic scholar and wonderful colleague, Hal will be deeply missed. The legacy of his contributions to the department and to the field of economics will endure. He will always be remembered fondly. Plans for a memorial service are currently underway.

This Issue

The current newsletter has a number of interesting articles that highlight how other members of the department are continuing to contribute to the field of economics. The headline article by **James Andreoni** and graduate student Laura Gee reports fascinating new results on how using a "hired gun" can incentivize individuals to contribute to the public good. I now know who to call to advise me on how to find "volunteers" for campus committee service. **Karthik Muralidharan** discusses his research on which policies can improve educational outcomes in India. His latest project analyzes the impact of performance pay on student outcomes in randomized trials. He finds that student learning increases as a result.

We are also featuring a biographical article on Professor **Michelle White**, which recounts her years as an undergraduate at Harvard University at a time when women were discouraged from pursuing academic careers and had yet to be fully integrated into student life. Women took classes with men but were not allowed into Harvard's nicer libraries or dining halls and were often found eating bagged lunches in Harvard Yard! Things certainly have changed. **Ross Starr**'s history of the department also chronicles changes in our department over the years.

Kudos

We congratulate **James Rauch,** who was recently named as a 2012 Guggenheim Fellow.

The department's micro theory/behavioral group organized and hosted the **2012 Southwest Economic Theory (SWET) conference in February**, which brought leading theorists to UC San Diego from a dozen universities in the region. Attendance was the highest in the history of the SWET conference. The gathering showcased the department's faculty and students, including students **Aislinn Bohren** and **Troy Kravitz**, whose co-authored **paper** was featured in one of the presentations.

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Undergraduate Program

Our undergraduate student majors are currently around 2,400, but these numbers may increase in the near future. We just received a report that among the students admitted to UC San Diego for fall 2012, there is a 60 percent increase — relative to last year — in the number of students who say they want to major in economics! We are delighted that our majors are so popular. Despite the large number of undergraduates we serve, we try to tailor our program to prepare our students for whatever path they choose when they graduate. For example, our Senior Essay Seminar is designed to allow our students to do independent research. This sequence is ideal for those students thinking about going to graduate school. **Michael Lorch's article** on his experience in this program shows the interesting research projects pursued by our students with guidance from our faculty.

For those students interested in pursuing a career directly after graduating, we are encouraging more connections to and formal talks by alumni who are already working in the world of finance and economics. Alumnae Emmy Sobieski and Kimberly Alexi presented a talk on "Breaking into Wall Street" on January 19 that was very well attended by our undergraduates interested in this career path. They discussed the key things our students needed to know, from "buy side" and "sell side" to constructing the perfect resume and tips on making the right impression in an interview.

Last year, we launched the Rising Leaders Program in an effort to assist some of our top students who were interested in pursuing professional careers. Three of these students — Aimee Kang, Jayoo Song and Rebecca Wagner — each obtained positions for the upcoming summer. Aimee will be interning at Ernst & Young as an assurance intern, furthering her goal of becoming a professional accountant. Jayoo accepted a position at Booz & Co. as a research assistant in his home country of South Korea. Rebecca will be working as an intern at Kroll Bond Ratings for the summer in New York City. We are very proud of our Rising Leaders and hope next year's selected students have as much success.

Graduate Admissions and Placement

Yixiao Sun led our admissions committee as they read through 769 applications for our doctoral program. From this pool we have an incoming class of 26 graduate students.

The job market for doctoral students was not as smooth this year, as the inability of many institutions to over-offer slowed down the workings of the market. In the end, though, our placements were very good. **Julie Cullen**'s summary can be found **here**.

Outreach and Alumni

We enjoyed seeing many alumni at the Department of Economics reception at the annual American Economics Association meetings in Chicago last January. Next year's meetings will be in San Diego, so we are hoping to catch up with even more alumni.

The **Economic Leadership Council** is now at eighteen members. This group of business leaders (most of whom are alumni) not only makes generous financial donations to the department but also serves as mentors to our students and advises us on how to form important ties to business and the community in general.

Marc Doss, regional chief investment officer for Wells Fargo, presented an overview of global investment opportunities at the February meeting of the **Economics Roundtable**. His analysis highlighted the emerging markets as especially likely to provide high returns.

We are always most appreciative of the support of our alumni. Please contact Doug Kurtz at **dpkurtz@ucsd.edu** or me at **econchair@ucsd.edu** if you would like to learn more about **Giving Back** possibilities.

Sincerely,

Valerie

Valerie Ramey, Chair

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Economics IN ACTION
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Do Affirmative Action Bans Discourage Minority Applicants from Applying to College?

By Ben Backes

Affirmative Action in College Admissions

Affirmative action in college admissions continues to be a central issue in American higher education. Sometime in 2012, the Supreme Court will decide whether to hear a case challenging the use of racial preferences by the University of Texas. Although the debate is often focused on abstract principles — if past inequities should be corrected by differential treatment — several empirical questions are prominent in the discussion.

For example, proponents of affirmative action often argue that the abolition of racial preferences sends a message of institutional hostility to potential underrepresented minority students, discouraging applications and further lowering the already depressed college graduation rates of blacks and Hispanics. Indeed, the University of Texas successfully defended its re-introduction of racial preferences in a 2011 decision from the 5th U.S. Circuit Court of Appeals by arguing that without racial preferences, highly qualified minority students would be less likely to apply for admission.

In a recent paper co-authored with Kate Antonovics, we set out to explore whether California's 1998 ban on affirmative action — voted into law as Proposition 209 — reduced the number of applications from minority students to UC campuses. In the paper, we look at admissions and application rates and test for evidence of a change in application behavior not directly explained by falling admissions chances.

The Picture at Berkeley

As a starting point, we examine admission and application rates at UC Berkeley. Since both of these rates vary greatly by academic credentials, we use an index of GPA (40 percent of the total weight) and SAT scores (30 percent each for math and verbal) to characterize the response to Prop 209.

