NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

Reporter OnLine at: www.nber.org/reporter

2011 Number 1

IN THIS ISSUE

Program Report

Economics of Education

Caroline M. Hoxby*

The Economics of Education Program is both exciting and productive, currently adding new Working Papers at the rate of 7.5 per month — a 50 percent increase from the rate at the time of my last program report in fall 2006. The number of papers submitted for a typical Program Meeting is often ten times the number of available slots, and attendance at those meetings is high.

I am particularly proud of three aspects of the Program. The first is the quality of the research being produced and the methods used by members, including some of the latest, most rigorous methods in applied microeconometrics. The second is the fact that members use some of the richest, most comprehensive datasets in economics — many of these datasets were initially compiled by schools or school-related organizations, and program members deserve enormous credit for their resourcefulness in making them useful for economic research by establishing strong, collegial relationships with data providers, convincing schools to conduct randomized and other policy experiments, matching data from diverse sources, and themselves surveying or testing people when data otherwise would be missing. Third, program members produce research that is policy relevant, credible to policymakers, and grounded in economic logic.

The NBER's Higher Education Working Group was integrated into the Economics of Education Program in 2009. We made the integration an occasion to celebrate the leadership of Charles T. Clotfelter, director of that working group, who oversaw an immense improvement in the quality of research on the economics of higher education. Although the practical policy questions differ across the two levels of education, all of the methods, much of the data, and much of the deep economic logic are shared.

*Hoxby is the Director of the NBER's Program on Economics of Education and the Scott and Donya Bommer Professor of Economics at Stanford University. *The numbers in parends throughout this report refer to NBER Working Papers. A complete list of NBER Education Working Papers can be found at: www.nber.org/papersbyprog/ED.html*

NBER Reporter

Areas of Continuing Interest and New Interest

In my last review, I focused on three areas in which research was advancing particularly rapidly: the analysis of peer effects; the estimation of teachers' effects on achievement; and making sense of students' college choices (not just whether to attend college in the first place, but which schools to attend and whether to persist at each school). These three areas continue to be highly productive. For instance, Elias Bruegmann and C. Kirabo Jackson (15202) demonstrate that, when a teacher whose own effect on achievement is strongly positive moves into a new school, her new colleagues improve. They further show that the colleagues' improved ability to raise achievement is attributable to their *changing*, not merely to selection. That is, incumbent teachers in the new school raise their performance. For another example, we now have substantial evidence on what happens to a student who goes to a school where other students are high-achieving: his own achievement rises. This evidence relies on regression discontinuity methods, that is, on comparing the later achievement of students who are just above and just below some admissions threshold, where the threshold is not known to students when they apply. Christian Pop-Eleches and Miguel Urquiola (16886) study this situation in Romania; Damon Clark ("Elite Schools and Academic Performance", presented at the spring 2007 Program Meeting) studies this situation in England; and C. Kirabo Jackson (16598) studies this situation in Trinidad and Tobago. Turning to college-going behavior, some of the most interesting new research provides rigorous evidence on how students respond to scholarships and other financial aid designed to improve their college outcomes. Aimee Chin and Chinhui Juhn (15932) show that allowing undocumented students to pay in-state tuition (usually just one-third to one-half of out-of-state tuition) has no statistically significant effect on their college attendance. Stephens Desjardins and Brian McCall ("The Impact of the Gates Millenium Scholars Program", presented at the spring 2008 Program Meeting) show that Gates Scholarships very modestly improved persistence among the low-income minority students eligible for them.

Since my last report, several new themes also have emerged in Economics of Education research. Two notable ones are the importance of information and the role of incentives for stu-

dents, teachers, and schools. Because any program review is necessarily selective, I focus here mainly on illustrating these new themes.

The Importance of Information

Much of the existing research on education concerns the change in some concrete resource: a salary increase for teachers; a reduction in class size; a scholarship or other financial aid for students; the extension of compulsory schooling; or the opening of a program. Although such resource changes often can be shown to change educational outcomes, their effects typically are much smaller than proponents believed they would be. Also, two students with similar prior achievement often react to resources in very different ways. For instance, although making financial aid more generous causes some students to attend college or to persist longer in college, a good share of students do not respond. Frustratingly for researchers, the students who do not respond often look very similar to the students who do. (On this point, see for instance the Desjardins and McCall paper mentioned above.) Put another way, researchers have been unable to show that policymakers could control and improve most people's educational outcomes simply by controlling policies that are concerned with educational resources.

Responding to the weak explanatory power of resource-type policies, researchers increasingly have wondered whether differences in students' and families' information can account for variation in educational outcomes. Recent findings from behavioral economics, which often show that apparently small differences in the content or framing of information can have large effects, have only intensified education researchers' focus on information. There are practical reasons to focus on information as well: information interventions tend to be very inexpensive compared to resource-type interventions (so that even modest benefits may outweigh costs) and often have positive spillovers (useful information given to one person tends to spread to other people).

Eric Bettinger, Bridget Long, Philip Oreopoulos, and Lisa Sanbonmatsu (15361) designed an experiment in coordination with the tax preparer H&R Block. Some families with college-aged children were randomly assigned to be given information on their child's eligibility for government-based financial aid and on local college-going options. Some families also were randomly assigned to receive help in filing the federal application for financial aid ("FAFSA"). The results, which are highly credible owing to the randomized design, suggest that the intervention that combined information and FAFSA help actually caused people to be 25 to 30 percent more likely to enroll in college. These effects are dramatic in size for such a modest intervention — one that, if implemented routinely, would cost only a few dollars per family.

Todd Stinebrickner and Ralph Stinebrickner (14810) investigate whether students learn about their academic ability in college and make decisions about persisting in a logical way, based on that information. To study this question, they combine rich administrative data from Berea College with data from surveys they conducted themselves. Thus, they are able to observe not just students' academic behavior, such as their course-taking patterns and the grades they earn, but also students' beliefs about their academic aptitude and expectations about college completion. The authors show that students enter college with beliefs about their academic ability that are both optimistic and diffuse. Moreover, the students update their beliefs in the manner predicted by the Bayesian learning model. Students' learning about their own aptitude explains much of their decision to drop out of college.

Amanda Pallais ("Why Not Apply?" presented at the spring 2008 Program Meeting) shows that an apparently tiny change in ACT policy produced a 20 percent increase in students' applications to colleges. The change was that ACT, one of the two college aptitude testing organization in the United States, gave students four free score reports instead of three. Because an additional score report cost only $6 before and after the policy change, the intervention was negligible when viewed against the background of family income or the potential returns to college attendance. Yet, the policy change caused about 40 percent of students to send their scores to an additional school. This generated some additional information for students because, when a student who is a plausible applicant sends his scores to a school, that school responds with brochures and other materials describing its offerings. It is striking that such a modest change in information produced such sizable effects on behavior.

Avery and Turner ("Playing the College Application Game", presented at the fall 2009 Program Meeting) and Avery and Hoxby ("The Missing One-Offs", presented at the 2010 Summer Institute) demonstrate that low-income students apply to fewer and less selective colleges than their more affluent counterparts who have the same test scores and achievement in high school. This fact holds even for low-income students whose achievement is so high that they qualify for free tuition and living expenses at the most selective colleges in the United States. The authors of these papers assemble an array of evidence that indicates that low-income students lack information about college-going. While it is hard to argue that these students do not have access to materials (since most colleges' materials are readily available online), they have few contacts with *people* who attended selective colleges. They are frequently too isolated geographically to find a critical mass of college-going peers or advisors. In fact, the latter paper shows that it would not even make sense for selective colleges' staff to visit the schools or cities of most low-income, high-achieving students: they are simply too isolated for the benefits of such visits to outweigh the costs. The bottom line is that information interventions might be warranted, but they may prove hard to design — see Avery (16359).

Informational differences among students are also important in primary and secondary education. Parag Pathak and Tayfun Sönmez (16783; also "Leveling the Playing Field," 2008 Summer Institute) show that school choice mechanisms that are susceptible to strategic manipulation tend to generate better outcomes for

families who are more informed. That is, although all students have the same opportunities under these mechanisms, students who understand how the mechanisms work and which schools are in demand end up enrolling in schools that are higher in their preference rankings. These better informed students disproportionately have parents who are affluent and educated. Thus, superior information is one reason why students' outcomes are correlated with their family's socioeconomic circumstances.

Abigail Wozniak and Ofer Malamud (16463) explore another reason why students from more educated families have better outcomes. They investigate the long-standing hypothesis that more educated people respond more elastically to changes in opportunities. (Theodore W. Schultz often is credited with originating this idea. See Bowman, 1980, cited in endnote.) Specifically, Wozniak and Malamud investigate people who were induced to attend college because they had a higher risk of being drafted for the Vietnam War. They use draft induction risk as an instrument for attending and graduating from college, and they show that college education makes a person more likely to subsequently choose his labor market experience based on expected earnings, as opposed to the market's mere proximity to his place of origin.

School report cards — simple reports that describe students' achievement in absolute terms and relative to other local schools — are very inexpensive to provide. Asim Khwaja, Tahir Andrabi, and Jishnu Das ("Report Cards," spring 2009 Program Meeting) arranged to provide reports in 112 randomly selected educational markets in Pakistan. The intervention was purely informational: no explicit rewards or punishments were included. The authors find that the report cards improved learning by 0.10 standard deviations and increased enrollment slightly. Private schools that were initially bad — those with below median scores at baseline — improved especially strongly: learning gains were 0.34 standard deviations. Private schools that were initially good did not improve learning but did cut their fees. Government schools were somewhat less responsive than private schools. The authors interpret these results as showing that report cards generate competitive pressure on schools to increase price-adjusted quality.