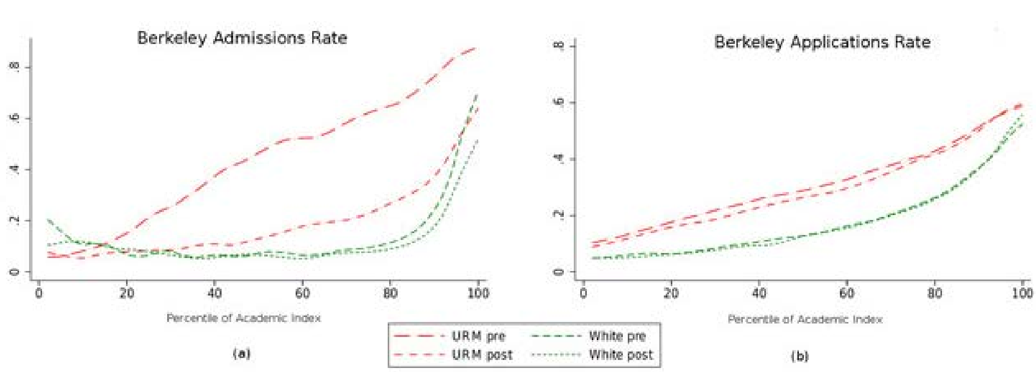

Figure A shows how the removal of racial preferences affected the probability of admission for the entire

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range of academic credentials. The x-axis measures academic credentials (with the most highly qualified applicants on the right), and the y-axis shows average admissions rates. Thus, for underrepresented minority (URM) students and non-URM students with a given level of academic credentials, the figure shows average admissions rates for each group. As expected, applicants with higher academic credentials are more likely to gain admission. Additionally the figure shows that prior to Prop 209, there was a large disparity between the admissions rates of URM (top red line) and white (top green line) applicants. (Using Asians — rather than whites — as a control group gives similar results.) However, after Prop 209, most of the advantage was removed: The red and green lines in the post period are much closer together.

Figure B shows the corresponding graph for application rates. Despite the large drop in admissions probabilities shown in Figure A, minority students remained much more likely to apply to Berkeley than whites with similar academic credentials. It does not appear that the large drop in admissions probability led to a reduction in application rates.

Remaining UC Campuses

For the remainder of the UC campuses, we have two main findings.

First, all URM students, regardless of their academic credentials, experienced a substantial relative drop in their chances of admission to at least one UC campus. Even the most highly qualified applicants had significant drops in admissions probability to Berkeley and UCLA, while students with low GPA and SAT scores were less likely to get into less selective UC campuses, such as Santa Cruz and Riverside.

Second, the relative decline in URM application rates after the end of affirmative action was concentrated at Berkeley and UCLA, where students experienced the largest drops in their predicted probability of admission. The fall in application rates, however, was small relative to the drop in probability of admission. In addition, these URM students increased the number of applications they sent to less selective UC campuses. This had the effect of lowering the average quality of the set of UC campuses to which URM students applied, though the magnitude of this drop was small.

Discussion

An important issue in the debate surrounding Prop 209 — and bans on affirmative action more generally — is whether the end of the use of racial preferences lowered the value URM students placed on attending UC campuses. For example, URM students may have become less interested in applying to UC schools after the ban because they feared, justifiably, that they would have fewer same-race peers if they were admitted. Taken at face value, our results are not broadly consistent with the idea that Prop 209 dramatically lowered the interest of URM students in attending UC campuses.

In evaluating why the total enrollment numbers of URM students fell dramatically at schools like Berkeley and UCLA after the end of racial preferences, the results of our paper suggest that this fall was brought about by the direct effect of the drop in URM students' chances of admission and not because URM students were discouraged from applying. URM-student interest in the UC system appears to have remained high. URM students with a given level of GPA and SAT scores were more likely than whites to apply, and be admitted, to UC campuses both before and after the ban on affirmative action, especially at the most selective campuses. This suggests that efforts to increase diversity in the UC system should be targeted at increasing URM students' level of academic preparation before they apply for college rather than at increasing application rates.

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How the Business Cycle Affects Undergraduate Decisions About Graduate School

By Michael Lorch

The Economics Senior Essay Seminar sequence (Economics 191A–191B) has been the most intellectually stimulating experience in my academic career. As a joint major in economics and mathematics with a minor in business, I found the series perfect for me because it allowed me to receive departmental honors; gave me a chance to see if I enjoyed research; and provided me the opportunity to use the economics, math and writing skills I mastered throughout my time at UC San Diego. The extensive process has challenged my ability to solve economic problems and has helped me get a realistic idea of what writing an academic paper entails. Much of my success in completing and excelling in my first economic research paper must be attributed to my professor and academic adviser throughout the entire process, Roger Gordon, and my fellow Economics 191A–B classmates.

The Process

After formulating the initial research question, Professor Gordon helped guide me through the rest of the paper. As is common with most empirical economic studies, my paper includes an introduction of the research topic, an in-depth literature review of past papers, a theoretical background section, a comprehensive empirical analysis, an examination of the results, and conclusions that come out of the study. All this seems daunting without the help of an experienced faculty member who gives straightforward answers to these complex research questions. In addition to having periodic meetings with Professor Gordon, at different stages in the writing process I presented my findings to classmates. Comprising some of the top students in the Department of Economics, my classmates provided another prospective and ultimately gave me many great suggestions and comments that substantially improved my paper.

Research Results

My research meticulously observes, measures and analyzes the impact that fluctuations in the domestic economy have on two important decisions many undergraduates must make: whether to apply to graduate school and, once admitted, whether to enroll in a specific graduate school. Using a time-series data set from the UC San Diego Office of Graduate Studies from 1994 through 2004 and the United States annual unemployment rates to measure fluctuations in the business cycle, I found that an undergraduate's application and enrollment decisions are countercyclical, with a few departmental exceptions. By using department type, a time control, tuition, financial aid and initial job placement after graduation as control variables, my study sets up a number of unique regressions in order to fully explain how the business cycle affects these decisions. I found a statistically significant countercyclical effect on both domestic and foreign students in the application decision. The study also observes a statistically significant increase in the percentage of enrolled graduate students when the annual unemployment rates increase.

In addition to basic application and enrollment decisions, this study thoroughly analyzes how annual unemployment rates affect the percentage of female and minority applications, the quality of students applying and enrolling to UC San Diego graduate programs, and the number of admissions and newly

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enrolled students. Scripps Institution of Oceanography is the only department that consistently has a procyclical affect: As the annual unemployment rate increases, there is a statistically significant probability that application and enrollment levels will decrease at Scripps.

Reflections

There is a huge sense of accomplishment in completing an economic paper of this magnitude as an undergraduate. As another a reward for all my hard work, I have been nominated to present my findings at the 2012 UC San Diego Undergraduate Research Conference in April. I fully encourage any motivated and hardworking student that is part of the Department of Economics to accept the challenge and opportunity of writing a senior thesis paper. I have no regrets and hope the students who enroll in the Economics 191 series next year find it as challenging and fulfilling as I did.

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FACULTY SPOTLIGHT

Michelle White

Blazing Trails in Economics

Michelle White's career in economics spans nearly five decades, from the bad old days when women were almost nonexistent in the profession to the present when women are — almost — accepted as equals.

First-Class Education in a Second-Class Position

Michelle's career in economics started in the mid-1960s when, as a freshman at Harvard University, she signed up to major in economics even though she had never taken a course in the field. She chose economics as a major because she was from Washington, D.C., and economics was the only social science field in which college graduates could get professional jobs in the federal government with just a bachelor's degree. But she quickly found that economics was a lonely field for a woman. There were almost no other female students in her classes, and the Harvard economics department had no female professors or even any female teaching assistants.

Moreover, female students at Harvard occupied a generally second-class position: They shared classes with men but were relegated to separate women's residence halls, dining halls and libraries and were barred from the superior facilities for men. Because the women's residence halls were located far from the classrooms and the men's dining halls were closed to women, Michelle recalls eating many bag lunches in the basement of Memorial Church, the only refuge for female students in Harvard Yard. Female students at Harvard took their classes with the men but were not expected to lead academically and rarely received the top prizes. They were discouraged from going to graduate or professional school and were expected to get married at graduation and do what was best for their husbands.

Instead of getting a government job when she graduated, Michelle headed for London where she enrolled in a master's program at the London School of Economics but mainly spent her time "studying" theater and opera. Then she ventured further afield, taking a job as a research assistant with a Harvard organization that sent economists to advise the governments of developing countries on economic policy. Her job was in the Pakistan Planning Commission.

Influenced by International Experience

Living in Pakistan, Michelle was exposed to a society in which women were more than discouraged from going to graduate school or working – they were discouraged from leaving their homes at all. Pakistani women were kept in purdah, rarely seen on the streets or in the markets. In the Pakistani government office complex where Michelle worked, there were no female professionals, and even the secretaries and cleaning staff were entirely male. Her time in Pakistan was cut short because rumors began to circulate that the foreign economists working in the Planning Commission were Zionist spies, which caused the organization to close its Pakistani operation. Michelle was then sent to Indonesia.

Arriving in Jakarta from Pakistan was like coming out into the sunshine from the shadows. Despite the fact that both Pakistan and Indonesia were Muslim countries, women in Indonesia sold most of the goods in the markets; they ran businesses and they worked in government jobs alongside men. Michelle worked on a Ministry of Education study of the costs of education, and she designed a survey of school finance. She tested the survey in Jakarta, conducting interviews of school headmasters with a female co-worker. The only problem was that the co-worker would sometimes switch from conducting the interviews in Indonesian, which Michelle could follow, to Dutch, where she was completely lost.

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At the Forefront of Feminism

The combination of observing how variable the treatment of women was across cultures, how purdah held back women in Pakistan, and how women's aspirations were held back by sexism in the United States caused Michelle to decide to get her doctorate in economics. (Reading Betty Friedan's feminist manifesto, *The Feminine Mystique*, helped, too.) Michelle arrived at Princeton University in the fall of 1970, eager to witness and participate in the new opportunities that feminism was opening up for women in the U.S. Princeton itself was changing rapidly at the time: Women had been accepted as graduate students for only a few years, and the first female undergrads were just arriving on campus. But feminism seemed to be on no one's mind at the time. Instead, the Princeton campus was disrupted by student protests against the Vietnam War.

Progress for women was slow in those years, and tokenism was the order of the day. Michelle was the only woman in her graduate-school class, and the previous two classes each had only one woman. By the time Michelle graduated, many economics departments were hiring their first female faculty members, but progress often ended when a token woman or two was hired. Michelle's first job was at the University of Pennsylvania, where she became the only female faculty member in a 50-"man" economics department. From Penn, Michelle moved to New York University, where she was one of two female faculty members in the economics group at the business school. Later she moved to the economics department at the University of Michigan, where the only other female faculty member retired before any additional female faculty were hired. Eventually the Michigan economics department hired three or four women among 45 men.

Only after moving to UC San Diego in 2001 did Michelle find herself in a department where female faculty members are more than tokens. She is proud of the fact the UC San Diego Department of Economics has enough female faculty to sometimes even outnumber the men in small groups. The department provides positive role models for female students and a message that the field will treat them equally.

Research: Effects of Bankruptcy Law

Michelle is best known for her research on the economic effects of personal bankruptcy law. When individuals file for bankruptcy, their credit card debts, medical bills and other unsecured debts are discharged, loosening the individual's budget constraints. Filers are not required to use any of their future incomes to repay but must repay from their wealth if it exceeds an exemption level set by the state where they live.

From an economic standpoint, individuals gain from being able to borrow in order to spread consumption over the life cycle, but borrowing is risky because their incomes may fall at the time when debt must be repaid. Having a bankruptcy procedure makes them better off by reducing the risk of borrowing, since debt can be discharged in bankruptcy if ability to repay is low. Having a bankruptcy procedure also encourages individuals to start and own businesses, since business debts can also be discharged in bankruptcy if the business fails. But bankruptcy drives up the cost of credit, since debtors may work less hard when the cost of job loss or business failure is lower.

Michelle's research on bankruptcy makes use of the variation in bankruptcy exemption levels across the United States. In states with high exemption levels, debtors can keep their homes in bankruptcy, while in states with low exemptions, they must give up their homes and more of their wealth. Her research shows that in states with high exemption levels, credit supply is lower, individuals borrow less and they pay higher interest rates. Small businesses also borrow less and pay more for credit. However, individuals are more likely to own businesses in states with high exemption levels, because the downside risk of being in business is lower.

Michelle's work on the effects of bankruptcy law has also encouraged other economists to do research in the area. They have recently shown that divorce rates are higher and people are less likely to have health insurance in states with high exemption levels. This is because bankruptcy reduces risk in the same way as having health insurance or sharing income across spouses. As a result, demand for health insurance and demand for being married are both lower in states that provide more insurance through bankruptcy.

One of Michelle's recent papers also suggests that changes in bankruptcy law were partly responsible for the subprime mortgage crisis and the recent recession. In 2005, bankruptcy law was reformed to discourage individuals from filing by greatly increasing filing costs. The result was a sharp drop in the number of bankruptcy filings, from 2 million in 2005 to 600,000 in 2006.