Jonah Rockoff, Douglas Staiger, Thomas Kane, and Eric Taylor (16240) study another informational intervention that appears small yet had big effects. They evaluate the effect of a program in which New York City school principals were provided with estimates of how much each of their teachers had raised students' test scores. Principals were randomly assigned to this program, so the study's findings are highly credible. The authors show that principals update their beliefs about teachers' effects in accordance with the Bayesian learning model: for instance, principals update their beliefs more when the estimates provided to them are more precise and their own prior opinions are less precise. More importantly, principals are likelier to retain their effective teachers (and not retain their ineffective ones) when they are provided with the estimated teacher effects. The change in the sensitivity of retention to performance improves student achievement by a statistically significant though small amount. Here, it is worthwhile to remember the cost-benefit ratios typical of information interventions: although the change in achievement is small, the cost of the intervention is very small on an ongoing basis.

Finally, Eric Taylor and John Tyler (16877) examine a highly reputed teacher evaluation system and find that it improves teachers' performance, as measured by their effects on student achievement. While the cost-benefit ratio of the program they study is not as impressive as the results of the information program in New York City (16240), the improvement that Taylor and Tyler see is entirely *within* teacher. As a rule, it has been hard for researchers to produce credible evidence that teachers improve simply through being evaluated and then informed about how to improve their instruction. Even if such evaluation systems are an expensive means of improving achievement relative to some of the informational interventions described above, they remain inexpensive relative to most resource-type interventions.

Incentives for Students, Teachers, and Schools

Even though improving incentives is often more expensive than improving information, incentive-type interventions are often much less expensive than resource-type interventions, especially when their relative efficacy is taken into account. This is shown by an array of recent research done by program members.

Joshua Angrist, Daniel Lang, and Philip Oreopoulos (12790) and Joshua Angrist, Philip Oreopoulos, and Tyler Williams (16643) explore incentives for students to improve their grades in a Canadian university. In the former paper, they study students who are randomly assigned to receive a merit scholarship if they maintain solid grades. In the second paper, they study students who are randomly assigned to receive cash for better grades: $100 for each grade of 70 or better and an additional $20 for each percentage point above 70 percent. They find that the merit scholarship improved the grades and persistence of female students, though not of males. Interestingly, they also find that the availability of the merit scholarship caused female students to seek out more help with their courses: they were more likely to take advantage of supplemental instructional services. In the latter paper, the authors find that the cash rewards improved males' achievement, though not females! The effects on males are modest overall, but larger for males who understood the function linking performance to rewards.

Judith Scott-Clayton ("On Money and Motivation", fall 2008 program meeting) studies a West Virginia incentive scheme for college students. The program offered free tuition to students who maintained a certain minimum course load and minimum GPA (2.75 in the freshmen year, 3.0 thereafter). Since students were not randomly assigned to the program, Scott-Clayton exploits differences in the timing of implementation and discontinuities in the eligibility formula to generate credible estimates. Not only does she find substantial effects on achievement, she also finds that the effects are

highly concentrated around the thresholds for annual scholarship renewal, indicating that the program's effects come via the incentives it provides, not simply via relaxing financial constraints.

C. Kirabo Jackson (15722) studies incentives for students and teachers based on Advanced Placement (AP) scores. The program he analyzes ("APIP") pays high school students and their teachers between $100 and $500 per score of three or above on an AP exam. To give a sense of magnitude of rewards that a person could earn, the maximum that a teacher has ever earned in one year is $11,500, and the maximum that a student has ever earned in high school is $1,400. Because the program is not randomly assigned to schools, Jackson has to use a detrended difference-in-differences strategy: essentially, the achievement trends of schools that adopted the program earlier are compared to the achievement trends of schools that adopted it later. Because the program's sponsors were not able to roll out the program in a single year to every school interested in adoption, the late adopters are fairly idiosyncratically selected from among schools who applied. Thus, the results are quite credible. Jackson finds that students who participate in the program are more likely to attend college and persist in college beyond their freshman year. In addition, Black and Hispanic students are more likely to graduate from college.

Eric Bettinger (16333) examines cash incentives for students funded by a philanthropist in Coshocton, a poor city in the Appalachian area of Ohio. Schools and grades in the city were randomly assigned to have their students get rewards of up $75 per year for "proficient" scores and $100 per year for "advanced" scores on Ohio's statewide exams. Bettinger finds that the incentives improve math scores by 0.15 standard deviations but he does not find similar effects on other subject exams. The Coshocton program was highly beneficial relative to its costs: the program costs were only fifteen hundredths of 1 percent (0.15 percent) of the district's per-pupil expenditures. The effects of this inexpensive program on achievement were 250 times what we would predict if the district had spent the same amount on class size reduction. (The class size comparison is based on Project Star, which generates some of the highest credibly estimated effects of class size reduction.)

Karthik Muralidharan and Venkatesh Sundararaman (15323) investigate performance pay for teachers, using a program in India that they themselves largely designed. Hundreds of schools were randomly assigned to have their teachers receive higher pay for higher students' scores. Hundreds of schools were assigned to an alternative treatment that gave them additional resources equal to the value of the performance pay. Muralidharan and Sundararaman find that students in incentive schools improved their performance by 0.28 and 0.16 standard deviations in math and language tests, relative to control scores. Students scored significantly higher on "conceptual" as well as "mechanical" components of the tests and also performed better on subjects for which no incentives were given. These results suggest that the students' gains in achievement were authentic, not mere "teaching to the test." The gains in schools that simply received the extra resources were one-third to one-half as large as the incentive-driven gains.

Several authors have examined what happens when *schools* face incentives. For instance, Jonah Rockoff and Lesley Turner (14564) and Hanley Chiang ("Accountability Pressure on Failing Schools," fall 2008 Program Meeting) use regression discontinuity methods to show that schools that "just fail" according to their state's accountability program raise their students' achievement more than schools that "just pass." In these two studies, failing schools faced several possible consequences: students could transfer out, principals could lose their jobs, and schools could be closed completely (though this was rare). Since the passing thresholds were unknown to schools in advance, the regression discontinuity designs produce convincing results.

A very different source of school incentives — competitive pressures generated by private school vouchers — is analyzed by David Figlio and Cassandra Hart (16056) and by Winnie Chan and Robert McMillan ("School Choice and Public School Performance, fall 2009 program meeting). Although the authors investigate programs in different locations — Figlio and Hart analyze a Florida corporate tax credit program and Chan and McMillan analyze a tax credit program in Ontario — both teams of authors exploit variation in pressure on public schools that arises through pre-existing differences in the local availability of private schools. Both teams find that public schools respond to the potential loss of students to private schools by raising their students' achievement. Neither team of authors finds evidence that differential student sorting (poor students disproportionately leaving the public schools) accounts for the improvement.

Summing Up

New themes emerge in research because researchers find themselves convinced by previous studies that some questions remain answered, thereby exposing other questions as likely to be important. Thus, I think that it is a measure of the success of the NBER's Economics of Education Program that, although some recent research extends and elaborates themes I identified previously, I did not predict the themes of much recent research in my previous program review. In particular, it is encouraging that so much current research focuses on issues like information and incentives that economists have long regarded as important. That information and incentive-type interventions also tend to have propitious cost-benefit ratios is a bonus. Finally, it is important that NBER researchers continue to pioneer rigorous methodological designs and create good data that allow them to analyze such interventions.

M.J. Bowman, "Theodore W. Schultz's Contributions to Economics," The Scandinavian Journal of Economics, *Vol. 82, No. 1 (1980), pp. 80–107*

Urban Growth and Climate Change

Matthew E. Kahn*

My recent research focuses on the implications of urban economic growth for greenhouse gas production. I also examine how the quality of life in different cities around the world may be affected by climate change.

Low Carbon Cities

Edward L. Glaeser and I ranked U.S cities with respect to their household greenhouse gas emissions.[1] Using micro data on household consumption of transportation, electricity, and home heating, we document significant differences across major cities. For example, if the average household chose to live in Houston versus San Francisco, it would produce roughly 16 more tons of carbon dioxide each year. San Francisco is ranked as a "greener" city because of its temperate climate, which means that households there use less electricity, the region relies more on natural gas rather than coal for power generation, and this lowers the electric utility's emissions factor. San Francisco is also more compact than Houston, with more of the metropolitan area's total employment located downtown. The suburbanization of employment has contributed to a rising carbon footprint. When people work in the suburbs, they are likely to live in the suburbs, and to live in a larger home and rely on a private vehicle for transportation.[2] Policies such as declining center city crime and improved urban public schools help to shrink a city's carbon footprint because they encourage densification and living closer to the city center.[3]

Today, households who live in Daqing — China's "brownest city" — produce only one fifth of the emissions of households who live in San Diego, the U.S.'s "greenest city". Building on my U.S research, I recently ranked the household carbon footprint for 74 Chinese cities using high quality data from the 2006 Chinese Urban Household Survey.[4] In the case of China, the dirtiest cities are to the North where coal is used for winter heating. These results are significant because Chinese regional economic development policy is encouraging growth in the Northern region to deflect growth away from the mega cities along the eastern coast. If Northern China's cities continue to rely on coal for heat rather than substituting to natural gas, then this spatial trend could have significant aggregate carbon implications.