Prior to the reform, many financially distressed homeowners filed for bankruptcy to avoid losing their homes; they used their gain from discharge of debt to avoid defaulting on their mortgages or to repay their mortgage arrears if they had already defaulted. The bankruptcy reform closed down this home-saving procedure, causing a large jump in the number of mortgage defaults starting in 2006. This led to an increase in the number of foreclosures and the resulting increase in housing supply caused home prices to drop. The home equity of many homeowners was wiped out, thus increasing their incentive to default on their mortgages. The result was the subprime mortgage crisis that led to the 2008 financial crisis. (This research is reported in ***Did Bankruptcy Reform Cause Mortgage Defaults to Rise?*** co-authored with Wenli LI and Ning Zhu, and available on **Michelle's website**.)

Michelle also does research on topics in public economics, including whether California's Proposition 13 caused homeowners' mobility to decline, whether adoption of local sales taxes leads to more jobs in retailing and fewer in manufacturing, and the effect of SUVs and pickup trucks on traffic safety.

Michelle is married to Roger Gordon, another faculty member in the Department of Economics. They enjoy going to the theatre and opera, as well as hiking in the mountains near San Diego. They also enjoy travel and will be spending their upcoming sabbatical in Beijing and London.

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Economics IN ACTION
UC San Diego Department of Economics

James Andreoni Ph.D., and Laura K. Gee

A small organization — an office, academic department, church or team — wants everyone to comply with its ideas of good behavior. But how does it do this without creating feuds and spending resources on fines and monitoring? Punishment by peers is known to make things worse, so what is left?

James Andreoni, Ph.D.

Laura K. Gee

We propose and test a device we call the Hired Gun. Someone is appointed, elected or hired to carry out a simple rule: Punish the biggest offender, but just to the point that he or she would rather have been the second biggest offender. This amount could be very small — a slap on the wrist — but the incentive creates a race to second place. That is, everyone wants to be the second biggest cheater to avoid the punishment. The only way everyone finishes second is if everyone stays in the starting blocks, if everyone behaves well. We show this simple rule results in easy monitoring and small and rare fines, and quickly produces good behavior.

Which Incentives Produce Good Behavior?

We know professors like teaching but prefer to do research. How does a department make sure effort is put into classes? Some neighbors want all the yards on the street to be clean, and others are lax. How can neighbors enforce civility while remaining civil? These represent classic problems in social science: When people face choices that benefit themselves at a cost to others, how do we structure incentives so people do the right thing?

Some have suggested that monitoring and punishing by peers can be enough: Good teachers can snub bad teachers, clean neighbors can scold messy neighbors. And if that doesn't work, they can resort to other forms of vigilantism. Economists have examined punishment by peers in laboratory studies and have found that peer punishment increases good behavior but often makes the group as a whole worse off. Vigilante justice is just too costly: People punish too much. Others have noted that, in reality, punishment by peers is fairly rare.

Instead, small groups appoint or hire someone with authority to enforce the social order. Just as in the Wild West when vigilantes were replaced with hired guns, schools have department heads who review teaching evaluations, and apartment buildings have superintendents to track complaints. These delegated authorities have the responsibility to discipline those who fall short of good behavior. But this leaves a critical question unanswered: If we delegate authority to hired guns, how should they govern? Monitoring

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everyone and punishing all cheaters is difficult and costly. We need an enforcement method that is simple and inexpensive and has small penalties and works.

The Race to Second Place

Imagine a one-minute race where the person who runs the second farthest gets $100. How would this race end? Poetically, it ends at the beginning. Everyone will be standing at the starting line, but nobody will cross. Why? Crossing the line starts you in first place, and no one else will ever want to pass you.

More realistically, think of driving on the highway. You want to go fast but also want avoid a ticket. If there is at least one car going faster than you, the highway patrol will ticket the faster car. You're safe if you are the second fastest car. If no one wants to get a speeding ticket, then everyone will try to be the second biggest speeder. Everyone slows down until they're all going the speed limit — they're all behind the line. Similarly, when a police car is on the road, typically everyone falls in behind it. To enforce the speed limit, the officer needs only fine the first driver who passes the police car.

We use this intuition to design our enforcement device.

The Hired Gun Versus Peer Punishment

We investigate whether a delegated authority — the Hired Gun — who punishes only the largest deviators can effectively enforce socially desirable outcomes. We also compare the effectiveness of this Hired Gun to vigilante or peer punishment. Can delegated authority replace costly and inefficient peer punishment and get superior social outcomes?

We represent a social dilemma with a public-goods game. A person is assigned to a group of four people and given five tokens to divide between a socially beneficial public good (like teaching well, or being a good neighbor) and a private good benefiting only the individual (like being a lazy teacher or messy neighbor). Each token spent on the public good pays a return of $2 to all group members. This means the group as a whole earns $8 (four people times $2 each). In contrast, each token spent in the private good pays a return of $3 to *only* the person who made the choice; no other group member benefits.

A purely selfish person will choose to spend all five tokens on the private good and none in the public good. If all the group members do that, then each person will earn $15 (five tokens times $3 each). However, a group taking the socially optimal action would instead spend nothing in the private good and instead spend all five tokens on the public good for a payoff of $40 per group member (five tokens from each of the four group members — 20 tokens total — times $2 each).

We add the ability to delegate punishing authority using the Hired Gun. The Hired Gun identifies the group member who gave the lowest number of tokens to the public good (like the fastest car on the highway). The Hired Gun fines this player just enough so that he or she would rather have been the second most selfish person: This player earns what the second most selfish person earns minus one token.

In our first study, people repeated the public goods game 10 times and then repeated it 10 more times with a Hired Gun. To prevent bias based on the reputation of the players involved, players decided how to allocate their tokens on a computer in anonymous, random groups that changed each round. As shown in Figure 1, players spent an average of only 1.3 tokens on the public good when there was no Hired Gun, but they raised their contributions to 4.5 tokens when there was a Hired Gun. This is a 68 percent increase in average earnings, as shown in Figure 2.

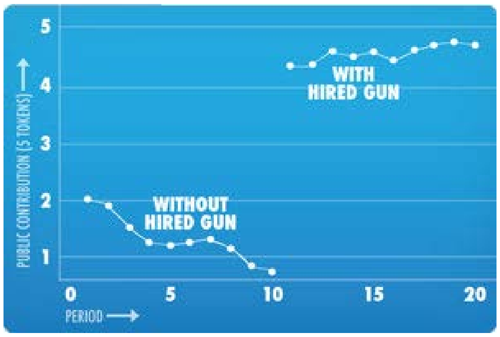

Figure 1: Average tokens contributed to the public good out of a possible five tokens. Periods 1 to 10 without a Hired Gun, periods 11–20 with a Hired Gun. (Click to enlarge.)