Durable Capital

Over time, new versions of products such as the Toyota Prius or Tesla electric car or Zero Net Energy homes will have much smaller carbon footprints than earlier makes of cars and homes. Such "green" products often represent a tiny share of the existing capital stock because cars and buildings are long lived capital. This means that it can take decades for average energy efficiency of homes or vehicles to improve.

I examine the consequences of durable capital for the greenhouse gas mitigation progress in one study with Lucas Davis. We collected detailed vehicle-level information on the scale and composition of used vehicles exported by the United States to Mexico under NAFTA.[5] As it turns out, NAFTA can be viewed as an early "cash for clunkers" program. While it provided cash for U.S households, this type of trade can have detrimental environmental consequences. Even though Mexican households drive fewer miles per year than U. S. households, the exported vehicles would have been scrapped had they remained in the United States. Our best estimate is that U.S vehicles that are imported into Mexico, and are 10 to 15 years old at the time, live on for another ten years. Thus free trade in used durables between richer and poorer nations slows down the overall vehicle scrappage rate.

In the case of residential homes, energy consumption varies across different birth cohorts. Using different datasets from California, Dora Costa and I document that homes built in the 1970s consume more electricity than observationally identical homes.[6] Using panel data for the same home over time, we dismiss the hypothesis that this effect simply reflects aging. Instead, our preferred explanation is that during times when residential electricity prices are low, homes built under such incentive regimes are more likely to be energy inefficient, and this effect persists decades later.[7] As the share of California homes that were built in the 1970s shrinks over time, overall California residential energy efficiency will rise.

The Political Economy of Carbon Legislation

In June 2009, the U.S House of Representatives passed the American Clean Energy and Security Act (ACES). This complex carbon mitigation legisla-

* *Kahn is a Research Associate in the NBER's Program on Environmental and Energy Economics and a Professor at the University of California, Los Angeles. His Profile appears later in this issue.*

tion bundled together a wide range of policies all intended to increase energy efficiency and reduce greenhouse gas emissions. For example, the ACES included legislation to enact an electric utility cap-and-trade system for carbon emissions. In the summer of 2010, the Senate chose to not vote on this legislation. I examine the correlates of carbon voting on key pieces of legislation such as this one.[8] Representatives from high carbon, poor, conservative areas have been the least likely to vote in favor of this legislation. Representatives in districts where industry is a large share of local emissions also were less likely to vote in favor.

During this slow recovery from the most recent recession, environmentalists are deeply concerned that climate change is not a policy priority. Indeed, President Obama did not mention the words "climate change" in his 2011 State of the Union address. In recent work Matthew Kotchen and I examine trends in Google searches to test for the relationship between business cycles and interest in the broad issue of climate change.[9] Google Insights allows us to search at the state/year/week level and permits a peek into the "zeitgeist" at that moment. We match this data to state unemployment data by month and document that in those states in which the unemployment rate increases, searches for "global warming" decline and searches for "unemployment" increase. These findings support the claim that the recession has chilled interest in prioritizing climate change as a pressing policy issue. This finding is important because it challenges the conventional wisdom that recessions are good for the environment. The traditional view is that industry activity is dirty and procyclical. These facts imply that pollution improves during recessions. But, if we need to introduce a Pigouvian incentive to combat climate change, then my results suggest that the probability of this taking place will decline during recessions.

States that rely on coal fired power plants, such as Indiana, have worried that if carbon emissions are priced through a carbon tax or cap-and-trade regulation, then their local electricity prices will soar because of pass through. The conventional wisdom is that such states will lose manufacturing jobs because those jobs seek out cheaper places to do business. Erin Mansur and I investigate this claim[10] by comparing employment counts by manufacturing industry in adjacent counties. Adjacent counties share many common factors such as amenities and a common local labor market and similar access to final consumers. But two adjacent counties can differ along key dimensions such as energy prices and exposure to government labor and environmental policy. We exploit this variation in energy prices and labor and environmental regulation within county-pairs to provide new estimates of their effects on the locational pattern of manufacturing. We conclude that employment in only a handful of energy intensive manufacturing industries, such as primary metals (NAICS 331), paper manufacturing (NAICS 322) and textile mills (NAICS 313), is responsive to electricity prices.

Environmental Ideology and Living the "Green" Life

In the absence of formal Pigouvian carbon pricing, households have no financial incentive to economize on their production of greenhouse gas emissions, yet at any point in time we observe many households living the "green life." In Berkeley, California, I see people driving Prius vehicles, biking to work, having solar panels installed, and even having the grass ripped out of their lawns. Each of these actions contributes to the public good. In a series of papers, I seek to describe who lives the "green life."[11] Controlling for standard demographic variables such as age, education, income and ethnicity, I focus strictly on the role of political ideology. It seems that people who are registered members of liberal political parties (Democrats, Green Party) literally "walk the walk." They are more likely to own a Prius, use public transit, and consume less electricity, and to respond to conservation "nudges" than observationally identical non-liberal households.[12] Of course, I do not literally believe that registering for the Democratic Party causes you to buy a Prius and to live a green lifestyle. Instead, such political party registration data provides a signal of one's otherwise difficult to observe "ideology."

This research contributes to a growing economics literature on the role of ideology in determining economic outcomes. There are several open research questions here. First, how does a person "acquire" an environmentalist ideology? What role do peers play in how this ideology evolves over time? The economics of identity literature offers some fruitful pathways for exploring this issue.[13]

Documenting the role of ideology in explaining population heterogeneity would be less important if we collectively taxed negative externalities. But, in the absence of formal carbon pricing, society as a whole benefits when a subgroup of citizens volunteers to be "guinea pigs" by purchasing the first generation of new green products and enacting novel new legislation such as California's AB32.

Urban Adaption to Climate Change

My book titled *Climatopolis: How Our Cities Will Thrive in the Hotter Future* was published in fall 2010.[14] In it, I examine how urban quality of life will be affected by climate change. Assuming free market capitalist growth and the fundamental worldwide free rider problem, global greenhouse gas emissions will continue to rise. Facing this reality, what will climate change do to our urban economy?

Although I cannot predict what will happen to a city such as Moscow in the year 2050, I am confident that the insights generated by NBER research have direct implications for the complex challenge of climate change adaptation. Microeconomics provides a powerful tool for thinking about how we will cope with this emerging ambiguous threat. The book's core thesis is that urban capitalism will play a crucial role in helping us to adapt to the challenge

posed by climate change.

For example, climate change is likely to raise the average temperature in certain cities. Because of that, cities such as Detroit and Buffalo will have an easier time competing against Sun Belt cities whose warm winter temperatures have acted as a magnet, attracting population migration. [15]

In *Climatopolis,* I argue that households will learn from climate scientists about the new challenges that different cities will face. If specific cities do experience a decline in their quality of life, then their real estate prices will decline, and they will suffer a net outflow of people. Households will "vote with their feet" and this nimbleness will help them to cope with the evolving challenge of climate change. Cities compete to attract and retain the skilled. If a city's quality of life declines because of climate change, then the skilled will leave and economic growth will slow.

My book emphasizes the potential for endogenous technological advance to play a key role in helping us to adapt. The billions of people who will be affected by climate change create a large market opportunity for entrepreneurs who can serve this market.[16] In the presence of fixed costs to develop new products, the scale of the market is a key determinant. If billions of people seek an energy efficient air conditioner to offset hot summers, then there will be sharp incentives to invest in developing such products. Some of these producers will succeed. In a globalized world market, the pay-off to the successful entrepreneur will be huge. In new research, I will continue to explore microeconomic issues related to climate change mitigation and adaptation.

[1] *E. Glaeser and M. Kahn, "The Greenness of Cities: Carbon Dioxide Emissions and Urban Development," NBER Working Paper No. 14238, August 2008.*

[2] *E. Glaeser and M. Kahn, "Decentralized Employment and the Transformation of the American City," NBER Working Paper No. 8117, February 2001.*

[3] *M. Kahn, "Urban Policy Effects on Carbon Mitigation," NBER Working Paper No. 16131, June 2010.*

[4] *S. Zheng, R. Wang, E. Glaeser, and M. Kahn, "The Greenness of China: Household Carbon Dioxide Emissions and Urban Development," NBER Working Paper No. 15621, December 2009.*

[5] *L. Davis and M. Kahn, "International Trade in Used Durable Goods: The Environmental Consequences of NAFTA," NBER Working Paper No. 14565, December 2008.*

[6] *D. Costa and M. Kahn, "Why Has California's Residential Electricity Consumption Been So Flat Since the 1980s? A Microeconometric Approach," NBER Working Paper No. 15978, May 2010.*

[7] *D. Costa and M. Kahn, "Electricity Consumption and Durable Housing: Understanding Cohort Effects," NBER Working Paper No. 16732, January 2011.*

[8] *M. Cragg and M. Kahn, "Carbon Geography: The Political Economy of Congressional Support for Legislation Intended to Mitigate Greenhouse Gas Production," NBER Working Paper No. 14963, May 2009.*

[9] *M. Kahn and M. Kotchen, "Environmental Concern and the Business Cycle: The Chilling Effect of Recession," NBER Working Paper No. 16241, July 2010.*

[10] *M. Kahn and E. Mansur, "How Do Energy Prices and Labor and Environmental Regulations Affect Local Manufacturing Employment Dynamics? A Regression Discontinuity Approach," NBER Working Paper No. 16538, November 2010.*

[11] *M. Kahn, "Do Greens Drive Hummers or Hybrids? Environmental Ideology as a Determinant of Consumer Choice,"* Journal of Environmental Economics and Management, *54(2) pp.129–45, 2007.*

[12] *D. Costa and M. Kahn, "Why Has California's Residential Electricity Consumption Been So Flat Since the 1980s?: A Microeconometric Approach," op. cit. and "Energy Conservation 'Nudges' and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment," NBER Working Paper No. 15939, April 2010.*

[13] *D. Costa and M. Kahn, "Shame and Ostracism: Union Army Deserters Leave Home," NBER Working Paper No. 10425, April 2004.*

[14] *M. Kahn,* Climatopolis: How Our Cities Will Thrive in the Hotter World *(see climatopolis3.com), Basic Books, 2010.*

[15] *O. Deschenes and E. Moretti, "Extreme Weather Events, Mortality, and Migration," NBER Working Paper No. 13227, July 2007.*

[16] *D. Acemoglu and J. Linn, "Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry," NBER Working Paper No. 10038, October 2003.*

Reducing the Risks of Catastrophes

Howard Kunreuther*

Given the hundreds of billions of dollars in economic losses that catastrophes have caused in the United States since 2001, people often are surprised to learn that Hurricane Hugo, which struck the South Carolina coast in 1989, was the first disaster to inflict more than $1 billion of insured losses. Sixteen years later, Hurricane Katrina cost insurers and reinsurers an estimated $48 billion.[1]

A comparison of economic losses from natural catastrophes alone reveals a large increase over time: $528.3 billion (1981–1990); $1,196.8 billion (1991–2000); and $1,213.5 billion (2001–2010). (See Figure 1.)

There have been many types of extreme events in recent years (for example, the 9/11 terrorist attacks, natural disasters such as Hurricane Katrina, technological accidents such as the BP oil spill, and the financial crisis of 2008), but they all have the following features in common:

- A failure of key decision makers to undertake risk reducing measures in advance of the disaster;
- A lack of availability of insurance to cover some potential catastrophic losses (such as from terrorism). When insurance is available, it generally does not provide financial incentives to encourage investment in risk reducing measures;
- Growing interdependencies and interconnectedness in the world, and our inability to appreciate how weak links can cause systemic failures.

Over the past ten years, much of my research, in collaboration with colleagues, seeks to explain these issues and considers ways to mitigate the losses from future catastrophes.

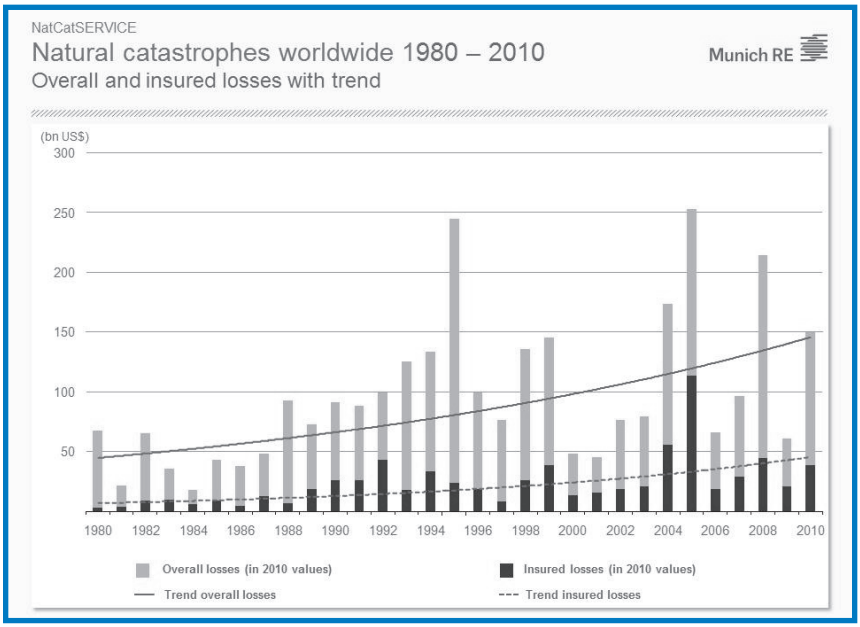


Figure 1 — Natural catastrophes worldwide 1980–2010. Overall and insured losses with trend.

Failure of individuals to undertake protective measures

There are two types of measures that those at risk can undertake to reduce the financial consequences of low probability adverse events: investing in loss reduction measures and purchasing insurance. However, there is a key difference between these two protective actions. Insurance normally is purchased on an annual basis with an option to renew for the coming year. Investing in loss-reduction measures involves an upfront cost, such as the outlay to install shutters to prevent losses from hurricanes; the benefits normally accrue over the life of the structure.

Prior to a disaster, many individuals believe that the event is below their threshold level of concern and thus do not invest voluntarily in insurance and protective measures.[2] After a major flood, earthquake, or hurricane, the government may provide at least some financial assistance to aid the recovery of the unprotected victims. Hurricane Katrina provided vivid evidence of this. Many homeowners who suffered water damage from the disaster did not have flood insurance, even though they were eligible to purchase such a policy at a subsidized rate through the National Flood Insurance Program (NFIP). In the Louisiana parishes affected by Katrina, the percentage of homeowners with flood insurance ranged from 57.7 percent in St. Bernard's to 7.3 percent in Tangipahoa. Only 40 percent of the residents in Orleans parish had flood insurance.[3]

Furthermore, homeowners are likely to cancel their flood insurance policies, even if they had been required to purchase a policy as a condition for

*Kunreuther is Co-Director of the NBER's Working Group on Insurance and a Professor at the Wharton School. His profile appears later in this issue.

a federally insured mortgage. A large-scale analysis of the 7.9 million new policies issued by the NFIP over the period January 1, 2000–December 31, 2009 revealed that the median length of time before those flood policies lapse is only three years.[4]

Most individuals are reluctant to invest in protective measures, even if they recognize the likelihood of a disaster. They are highly myopic and tend to focus on the returns only over the next couple of years. The effect of placing too much weight on immediate considerations is that the upfront costs of mitigation will loom disproportionately large relative to the delayed expected benefits in losses over time.[5]

A 1974 survey of more than 1,000 California homeowners in earthquake-prone areas revealed that only 12 percent of the respondents had adopted any protective measures.[6] Fifteen years later, there was little change, despite the increased public awareness of the earthquake hazard. In a 1989 survey of 3,500 homeowners in four California counties at risk from earthquakes, only 5 to 9 percent of the respondents in these areas reported adopting any loss reduction measures.[7] Other studies have found a similar reluctance by residents in flood-prone areas to invest in mitigation measures.[8]

As a way of characterizing behavior that deviates from standard models of choice, such as expected utility theory, David Krantz and I propose a model of goals and plans that is based on a constructive model of choice. More specifically, the weights associated with different goals may change over time as a function of resources, past information, and social norms.[9] We apply this model to protective decisions in an attempt to explain anomalies, such as people insuring against non-catastrophic events, underinsuring against catastrophic risks, and allowing such factors as anxiety and peace of mind to influence their insurance purchases and other protective actions. Neither expected utility theory nor prospect theory can explain these anomalies satisfactorily.

Insurers' reluctance to provide protection against catastrophic risks

Insurers exhibit biases similar to those of consumers. The case of terrorism coverage illustrates this point rather dramatically. Even after the terrorist attack on the World Trade Center in 1993 and the Oklahoma City bombing in 1995, insurers in the United States did not view either international or domestic terrorism as a risk that should be explicitly considered when pricing their commercial insurance policies.

Following the terrorist attacks of 9/11, insurers found themselves with significant amounts of terrorism exposure in their existing portfolios and only limited possibilities of obtaining reinsurance to reduce the losses from a future attack. Insurers warned that another event of comparable magnitude could do irreparable damage to the industry, and most companies excluded terrorism protection from their commercial policies, with the remaining insurers charging extremely high premiums for coverage. This led Congress to pass the Terrorism Risk Insurance Act of 2002, which involved risk sharing between the insurance industry and federal government.[10]

Similar withdrawal of insurance coverage occurred after the Florida hurricanes of 2005 when the state of Florida refused to provide the rate increases demanded by insurers. Instead, Florida established a state insurer, *Citizens Property Insurance Corporation*s. Citizens' rates were highly subsidized for those residing in hurricane prone areas, which led several insurers to refuse to offer new coverage in the state.[11]

Interdependencies and weak links in the system

After the terrorist bombing of the World Trade Center on 9/11, Geoffrey Heal and I began exploring the impact that weak links in an interconnected system would have on the decisions of others to invest in protective measures. We focused on the tragic Pan Am 103 crash over Lockerbie, Scotland, in 1988. In that instance, the weak link was an obscure airport, Gozo in Malta, where terrorists checked a bomb on Malta Airlines that eventually was loaded onto Pan Am 103 at London's Heathrow Airport. Pan Am could not have prevented the crash without inspecting every item transferred from other airlines.