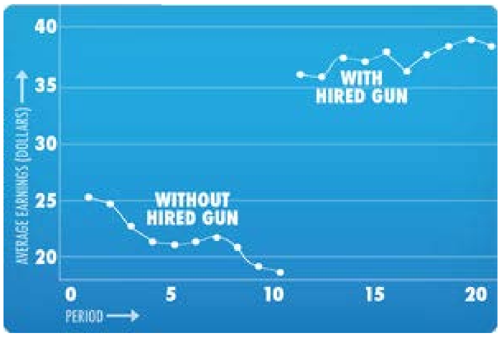

Figure 2: Average earnings per person per period. Periods 1–10 without a Hired Gun, periods 11–20 with a Hired Gun. (Click to enlarge.)

Clearly the Hired Gun had the desired effect of starting a race for second place. To understand if this was a superior mechanism to peer punishment, we ran a second study. Here we allowed players to pay a price to fine one another after they played the public goods game. This type of vigilante justice is akin to a tenant in an apartment complex penalizing a messy neighbor by complaining to the person directly.

After 10 periods of only peer punishment, some groups were given the chance to pay a fee to get a Hired Gun. The players paid for the Hired Gun more than 70 percent of the time and, as can be seen in Figures 3 and 4, it was well worth the cost.

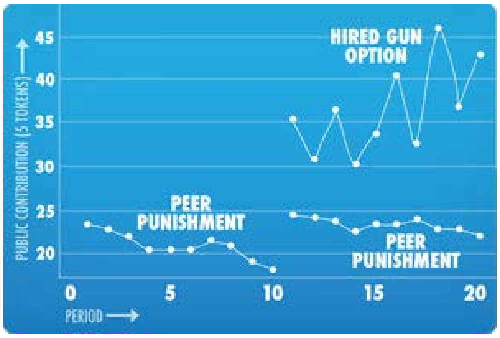

Figure 3: Average tokens contributed to the public good out of a possible five tokens. Periods 1 to 10 played with only peer punishment; periods 11–20 played with an option to get a Hired Gun as well as use peer punishment. (Click to enlarge.)

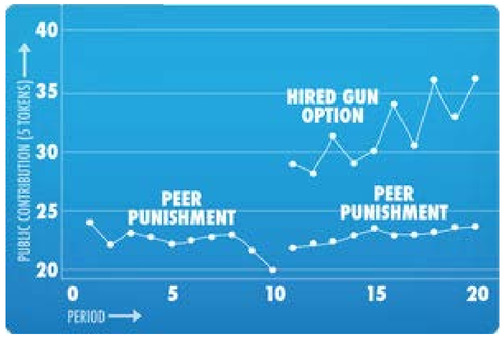

Figure 4: Average earnings per person out of a possible $41. Periods 1 to 10 played with only peer punishment; periods 11–20 played with an option to get a Hired Gun as well as use per punishment. (Click to enlarge.)

It is clear from Figure 3 that the option to have a Hired Gun causes people to give more to the public good. Figure 4 illustrates the huge increase in money earned.

When the Hired Gun option is available, people stop using peer punishment. Just as when a tenant directs complaints to the superintendent instead of complaining directly to a messy neighbor, when Hired Guns are available, people stop using vigilantism to enforce good behavior.

Conclusion

Our research shows that when things aren't working, people are clever enough to invent methods, like a Hired Gun, that help them achieve better outcomes. Direct punishment by peers is one option, but it only makes things worse. Instead, delegating punishment that creates a race for second place is far more effective and, moreover, pushes out vigilantism.

So, let the races begin!

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Economics IN ACTION
UC San Diego Department of Economics

Consistently Strong: Job Placement Remains Highly Successful

By Julie Cullen, Ph.D.

This year continued the recent pattern of an unusually large group of our graduate students on the job market. There were 17 candidates seeking positions as economists. After weathering a bumpy market, nearly all have found matches.

The friction in the market this year seemed to arise from nearly universal restrictions on institutions' ability to over-offer. This resulted in long delays between successful visits and offers, followed by offers with extremely short fuses. By the time institutions pursued and lost their first choices, they often found that their second and third choices were no longer available. This mismatching generated several disjointed market rounds, with yet another still ongoing. This year required reserves of patience and resourcefulness from the students and their advisers in the face of extended slow periods punctuated with spikes of activity. The good news is that all the hard work leading up to this phase — and during the market — paid off with another year of excellent outcomes.

One-third of the students chose academic positions at leading national or international institutions:

This set includes students from the entire array of fields. Game theorist Aislinn Bohren had broad success on the market and ultimately decided to join the faculty at the University of Pennsylvania. Newly engaged Leah Nelson and Aeimit Lakdawala landed positions at Michigan State University in their respective fields of development and macroeconomics. International economist Kristy Buzard found a great match with a position at Syracuse University. One of our two environmental economists Kevin Novan will be joining the agricultural and resource economics department at UC Davis. The other, Anthony Liu, will be moving to one of the premier business schools in China, Cheung Kong, while maintaining a position as a research fellow at Resources for the Future.

Two-thirds of the students will be starting their careers as researchers in first-rate government, nonprofit or private sector institutions:

Government opportunities in both the United States and abroad attracted several of our macroeconomists and international economists. Macroeconomists Ben Kay and Tom Daula will both be in D.C. at the Treasury's Office of Financial Research and the Federal Housing Finance Association respectively. Macroeconomist Soojin Jo is heading north to the Bank of Canada, while international economist Martin Tobal is heading south to join the regional association of central banks, Centro de Estudios Monetarios Latinoamericanos. Applied microeconomist Michael Futch will have an exciting year: He will be working on President Obama's campaign.

Several of our other applied microeconomics candidates were recruited to positions in nonprofit and private sector organizations with agendas that dovetail with their research interests. Ben Backes, a labor economist specializing in higher education, joined American Institutes for Research. Sam Dastrup, a real estate and urban economics expert, is joining Abt Associates. Innovation and technology expert Kirti Gupta will be in-house economist at Qualcomm Inc., while financial economist Shalini Nageswaran will be joining Analysis Group.

Congratulations to the graduate students and the faculty who supported them in these successful job market outcomes! Thank you for all the hard work that furthers the department's continuing reputation for producing top-notch economists.

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Economics IN ACTION
UC San Diego Department of Economics

Can Performance Pay for Teachers Improve Student Learning in India?

By Karthik Muralidharan, Ph.D.