Based on a game-theoretic analysis, we show that the incentive of any agent to invest in risk-reduction measures depends on how he expects others to behave in this respect. If he thinks that they will not invest in security, then his incentive to do so is reduced. On the other hand, should he believe that they *will* invest in security, it might be best for him to do so as well. Thus there may be an equilibrium in which no one invests in protection, even though all would be better off if they had incurred this cost. This situation, which we termed *interdependent security (IDS),* does not have the structure of a prisoners' dilemma game, even though it has some similarities.[12]

Alex Muermann and I apply the IDS model to the case where insured individuals face negative externalities in the form of potential contamination. We show that individuals will want to under-invest in mitigation measures to reduce their future losses. Limiting insurance coverage through deductibles, or selling "at-fault" insurance, can partially internalize this negative externality and thus improve individual and social welfare.[13]

At a more general level, a central problem in today's networked world is that the risks a firm or individual faces partially depend on the actions of others. Put more starkly: we no longer control our own destinies, even when we undertake protective measures. Consider the following examples:

- The August 2003 blackout over the northeastern United States and southeastern Canada was caused by an Ohio utility whose inability to provide electricity was passed on to other utilities and customers through an interconnected grid.[14]
- Actions of even a small division in a giant corporation can cause the entire

firm to go under and may have significant effects on the global financial system. One only has to look at the failure of Baring's Bank in February 1995, driven by the actions of a single trader in its Singapore branch, or the demise of Arthur Andersen in 2002 attributable to criminal action by its Houston branch auditing Enron.[15]

- With respect to the financial crisis of 2008, the American International Group (A.I.G.), the world's largest insurer, suffered severe financial losses because of the actions of a 377-person London unit known as A.I.G. Financial Products, run with almost complete autonomy from the parent. That one unit decimated the entire company.[16]

On a more positive note, Heal and I show that if agents are heterogeneous with respect to costs or the degree they impact others, then under relatively weak assumptions there is a *tipping set* — a group of agents who can tip the equilibrium from one where no one joins to one where everyone does. To make this idea more concrete, suppose there are 50 agents. Initially they are at an equilibrium at which none of them invests in risk reducing measures. If agents 1 through 5 form a tipping set, that is if they change from not investing in protection to investing, then all others will follow suit; the best strategy for agents 6 through 50, conditional on 1 through 5 investing in risk reducing measures, is for them to also join.[17]

Multi-year, risk-based contracts with short-term incentives

One way of addressing many of the problems described above is for insurance policies to encourage adoption of risk-reducing measures against catastrophic risks.[18] Insurance premiums based on risk provide signals to individuals about the hazards they face, and encourage them to engage in cost-effective mitigation measures that reduce their vulnerability to catastrophes. This principle is necessary for a competitive insurance market to operate efficiently. Dwight Jaffee, Erwann Michel-Kerjan, and I further show the conditions under which multi-year insurance contracts may be superior to standard annual policies, in particular when there is a cost that consumers will have to pay if they decide to cancel their policy and switch to an annual contract.[19] Michel-Kerjan and I have studied the impact of attaching multi-year flood insurance contracts to the property, not to the owner, with premiums reflecting risk. Multi-year contracts coupled with short-term incentives and well-enforced regulations comprise one strategy for dealing with the problems of myopia that characterize behavior with respect to low probability/high consequence.[20]

---

1 *For more details on the increased losses from catastrophes, see H. Kunreuther and E. Michel-Kerjan,* At War with the Weather, *Cambridge, MA: MIT Press, 2009.*

2 *H. Kunreuther and M. Pauly, "Neglecting Disaster: Why Don't People Insure Against Large Losses?",* Journal of Risk and Uncertainty *28 , 2004, pp. 5–21.*

3 *H. Kunreuther and M. Pauly, "Rules rather than Discretion: Lessons from Hurricane Katrina" NBER Working Paper No. 12503, August 2006, and* Journal of Risk and Uncertainty, *Vol. 33, Numbers 1-2, September 2006, pp. 101–16.*

4 *E. Michel-Kerjan, S. Lemoyne de Forges, and H. Kunreuther, "Policy Tenure under the U.S. National Flood Insurance Program (NFIP)" Wharton Risk Management and Decision Processes Center, (mimeo), 2010.*

5 *H. Kunreuther, R. J. Meyer, and E. Michel-Kerjan, "Strategies for Better Protection against Catastrophic Risks", forthcoming in* Behavioral Foundations of Policy, *E. Shafir, ed., Princeton, NJ: Princeton University Press.*

6 *H. Kunreuther, R. Ginsberg, L. Miller, P. Sagi, P. Slovic, B. Borkan, and N. Katz,* Disaster Insurance Protection: Public Policy Lessons, *New York: John Wiley and Sons, 1978.*

7 *R. Palm, M. Hodgson, R. D. Blanchard, and D. Lyons,* Earthquake Insurance in California: Environmental Policy and Individual Decision Making, *Boulder, CO: Westview Press, 1990.*

8 *R. Burby, "Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing about Wise Governmental Decisions for Hazardous Areas,"* Annals of the American Academy of Political and Social Science *604, 2006, pp.171–91; S.B. Laska,* Floodproof Retrofitting: Homeowner Self-Protective Behavior, *Boulder, CO: Institute of Behavioral Science, University of Colorado, 1991.*

9 *D. Krantz and H. Kunreuther, "Goals and Plans in Protective Decision Making," NBER Working Paper No. 12446, August 2006, and* Judgment and Decision Making, *Vol. 2, No. 3, June 2007, pp. 137–168.*

10 *H. Kunreuther and E. Michel-Kerjan, "Policy Watch: Terrorism Risk Insurance in the United States," NBER Working Paper No. 10870, November 2004, and* Journal of Economics Perspectives, *18 (4), 2004, pp. 201–14.*

11 At War with the Weather, *op. cit.*

12 *H. Kunreuther and G. Heal, "Interdependent Security," NBER Working Paper No. 8871, April 2002, and* Journal of Risk and Uncertainty, *Springer, 26(2–3), 2003, pp. 231–49*

13 *A. Muermann and H. Kunreuther, "Self-Protection and Insurance with Interdependencies," NBER Working Paper No. 12827, January 2007, and* Journal of Risk and Uncertainty, *36, 2008, pp. 103–23.*

14 *G. Heal and H. Kunreuther, "Interdependent Security: A General Model", NBER Working Paper No. 10706, August 2004, and "Modelling Interdependent Risks",* Risk Analysis, *27, 2007, pp. 621–34.*

15 *G. Heal and H. Kunreuther, "You Only Die Once: Managing Discrete Interdependent Risks", NBER Working Paper No. 9885, August 2003, and "You Only Die Once: Interdependent Security in an Uncertain World, in* The Economic Impacts of Terrorist Attacks, *H.W. Richardson, P. Gordon, and J.E. Moore II, eds., Cheltenham, UK: Edward Elgar, 2005.*

16 *H. Kunreuther, "The Weakest Link: Managing Risk Through Interdependent Strategies", in* Network Challenge: Strategy, Profit and Risk in an Interlinked World, *P. R. Kleindorfer and*

Y. Wind, eds., Upper Saddle River, NJ: Wharton School Publishing, 2009.
[17] *G. Heal and H. Kunreuther, "Supermodality and Tipping," NBER Working Paper No. 12281, June 2006, and "Social Reinforcement: Cascades, Entrapment and Tipping," NBER Working Paper No. 13579, November 2007, and* American Economic Journal: Microeconomics, *2(1), 2010, pp.86–99.*
[18] At War with the Weather, *op. cit.*
[19] *D. Jaffee, H. Kunreuther, and E. Michel-Kerjan, "Long-Term insurance (LTI) for Addressing Catastrophic Market Failure," NBER Working Paper No. 14210, August 2008, and* Journal of Insurance Regulation, *2010 Issue, (29)7, pp. 167-187.*
[20] *H. Kunreuther and E.O. Michel-Kerjan, "Market and Government Failure in Insuring and Mitigating Natural Catastrophes: How Long-Term Contracts Can Help" in* Public Insurance and Private Markets, *J. R, Brown, ed., Washington, DC: AEI Press, 2010.*

Trade Agreements as Incomplete Contracts

Giovanni Maggi*

The traditional theory of international trade typically views trade agreements as complete, or as contracts that specify all the relevant policy instruments and cover all possible contingencies. Implicit in this approach is the assumption that all relevant policy instruments and contingencies can be specified in the contract and verified by a court. In reality, though, even the most elaborate trade agreement — the GATT/WTO — is a vastly incomplete contract: the constraints imposed by the agreement on governments' policy choices are largely non-contingent, and many relevant policy instruments are left out of the agreement.

Another counterfactual implication of the complete-contracting view of trade agreements is that judicial bodies, such as the WTO's Dispute Settlement Body, should play only a pure enforcement role. In reality, however, most trade disputes in the WTO concern not simply the enforcement of clearly specified obligations but rather the interpretation of vague provisions, or of instances in which the text of the agreement is silent. This suggests that one important role for the WTO's court may be to "complete" an incomplete agreement.

All of this leads to important questions: How do we explain the particular structure that trade agreements take in reality? Can an incomplete-contracting perspective help us interpret the rules and institutions that have emerged in the world trading system?

Rigidity and Discretion in Trade Agreements

In one paper, Henrik Horn, Robert Staiger, and I propose a simple incomplete-contracting model of trade agreements in which the contractual incompleteness arises from the presence of contracting costs.[1] We argue that this incomplete-contracting perspective can help to explain some core features of the GATT/WTO. In particular, the agreement binds trade policy instruments, while leaving the choice of most domestic policy instruments to the discretion of governments. One exception is that the WTO has introduced some regulation of domestic subsidies. Second, the restrictions in the GATT/WTO are not usually conditioned on any information about the state of the economy, except for some "escape clauses" that allow for temporary protection under some specific circumstances. Finally, the agreement only stipulates upper bounds on the tariffs, thus leaving governments with discretion to go below the bounds.