Educating India's Children

With around 200 million children aged six to 14, which is nearly two-thirds the size of the entire United States population, India has the largest primary school system in the world. While India's primary-school enrollment rates have significantly improved — more than 95 percent of appropriately aged children are enrolled in school — the actual learning level of these students is still dismal. More than 60 percent of enrolled students do not even read at a second grade level (Pratham 2012).

Figuratively speaking, throwing money at the problem is a common response to low levels of education and learning in developing countries, and the government of India has substantially increased spending on primary education in the past decade. Unfortunately this increase did not translate into better-educated children. In some of my **previous collaborative research**, we show that a central challenge in translating increased spending into better-educated children is limited teacher motivation and accountability. On any given day, 25 percent of teachers in Indian public schools are absent and that *less than half* were actually teaching when observed during unannounced visits.

Motivating teachers is clearly a key education-policy imperative. Following the dissemination of the results on teacher absence, the education secretary of the Indian state of Andhra Pradesh (AP) struck out to implement a performance-based pay structure that would recognize and reward highly effective teachers. Evidence on the impact of this program was presented in a **recent paper** co-authored with Venkatesh Sundararaman of the World Bank.

Experimental Design and Research Questions

The pay-for-performance program is distinct because it was evaluated using a rigorous randomized evaluation. Schools were selected by lottery to participate in the program; schools selected for the program (treatment) and those not selected (control) are identical on average on all characteristics. This structure means that any difference in outcomes from these schools over time can be attributed to the pay-for-performance program. The experiment was carried out in a large representative sample of 300 rural public schools in AP. The 300 schools were divided evenly among a group teacher-incentive program, an individual teacher-incentive program, and a control group.

This experimental design allowed us to answer a comprehensive set of questions, including 1) Can performance pay for teachers based on students' test scores improve student achievement? 2) What, if any, are the negative consequences of teacher incentives based on student test scores? 3) How do school-level group incentives compare with teacher-level individual incentives? 4) How does teacher behavior change in response to performance pay? and 5) How cost effective are teacher incentives relative to other uses for the same money?

Results

Pay-for-performance creates better-educated students who out performed students in control schools in all five grades, all districts and all levels of test question difficulty.

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Our main finding was that the teacher pay-for-performance program was quite effective in improving student learning. At the end of two years of the program, students who attended the incentive schools performed significantly better than those in control schools by 0.27 and 0.17 standard deviations in math and language tests respectively (these correspond to improvements of 11 and 7 percentile points for a median student in math and language). We also found that the gains are very broad based, with students in incentive schools out-scoring the students in control schools in all five grades, all districts and all levels of test question difficulty.

There are no adverse consequences as a result of the pay-for-performance programs and no evidence of teachers trying to game the system.

We found no evidence of any adverse consequences resulting from incentive programs. In fact, incentive schools did significantly better on mechanical components of the test that were designed to reflect rote learning, and conceptual components of the test that were designed to capture deeper understanding of the material. This suggests that the gains in test scores represent an actual increase in learning outcomes as opposed to merely reflecting teaching to the test. A positive spillover effect was also suggested because students in incentive schools did significantly better not only in math and language, for which there were incentives, but also in science and social studies, where there were no incentives. We also found no evidence of any adverse gaming of the incentive program by teachers.

Teachers start teaching with financial incentives.

We found that school-level group incentives and teacher-level individual incentives performed equally well in the first year, but the individual-incentive schools outperformed the group-incentive schools after two years of the program. We measure changes in teacher behavior in response to the program with teacher interviews as well as direct physical observation of teacher activity. Our results suggest that the main impact of the incentive program was not increased teacher attendance but greater (and more effective) teaching effort conditional on showing up for work.

Performance-based bonuses effectively increase test scores and are more cost effective when compared to similar amounts of spending on education without performance conditions.

We found that performance-based bonus payments to teachers were a significantly more cost effective way of increasing student test scores compared to spending a similar amount of money unconditionally on additional schooling inputs. For example, in a parallel set of studies, two other sets of 100 randomly chosen schools were provided with an extra teacher as well as a cash grant for school materials. We find that while students in these schools also did better, the students in the schools with the teacher-incentive programs did markedly better than those in input schools (with the incentive program being three times more cost effective).

Policy Impact

This work — along with the experimental evaluations of other interventions to improve education outcomes in the same setting — has had considerable impact on policy over the past couple of years. The results have been featured in op-ed columns in **leading newspapers in India** and international news magazines such as ***The Economist***. The **World Bank has written policy notes** for governments on the basis of this work. I have given several presentations to senior policymakers in the government of India and senior staff at international agencies like the World Bank and the British aid agency (DFID), as well as **public lectures in India** and the **United States**. We also made a **documentary that interviewed teachers about the program** to showcase their experiences with it. Overall, this research is seen as both academically rigorous as well as relevant to policy in developing countries, which is a feature I try to maintain in most of my ongoing research.

Karthik Muralidharan is an assistant professor of economics at the UC San Diego, where he has been on the faculty since 2008. Born and raised in India, he earned an A.B. in economics (summa cum laude) from Harvard University, an M.Phil. in economics from Cambridge University and a Ph.D. in economics from Harvard. He is a faculty research fellow at the ***National Bureau of Economic Research (NBER)****, a junior affiliate at the* ***Bureau for Research and Economic Analysis of Development (BREAD)****, a member of the* ***Jameel Poverty Action Lab (J-PAL)*** *network, an affiliate at the* ***Center of Evaluation for Global Action (CEGA)****, and a research affiliate with Innovations for Poverty Action .*

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Economics IN ACTION
UC San Diego Department of Economics

UC San Diego's Department of Economics The Latter Years: The 1980s to Present Day

By Ross Starr, Ph.D.

Part I, "**The Early Years: The 1960s and 1970s**," was published in the October 2010 issue of *Economics in Action*.

Now in its 51st year, UC San Diego and the Department of Economics in particular has grown from a small institution to one known internationally for its academic research. The year 1980 brought significant transformation to the Department of Economics faculty. The theory faculty was bolstered by the appointments of Mark Machina and Ross Starr, and Hal White's grant of tenure solidified the robust econometrics group.