Our key assumption is that it is costly to negotiate and draft a trade agreement, and that contracting costs are higher when the agreement is more detailed, both in terms of the policies that it seeks to constrain and the contingencies that it specifies.[2] We explicitly incorporate the costs of contracting over policies and contingencies into our model, and study the optimal design of a trade agreement in the presence of these costs.[3]

We find first that it cannot be optimal to contract over domestic subsidies while leaving tariffs to discretion. This result accords well with the emphasis on trade measures that characterizes the GATT/WTO. And, while this feature is often informally explained as deriving from distinct levels of contracting costs across these instruments, our model imposes no such distinction and thus identifies a more fundamental explanation.

Next we find that it is optimal to leave subsidies to discretion if: 1) countries have little monopoly power in trade, in which case they have little ability to manipulate terms of trade; or 2) they trade little, in which case they gain little from exploiting their power over terms of trade; or 3) subsidies are a poor substitute for tariffs as

Maggi is a Research Associate in the NBER's Program on International Trade and Investment and a Professor of Economics and International Affairs at Yale University. His profile appears later in this issue.

a tool for manipulating the terms of trade. The trade volume effect identified above suggests a possible explanation for the fact that the WTO has introduced a regulation of domestic subsidies that was not present in GATT, namely that a general increase in trade volumes over time has increased the cost of discretion, thereby heightening the need to constrain domestic policies.

We then examine whether the optimal agreement will include contingencies regarding the state of the economy, and if so, what variables should be used to condition the agreement's terms. A key observation is that, since the incentive to distort subsidies for terms-of-trade purposes increases with trade volume, making tariffs state-contingent can help to mitigate this incentive against especially high trade volumes. This effect is at the core of our third result: conditional on leaving subsidies to discretion, it can be optimal to make tariffs contingent on variables that affect the trade volume but are irrelevant to the first-best tariff level. One implication of this result is that it can be optimal to specify an escape-clause type rule that allows governments to raise tariffs when the level of import demand is high.

Finally, we show that the presence of contracting costs can explain the fact that the constraints imposed by the agreement on tariffs take the form of upper bounds, rather than exact tariff levels.

Dispute Settlement Procedures

In a subsequent paper, Staiger and I take the incomplete-contracting approach to trade agreements one step further by examining the potential role of a Dispute Settlement Body (DSB) as a mechanism for "completing" an incomplete agreement.[4]

Although in economic models trade disputes typically are treated as synonymous with concerns about enforcement, in reality most WTO disputes seem to concern the interpretation of vague provisions, or instances in which the agreement is silent. Some have suggested that the WTO's DSB could usefully grant exceptions to rigid contractual obligations. In this paper, we examine these potential DSB roles with the help of a formal model and address two more specific questions: How "activist" should the DSB be? That is, should it have authority to interpret vaguely-stated obligations, to fill gaps in the agreement, or to modify rigid obligations? And, should DSB rulings set *precedent* for future rulings?

We find that, if the DSB has sufficiently accurate information, it is optimal to build discretion into the contract and to provide the DSB with a mandate to fill the gaps. On the other hand, if the DSB's information is poor, it is optimal to write a contract that is either vague or rigid and to then bar the DSB from attempting to "complete" the contract. If the accuracy of the DSB's information falls into an intermediate range, then it is optimal to write a vague contract and to provide the DSB with a mandate to interpret the contract when disputes arise.

Interestingly, our analysis does not support the "modification" role of the DSB: it is never optimal to allow the court to void obligations that are clearly stated in the agreement. We also find that, if the DSB is sufficiently accurate, the first-best outcome can be achieved even though the contract is highly incomplete, the use of the DSB is costly, and the DSB rulings are imperfect. That is because the *threat* of invoking the DSB, and the expectation of a sufficiently precise DSB ruling, is sufficient to induce governments to act efficiently. Therefore, our model suggests that imperfection in the DSB information does not necessarily impair the performance of the institution; the presence of an activist DSB potentially can generate dramatic efficiency gains, in spite of its (inevitable) information limitations.

At the same time, our analysis offers a warning. We find that, if litigation costs are not too high, the equilibrium policy tends to be efficient when the DSB is not invoked in equilibrium. Moreover, we find that equilibrium disputes are more frequent when the DSB is less accurate. Thus, in effect the motives that trigger a DSB filing are inefficient, and the efficiency-enhancing effect of the DSB is associated with its off-equilibrium impacts. This is because, anticipating the possibility of error by the DSB, governments are tempted to game the system within the leeway offered by the incompleteness of the contract: the importer is tempted to protect when it should not, hoping to get away with it; and the exporter is tempted to force free trade by filing a dispute when it should not. One implication of these findings is that the intensity of DSB use is not a reliable indicator of the performance of the institution.

We next examine whether DSB rulings should set legal precedent for future rulings. On one hand, precedent reduces the probability of having disputes tomorrow, by removing uncertainty about the rights and obligations that will apply should the same situation occur again, and this leads to a beneficial savings in litigation costs. On the other hand, we find that precedent increases the probability of a dispute today, with the associated waste in litigation costs and a less efficient policy selection (because the DSB is imperfectly informed). When we examine how the resolution of these opposing effects varies with key parameters of the model, we find that the introduction of precedent is more likely to enhance the performance of the institution when the accuracy of DSB rulings is low and when governments care little about the future, or are not very likely to interact repeatedly.

Liability Rules versus Property Rules in Trade Agreements

A further potential strategy for coping with the incompleteness of trade agreements is to structure trade policy commitments as "liability" rules. A liability rule leaves a government free to raise trade barriers in response to changing circumstances, but requires the government to compensate its trading partners with a certain amount of "damages." This type of rule builds some flexibility into the agreement without the need to describe contingencies explicitly. The alternative to liability rules is given by "property rules." A property rule either endows the exporting country (or countries) with the right to free trade or endows the importing country with the right to trade protection.

Such entitlements can only be transferred through a voluntary transaction (renegotiation). There is a large law-and-economics literature on the choice between liability rules and property rules in the design of domestic law, but there is little formal research on this question in the context of international trade agreements.

In another paper, Staiger and I forge a link between the theory of trade agreements and the law-and-economics theory of the optimal design of legal rules.[5] We propose a simple model that highlights the role of transaction costs, renegotiation, and settlement "in the shadow of the law." We ask under what conditions liability rules are preferable to property rules and, in cases where liability rules are desirable, what the optimal level of damages is.

It is important to understand the difference between domestic law as studied in the law-and-economics literature and international trade agreements, which are our focus. In international bargaining there is a salient feature that is plausibly absent in the domestic context: there are no efficient government-to-government compensation mechanisms. In the GATT/WTO, the typical means by which a government achieves compensation is through "counter-retaliation" — that is, by raising its own tariffs. Such compensation mechanisms entail important inefficiencies that introduce a novel transaction cost in the international context (which we refer to as the "cost of transfers"). A major point of departure of our model is precisely this difference between the domestic setting and the international government-to-government setting.

One of our key findings concerns the impact of ex-ante uncertainty about the joint benefits of free trade. We find that a property rule is optimal if ex-ante uncertainty is sufficiently low, whereas a liability rule tends to be optimal when ex-ante uncertainty is high. This suggests that as uncertainty over the joint benefits of free trade falls, the optimal institutional arrangement should tend to move away from liability rules toward property rules. Conversely, liability (property) rules should be more prevalent in issue areas characterized by a higher (lower) degree of uncertainty.

When we allow the DSB to conduct a noisy investigation ex post, and if the DSB information is sufficiently accurate either because ex-ante uncertainty is small or because the signal observed by the DSB is very precise, we find that a property rule is optimal, but with the assignment of entitlements contingent on the DSB signal. Thus at a broad level, if one accepts that the accuracy of DSB rulings has increased over time, or that the degree of ex-ante uncertainty about the joint benefits of free trade has fallen over time, then our model predicts a gradual shift from liability rules to property rules. As we discuss in the paper, the majority of legal scholars maintain that this shift can indeed be seen in the GATT/WTO.

We also find that, in circumstances where a liability rule is desirable, it is never optimal to set damages high enough to make the exporter "whole." This runs counter to the "efficient breach" argument in the law-and-economics literature, according to which damages should be set at a level that makes the injured party whole. In addition, we find that the damages for breach should be responsive to both the harm caused to the exporter and the benefit garnered by the importer. We suggest that this feature is reminiscent of some aspects of the injury criterion and the rules of compensation for WTO escape clause actions.

Our model also generates interesting insights with regard to the role of transaction costs in determining the optimal rules. We find that a property rule tends to be preferable to a liability rule when the cost of transfers is high. We also find that the introduction of frictions in bargaining tends to favor property rules over liability rules. These results contrast with the findings in the law-and-economics literature that liability rules tend to be preferable to property rules when transaction costs are high.

---

[1] *H. Horn, G. Maggi, and R.W. Staiger, "Trade Agreements as Endogenously Incomplete Contracts," NBER Working Paper No. 12745, December 2006, and* American Economic Review, *100(1) (March 2010), pp. 394–419.*

[2] *This approach broadly follows the contracting-costs framework proposed in P. Battigalli and G. Maggi, "Rigidity, Discretion and the Costs of Writing Contracts,"* American Economic Review, *92(4) (September 2002), pp. 798–817.*

[3] *For an early attempt to model trade agreements as incomplete contracts, see P. Battigalli and G. Maggi, "International Agreements on Product Standard: an Incomplete Contracting Theory", NBER Working Paper No. 9533, March 2003.*

[4] *G. Maggi and R.W. Staiger, "On the Role and Design of Dispute Settlement Procedures in International Trade Agreements," NBER Working Paper No. 14067, June 2008, and "The Role of Dispute Settlement Procedures in International Trade Agreements," forthcoming in the* Quarterly Journal of Economics.