The distinctive event of 1980, however, was moving house. Since the founding of the department, the economics faculty had been housed at Revelle College amid distinctive architecture, a striking quadrangle, a gracious lawn and our own piece of the Stuart Art Collection, the *La Jolla Project* (a.k.a UC San Diego's *Stonehenge*). Despite the faculty's vigorous objections, the department moved to its current quarters in what is quaintly called the Motel 6 building. Its saving grace is the hint of an ocean view, and more important, the ability to expand and strengthen our faculty. Much of our growth would occur over the next three decades. The period from 1980 to 2011 is characterized by several major trends: continued strength and growth of the faculty in its traditional areas of econometrics and economic theory, establishment of distinctive areas of concentration in applied economics and economic policy and a generation of success and prominence for UC San Diego graduates, at both the bachelor's and doctoral levels.

Economics Outreach

Starting in the 1990s, the Department of Economics began to relate more actively to alumni and the San Diego community. The semiannual publication *Economics in Action* was initiated with profiles of faculty and articles on current issues. It has now, like many publications, gone fully electronic. The UC San Diego Economics Roundtable started up, with quarterly meetings featuring guest speakers. They form a colorful collection: Some speakers, like Ben Bernanke, became famous; others, such as William Lerach, became notorious.

UC San Diego Economics in the World and in Policy

UC San Diego's Department of Economics isn't just in San Diego, and it isn't in an ivory tower. There has been an active flow of our faculty to China: Roger Gordon, Mark Machina, Ross Starr and Michelle White have taught at RenDa (People's University of China) in Beijing. A few time zones away, Richard Carson was in charge of the government's economic damage assessment for the Exxon Valdez oil spill that resulted in the largest settlement at the time for harm to the environment. In the late 1990s, he helped oversee the technical negotiations between Israelis and Palestinians over water issues when he was research director for International Environmental Policy at the University of California's Institute on Global Conflict and Cooperation.

In 2011, after a decade of research, Karthik Muralidharan conducted and participated in many high-level meetings with several agencies within the government of India, focusing on education policy. Karthik also gave briefings to the U.S. Congress' Caucus on Foreign Aid Effectiveness and to the British Department for International Development (DFID).

Closer to home, Julian Betts founded the San Diego Education Research Alliance (SanDERA) at UC San Diego in May 2010. Over the past dozen years, SanDERA has evaluated and influenced a number of

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educational reforms in San Diego, from literacy reforms to charter schools, as well as the impact of California's High School Exit Exam. Betts is currently the principal investigator of the National Evaluation of Magnet Schools for the U.S. Department of Education.

On a cultural note, our own country western duo of professional guitarists emerged in the 1990s: James Hamilton and Garey Ramey, better known as The Country Doctors.

Econometrics at UC San Diego

By 1980, the core of faculty concentration in time-series econometrics – Clive Granger, Rob Engle and Hal White – was in place. It was supported in part by the Project for Econometric Analysis, with significant funding. That strength was augmented by a succession of additional appointments. David Hendry – now Sir David – from Oxford University joined the faculty in 1990. James Hamilton, author of the leading textbook in time-series econometrics, joined in 1992. Graham Elliott joined in 1994. Yixiao Sun joined in 2002, Ivana Komunjer in 2005, Andres Santos in 2007, Brendan Beare in 2008 and Patrik Guggenberger in 2009.

Granger published the concept of cointegration (underlying coherent structure of economic data accruing over time) in 1981. The 1980s started a cascade of studies by Engle, along with his students and colleagues, of models emphasizing the time-varying error structure of statistical models, summarized as ARCH (autoregressive conditional heteroskedasticity). UC San Diego doctoral students of econometrics in that era have progressed to leadership positions both in academia and in the private sector.

The climactic event for UC San Diego econometrics – and the department – occurred in the fall of 2003 when Clive Granger and Robert Engle won the Nobel Memorial Prize in Economic Sciences. Unparalleled pride and joy broke out and carried on for weeks. This joint award was a homegrown prize, reflecting decades of work at here at UC San Diego. Granger had been on the faculty for 30 years, and at the time of the award, he was retired as professor emeritus, spending long vacations in New Zealand, where he received the news. Engle was an active faculty member for 25 years, and at the time of the award was a professor emeritus and a New York University faculty member, spending long vacations in France, where he received the news. The summary of the award stated "The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2003 was divided equally between Robert F. Engle III '*for methods of analyzing economic time series with time-varying volatility (ARCH)*' and Clive W. J. Granger '*for methods of analyzing economic time series with common trends (cointegration).*'" An additional benefit of the prize was that Granger, still a British subject, was knighted by Queen Elizabeth in an elaborate ceremony. He became Sir Clive, a title he never used in San Diego.

The Nobel Prize was celebrated on many occasions, hosted by UC San Diego Chancellor Marye Anne Fox, where Granger spoke publicly. In a more personal conversation at one of these events, Granger mentioned to Chancellor Fox that Nobel laureates at Berkeley are accorded reserved parking spaces. She took the hint and Granger enjoyed a reserved parking space near the Economics Building throughout the rest of his time at UC San Diego.

There was a grand reunion of Engle's students and colleagues in San Diego in June of 2008, launching a Festschrift (birthday celebration volume of essays) in his honor. Students and colleagues traveled from all over the globe to celebrate and reminisce. Spirited conversations following the conference dinner lingered into the wee hours the following morning. In 2011 the department hosted another grand reunion celebrating the lifetime achievements of Hal White. The Festschrift for White was a smashing success with two days of conference proceedings that were capped by White himself leading big-band music with his trumpet during the closing banquet.

Economic Theory at UC San Diego

By 1980 the core of UC San Diego's economic theory faculty was in place: John Conlisk, Vincent Crawford, Theodore Groves, Walter P. Heller, Mark Machina, Joel Sobel and Ross Starr. That group covered game theory, price theory, growth theory, general equilibrium theory, uncertainty and public economics. The year 1983 provided a unique opportunity for deepening the theory faculty: The Department of Mathematics hired Linda Rothschild from the University of Wisconsin, and the Department of Economics was glad to cooperate by hiring her husband, Michael Rothschild. Michael was already a prominent economic theorist, and in a few years he became dean of Social Sciences at UC San Diego. The theory faculty was augmented by appointments of Maxwell Stinchcombe in 1986, Joel Watson in 1994, Navin Kartik and David Miller in 2004, James Andreoni in 2005, Nageeb Ali in 2007 and Christopher Chambers in 2010. Following trends in the field, these faculty increased coverage in decision theory, game theory, industrial organization, experimental and behavioral economics.