[5] *G. Maggi and R.W. Staiger, "Breach, Remedies and Dispute Settlement in Trade Agreements," NBER Working Paper No. 15460, October 2009.*

The Impact of Employee Pension Promises on State and Local Public Finance

Joshua Rauh*

Most U.S. state and local governments face legal restrictions on the extent to which they can run deficits and issue debt. However, like the U.S. federal government, state and local governments have substantial off-balance-sheet liabilities in the form of pension promises. At the state and local level, these liabilities arise primarily from defined benefit (DB) pension promises made to government employees, including teachers, public safety officials, and other employees of states, cities, and counties. An underfunded pension promise can be thought of as an alternative form of government debt: the government is borrowing from public employees through promises to pay them pensions when they retire.

Robert Novy-Marx and I have written a series of papers in which we investigate the issues in public finance and financial markets that have arisen as a result of this substantial form of off-balance-sheet borrowing at the state and local level. These papers focus on measuring the present value of public pension promises, examining the potential effects of different policy measures on the value of pension promises, and asking whether municipal bond markets have reacted to unfunded pension liabilities. This line of inquiry is related to my previous work on corporate defined benefit pension plans and the issues they pose for firms' investment and capital structure decisions.

Rauh is a Research Associate in the NBER's Programs on Corporate Finance, Public Economics, and Aging, and an Associate Professor of Finance at Northwestern University's Kellogg School of Management. His Profile appears later in this issue.

What is the Present Value of Public Pension Promises?

Most U.S. state governments offer their employees DB pension plans. This arrangement contrasts with the defined contribution (DC) plans that now prevail outside the public sector, such as 401(k) or 403(b) plans in which employees save for their own retirement and manage their own investments. In a DB plan, the employer promises the employee an annual payment that begins when the employee retires, and that payment depends on the employee's age, tenure, and late-career salary.

When a state government promises a future payment to a worker, it creates a financial liability for its taxpayers. When the worker retires, the state must make the benefit payments. To prepare for this, states typically contribute to and manage their own pension funds, pools of money dedicated to providing retirement benefits to state employees. If these pools do not have sufficient funds when the worker retires, then the states will have to raise taxes or cut spending at that time, or default on their obligations to retired employees.

State governments have approximately $2 trillion set aside in pension funds. Yet we do not know how the value of these assets compares to the present value of states' pension liabilities. Just as future Social Security and Medicare liabilities do not appear in the headline numbers of the U.S. federal debt, the financial liability from underfunded public pensions does not appear in the headline numbers of state debt. If pensions are underfunded, then the gap between pension assets and liabilities is off-balance-sheet government debt.

In fact, government accounting standards require states to use procedures that severely understate their liabilities.[1] In particular, government accounting standards require states to discount their liabilities at the expected return on their assets. In practice, this usually amounts to discounting pension liabilities at an approximately 8 percent rate. The government pension accounting approach also presents analytical problems: the magnitude of pension liabilities, and how a pension's funds are invested, are two separate issues to be considered independently. In practice, however, the accounting standard being used sets up a false equivalence between pension payments, which are extremely likely to be made, and the much less certain outcome of a risky investment portfolio.

Our work on liability measurement begins by focusing only on payments that already have been promised and accrued. In other words, even if the pension plans could be frozen completely, states would contractually owe these benefits. This quantity is known as an Accumulated Benefit Obligation (ABO) or termination liability. The ABO is a narrow measure, and is not affected by uncertainty about future wages and service.

According to the principles of financial economics, the present value of a stream of cash flows is calculated using discount rates that reflect the risk of the payments. We collect a unique database of 116 pension plans sponsored by the 50 states to perform these calculations. The calculations require us to model the prospective stream of payments from state pension promises using each state's stated liability, discount rate, and actuarial cost method, as well as information on benefit formulas, the numbers and average wages of state employees by age and service, salary growth assumptions by age, mortality assumptions, cost of living adjustments (COLAs), and separation (job leaving) probabilities by age.

If benefits have the same default and recovery characteristics as state general obligation debt, then the national total of promised liabilities based on current salary and service is $3.20 trillion as of June 1999.[2] If pensions have higher priority than state debt, then the present value of liabilities is much larger. Using zero-coupon Treasury yields, which are default-free but contain other priced risks, promised liabilities are $4.43 trillion. Liabilities are even larger under broader concepts that account for projected salary growth and future service.

There are important caveats about using the Treasury yield curve as a measure of risk in a default-free pension liability. Although the Treasury yield curve is generally viewed as default-free, it reflects other risks that may not be present in the pension liability. State employee pensions typically contain cost of living adjustments (COLAs). If inflation risk is priced, then an appropriate default-free pension discount rate would involve a downward adjustment of nominal yields to remove the inflation risk premium. This adjustment would further increase the present value of ABO liabilities. A countervailing factor is the fact that Treasuries trade at a premium because of their liquidity. Pension obligations are nowhere near as liquid as Treasuries. Therefore, ideally a liquidity price premium should be removed from Treasury rates before using them to discount default-free but illiquid obligations.

The $4.43 trillion in state pension liabilities compares to assets in state pension funds worth around $2 trillion, so there is an unfunded liability under the Treasury rate measure of around $2.5 trillion at the state level. For comparison, total state non-pension debt was $1 trillion and total state tax revenues were $0.8 trillion in 2008. It is worth emphasizing that the optimal level of pension underfunding may not be zero, just as the optimal level of public debt may not be zero.

We also estimate unfunded liabilities at the local level[3] by examining 77 local plans sponsored by 50 major U.S. cities and counties, and we perform the same calculations as in the case of the states. If on a per-member basis the unfunded liability is the same for the one-third of workers covered by municipal plans that are not in our sample, then the total unfunded ABO liability for all municipal plans in the U.S. is $574 billion. It is worth emphasizing that, while teachers are hired at the local level, their pension systems are sponsored at the state level and hence count as part of the state total.

One question related to the funding status of public pensions is whether taxpayers should be concerned about the fact that state pension funds are invested in risky assets. Under current pension fund investment policy, there is a wide distribution of possible future funding outcomes. The outcomes are skewed in such a way that there is a small probability of an extremely good outcome and a large probability of poor outcomes. There are some theoretically plausible reasons why current taxpayers might not care about this distribution. Equity investing inside of public pension funds can be viewed as equivalent to matching liabilities with bonds, and making side bets that entail borrowing money from the states' employees and investing in the stock market. In terms of the intergenerational consequences of pension fund asset allocation, a starting point is the idea that citizens may be able to undo government actions. Equity exposure in pension plans passes through to the taxpayers of the state. If the state increases its pension fund exposure to equities, households can rebalance their own portfolios away from equities. Of course, in order for the public to unwind the government's position, it must be aware of the full extent of the government's net equity position.

It is possible to calculate a distribution of outcomes so that taxpayers can decide for themselves whether the state is taking an acceptable level of risk on their behalf. [4] We estimate that as of September 2008, the median 15-year outcome under the investment strategies used by states was a shortfall of $2.8 trillion. The 25th percentile outcome is a shortfall of $3.4 trillion, the 10th percentile is a shortfall of $3.8 trillion, and the 5th percentile is a shortfall of $4.0 trillion. There is a less than a 5 percent chance that the current pattern of pension fund investments will meet the needs of retirees in 15 years. Under state accounting rules, however, this distribution was deemed to be underfunded by only $1 trillion.

It is important to emphasize that state DB pension plans and individual DC pension plans have different objectives. An individual 401(k) or 403(b) plan is a savings vehicle for an individual. Optimal asset allocation in such plans is governed by the maximization of individual lifetime utility. A state DB pension plan serves to deliver a contractually prespecified annuity for the state employees, with taxpayers responsible for shortfalls.

Effects of Policy Measures on Pension Liabilities

A number of states have enacted changes designed to reduce the liabilities associated with their pension systems. Most of these changes affect new employees only, and hence have no impact on standard liability measures, which do not consider future employees. However, some changes, such as the reductions in the cost of living adjustments (COLAs) passed by Colorado and Minnesota this year, do affect existing plan members and hence the economic present value of current state pension liabilities.

Motivated by these changes, we examine the present value of state pension liabilities under existing policies and then under several sets of hypothetical policy measures.[5] In particular, we consider changes to COLAs, full retirement ages, early retirement ages, and buyout rates for early retirement.

A single percentage point reduction in COLAs would lower total liabilities by 9–11 percent; implementing actuarially fair early retirement would reduce them by 2–5 percent; and increasing the retirement age by one year would reduce them by 2–4 percent. Dramatic policy changes, such as the elimination of COLAs or the implementation of Social Security retirement age parameters, would leave liabilities around $1.5 trillion more than plan assets.

Reaction of Municipal Bond Markets

To what extent do the markets for state and local government debt provide discipline to states with unfunded pension liabilities?[6] Public employee pension obligations generally enjoy high levels of legal protection in state constitutions and statutes. As a result, increases in unfunded pension liabilities are a serious concern for municipal bond investors. In the final three months of 2008, there was great variation in pension funding. In the aggregate, a new unfunded liability of around 42 percent of the total amount of existing municipal bond debt appeared in the capital structure of state governments. In the quarter ending December 2008, losses in state pension funds amounted to between 1 percent and 6 percent of annual gross state product, and between 9 percent and 48 percent of annual state revenue, depending on the state.