Applied Economics at UC San Diego

By the mid-1980s the faculty recognized that it was applied economics’ turn for attention. In 1980 the principal applied economists on the faculty were Dennis Smallwood, medical economics and industrial organization/law; Luis Guasch, economic development and industrial organization; Jeffrey Hammer, economic development; and David Lilien, macroeconomics. New appointments throughout the 1980s included Robyn Phillips, urban economics; Graciela Kaminsky, international finance; Richard Carson, environmental economics; James Rauch, international trade and economic development; Garey and Valerie Ramey, macroeconomics; Alfredo Pereira, public finance and computational modeling; and Andrew Levin, macroeconomics. The capstone of this effort was the 1990 appointment of George Borjas, one of the world’s leaders in the labor economics of immigration.

By the early 1990s, to general astonishment, it was possible to convene and populate a weekly seminar in applied economics at UC San Diego. Most students of economics are not primarily interested in pure theory or pure econometrics; strengthening applied economics at UC San Diego provided a productive balance. The interaction of a strong econometrics faculty with a broad and talented applied faculty is a fertile mix. UC San Diego graduate students in applied studies have at their disposal the most advanced statistical techniques available. The applied faculty now includes Kate Antonovics, labor economics; Eli Berman, labor economics and insurgency; Julian Betts, economics of education; Prashant Bharadwaj, fertility and labor; Julie Cullen, economics of education; Gordon Dahl, labor economics; Melissa Famulari, labor and medical economics; Marjorie Flavin (the first tenured female economist at UC San Diego), applied macroeconomics; Silke Forbes, industrial organization; Roger Gordon, public finance; Gordon Hanson, international economics; Mark Jacobsen, environmental economics; Marc Muendler, international trade and finance; Karthik Muralidharan, economic development; Paul Niehaus, economic development; Irina Telyukova, computational macroeconomics; and Michelle White, law and economics.

The Institute for Applied Economics creates and maintains research infrastructure for applied economic research at UC San Diego. The Center for Environmental Economics promotes research in environmental economics and provides a community for scholars – faculty, graduate students and others – interested in various topics on environmental economics.

Undergraduate Economics at UC San Diego

In the 1980s, the Department of Economics offered two undergraduate majors: management science and economics. There was significant overlap in coverage: management science emphasized microeconomics – firms and markets – and quantitative methods, including programming; economics included macroeconomics.

The majors were popular. Courses were often over-enrolled, putting a strain on teaching resources. Following the example of other UC campuses in the late 1980s and early 1990s, UC San Diego tried to control economics enrollment with separate admission requirements to the majors and renaming management science as the less-attractive quantitative economics and decision sciences (QEDS). The attempt to limit enrollments proved daunting (it annoyed undergraduate students and required considerable faculty and staff effort) and unpredictable (enrollments fell far more than planned). The plan to limit enrollments was abandoned and management science got its name back.

Modern economics is distinctly mathematical. In the late 1990s, UC San Diego introduced the joint major in mathematics and economics, a cooperative effort between the Departments of Economics and Mathematics. This major is excellent preparation for graduate study in economics and for professional degree programs such as an M.B.A.

By the early 21st century, the scale of the economics undergraduate programs had grown massively. Several sections of undergraduate core courses – each with hundreds of students enrolled – with several different instructors were offered each quarter. That meant there was room for immense variety in the course content. A little variety is good; a lot becomes unpredictable. In middecade, under the direction of Melissa Famulari, vice chair of undergraduate studies, the department undertook a systematic reformulation of the majors. The aim, successfully achieved, was to bring the majors up to date and to standardize the core courses so that they could be relied on as prerequisites. The department is justifiably proud of three undergraduate majors that provide an excellent coherent presentation of modern economics.

The majors provide a sound education in modern economics and management science, including its quantitative methods, for hundreds of graduating seniors each year. For the most ambitious undergraduate students, there are opportunities go more deeply into the field. The core upper division microeconomics and macroeconomics courses (Econ 100ABC, Econ 110AB) offer honors sections where extra time and work is spent on advanced topics. The senior honors essay course (Econ 191AB) provides a two-quarter exercise in independent research for qualifying students. In 2010–11, 755 bachelor’s degrees in economics were earned by UC San Diego seniors, representing more than 12 percent of UC San Diego’s graduates.

Baccalaureates Pursuing Further Study

With several hundred graduating seniors annually – and many foreign exchange students – it's not really possible to keep track of all of them, but we're delighted with the progress of those who kept in touch, especially those who go on to advanced degrees in economics.

Graduate Study at UC San Diego

Since the inception of the Department of Economics in the 1960s, there has been an emphasis on graduate students pursuing doctoral degrees. UC San Diego economics graduates are now faculty members at colleges and universities in the United States, China, South Korea, Japan and Europe. They are in Federal Reserve Bank research departments, investment banks, commercial banks and consulting firms. Their specialties are diverse: econometrics, finance, international trade, education, behavioral economics, labor economics, industrial organization and public finance. There are roughly 100 graduate students in residence and more than a dozen graduate with a Ph.D. each year. While on campus they fulfill significant research and teaching functions as teaching assistants, helping to teach undergraduate and graduate courses and grading exercises and examinations, and research assistants, helping with faculty research while pursuing their own. According to the most recent *U.S. News & World Report* rankings of graduate programs in 2009, the UC San Diego Department of Economics is ranked as the 14th best Ph.D. program in the United States and ranked 6th in the nation for econometrics. That ranking puts UC San Diego on a par with our sister campus UCLA – 45 years older than UC San Diego – and in the same league with such economics powerhouses as the University of Wisconsin, Brown University, and Cornell University.

Women in Economics

The proportion of women on the faculty and in graduate study has grown substantially – a more precise mathematician might say that it (the proportion) has grown infinitely. Judith Mann was a valued member of the faculty in the 1970s but by 1980 there were no women on the UC San Diego economics faculty and none in doctoral study. By 2011 that situation had changed dramatically, highlighted by Valerie Ramey becoming the first female chair of the department. Approximately one quarter of the graduate students and faculty are women, and a majority of our female faculty members are tenured.

Into the 21st Century

Over the previous three decades, 65 faculty members have joined the Department of Economics, and 40 have left. Because of the nature of this highly competitive field, many have departed for promising opportunities elsewhere. Others have retired but remain active in their specialty as emeritus faculty. We mourn the deaths of some of our founders: Clive Granger, Walter P. Heller, John Hooper, Dennis Smallwood and Hal White. But the focus of the 1970s lives on: excellence and econometrics with room for excellence in the other areas of economic research. Growth has brought breadth as well.

That's the story so far: from nowhere in 1965 to a contender in 2012, barely middle-aged. For more details on our graduate and undergraduate program, as well as faculty research and teaching, visit the UC San Diego Department of Economics **website**.

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