Using this cross-sectional variation, we estimate that tax-adjusted municipal bond spreads rose by 10–20 basis points for each 1 percent of annual gross state product lost in pension funds by states in the lower half of the credit quality spectrum. A similar result holds for each 10 percent of annual state revenues lost. The effect is approximately constant over the yield curve, suggesting a constant upward shift in annual risk-neutral default probabilities. These results are robust to controls for credit ratings and other measures of the state's fiscal strength. They hold within credit rating categories and are strongest among states with the weakest ratings.

Furthermore, a number of systems in the United States face the possibility of a squeeze in liquidity if asset returns and contributions to the funds are not very strong.[7] For several major states, including Illinois and New Jersey, the assets in pension funds are insufficient to pay for today's already-promised benefits through the end of this decade, even if the assets do earn an 8 percent return. Local governments in Philadelphia, Boston, and Chicago face similarly precarious funding situations.

Comparison to Regulatory Framework for Corporate DB Sponsors

Corporate DB pension systems face an entirely different regulatory structure than do the states. While states regulate themselves in consideration of rules set by the Government Accounting Standards Board, corporate DB sponsors are directly regulated by the federal government. This regulation stems from the 1974 ERISA legislation and the creation of the Pension Benefit Guaranty Corporation (PBGC). Because they receive PBGC insurance, companies must pay premiums to the government, make contributions to remedy funding shortfalls on certain specified schedules, and discount liabilities for funding purposes using segment rates calculated by the IRS based on the yields on high-quality corporate bonds.

Companies also prepare liability calculations for the purposes of their accounting statements. In statements to investors, they follow prescriptions of the Financial Accounting Standards Board. Since 2006, the balance sheet of firms must reflect unfunded liabilities, although firms still book as income an expected return on their plan assets. There is some evidence that the ability to manage earnings with pension assumptions may have been used opportunistically by corporate managers during the 1990s.[8]

Using nonlinearities in the schedule of mandatory pension contributions, we can show that when firms face binding contribution requirements, there is a significant and negative impact on firm-level capital expenditures.[9] This is one possible explanation for why firms do not seem to follow the risk-shifting hypothesis in their investment strategies, but rather allocate their pension assets to safer securities when they are closer to financial distress.[10] Because of these different regulatory structures, state and local governments face very different incentives from corporations in managing their pension systems. Actuarially required contributions for government pension systems are not legally binding in many states, and in any case are based on liability calculations that are a function of expected returns on assets. Especially given the recent introduction of legislation in Congress that might begin to regulate state and local pension disclosure at the federal level, the differential effect that these accounting systems have on pension funding and investment policy is an important avenue for future research.

---

1 *R. Novy-Marx and J. Rauh, "The Intergenerational Transfer of Public Pension Promises," NBER Working Paper 14343, September 2008.*

2 *R. Novy-Marx and J. Rauh, "Public Pension Promises: How Big Are They and What Are They Worth?" forthcoming in* Journal of Finance.

3 *R. Novy-Marx and J. Rauh, "The Crisis in Local Government Pensions in the United States," forthcoming in* Growing Old, *Brookings Institution: Washington D.C.*

4 *R. Novy-Marx and J. Rauh, "The Liabilities and Risks of State-Sponsored Pension Plans,"* Journal of Economic Perspectives *23(4), 2009, pp. 191–210.*

5 *R. Novy-Marx and J. Rauh, "Policy Options for State Pension Systems and Their Impact on Plan Liabilities," NBER Working Paper 16453, October 2010, forthcoming in* Journal of Pension Economics and Finance.

6 *R. Novy-Marx and J. Rauh, "Fiscal Imbalances and Borrowing Costs: Evidence from State Investment Losses," working paper, 2010.*

7 *J. Rauh, "Are State Public Pensions Sustainable? Why the Federal Government Should Worry About State Pension Liabilities,"* National Tax Journal *63(3) Forum, 2010.*

8 *D. Bergstresser, M. Desai, and J. Rauh, "Earnings Manipulation, Pension Assumptions, and Managerial Investment Decisions," NBER Working Paper No. 10543, June 2004, and* Quarterly Journal of Economics *121(1), 2006, pp. 157–95.*

9 *J. Rauh, "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans,"* Journal of Finance *61(1), 2006, pp. 33–71.*

10 *J. Rauh, "Risk Shifting versus Risk Management: Investment Policy in Corporate Pension Plans,"* Review of Financial Studies *22(7), 2009, pp. 2687–734.*

NBER Profile: *Matthew E. Kahn*

Matthew E. Kahn is a Research Associate in the NBER's Program on Environmental and Energy Economics. He is also a Professor in the Institute of the Environment and the Departments of Economics and Public Policy at the University of California, Los Angeles (UCLA).

Kahn holds an undergraduate degree in economics from Hamilton College and a Ph.D. in Economics from the University of Chicago. Before joining the UCLA faculty in January 2007, he taught at Columbia University and at Tufts University's Fletcher School. He also has served as a Visiting Professor at Harvard University and Stanford University.

Kahn is the author of *Green Cities: Urban Growth and the Environment* (Brookings Institution Press, 2006), the co-author of *Heroes and Cowards: The Social Face of War* (Princeton University Press, 2009), and *Climatopolis* (Basic Books, 2010). He also blogs about environmental economics for the *Christian Science Monitor.*

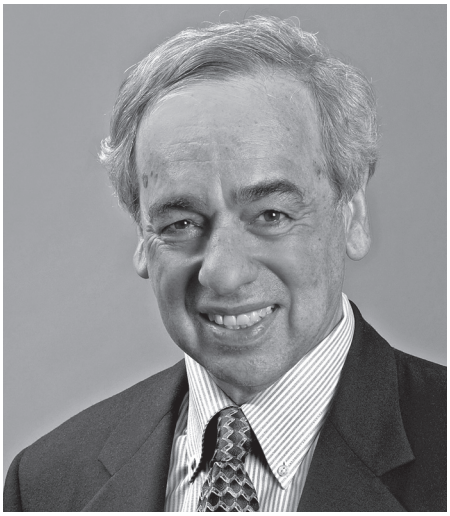
Kahn is married to his favorite co-author, Dora L. Costa. They have a happy nine-year-old son named Alexander.

NBER Profile: *Howard Kunreuther*

Howard Kunreuther is co-director of the NBER's Working Group on Insurance and the James G. Dinan Professor of Decision Sciences and Public Policy at the Wharton School, University of Pennsylvania. He is also Co-Director of the Wharton Risk Management and Decision Processes Center.

Kunreuther received his undergraduate degree from Bates College and his Ph.D. in Economics from MIT. He is a Fellow of the American Association for the Advancement of Science (AAAS); a member of the National Academy of Sciences' Panel on Increasing National Resilience to Hazards and Disasters; and a Distinguished Fellow of the Society for Risk Analysis, having received its Distinguished Achievement Award in 2001. He co-chaired the World Economic Forum (WEF) Global Agenda Council on "*Innovation and Leadership in Reducing Risks from Natural Disasters*" and is currently involved with the WEF *Risk Response Network*. He is also a member of the OECD's High Level Advisory Board on Financial Management of Large-Scale Catastrophes and a chapter lead author for the 5th Assessment Report of the Intergovernmental Panel on Climate Change. His most recent books are *At War with the Weather* (with Erwann Michel-Kerjan, July 2009, MIT Press) and *Learning from Catastrophes: Strategies for Reaction and Response* (with Michael Useem, January 2010, Financial Times Press) which was named to two "top" lists: *Risk Management Monitor's* list of Top 10 books in 2010 for Business Managers and "Best Business Books" in 2010 by *Strategy + Business* magazine.

Kunreuther and his wife Gail, who works with young children and their parents, live in Philadelphia. They also spend



time in their New York City apartment, closer to their four children and grandchildren and to his research with colleagues at Columbia University. They enjoy bicycling and travel.

NBER Profile: *Giovanni Maggi*

Giovanni Maggi is a Research Associate in the NBER's Program on International Trade and Investment and a Professor of Economics and International Affairs at Yale University. He is also Co-Director of the Leitner Program for Comparative and International Political Economy at Yale University.

Maggi received his undergraduate degree from Universita' Bocconi in Milan in 1989 and his Ph.D. in Economics from Stanford University in 1994. He then joined the Princeton University economics faculty in 1994 as an Assistant Professor, was promoted to Associate Professor in 2001, and to full Professor in 2002. He came to Yale University in 2007. He is also a Visiting Professor at the Getulio Vargas Foundation.

Maggi's research and teaching interests include International Trade, International Political Economy, and the Theory of Contracts and Institutions. His work has been published in a number of economic journals, and he is currently Co-Editor of the *Journal of International Economics.*

NBER Profile: *Joshua Rauh*

Joshua Rauh is an NBER Research Associate in the Corporate Finance and Public Economics Programs and an Associate Professor of Finance at the Kellogg School of Management at Northwestern University. He studies corporate investment, public pension liabilities, and the financial structure of pension funds and their sponsors.

Rauh holds a B.A. from Yale University and a Ph.D. in economics from MIT. Prior to joining the Kellogg faculty, he taught at the University of Chicago's Booth School of Business. He also has worked as an Associate Economist for Goldman Sachs in London.

Rauh serves on the editorial boards of the *Journal of Finance, the Review of Corporate Finance Studies,* and the *Journal of Pension Economics and Finance.* He is married and has two young children.

Conferences

Fiscal Policy and Crisis

The 23rd NBER-TCER-CEPR Conference on "Fiscal Policy and Crisis" took place in Tokyo on December 16–17, 2010. These conferences are sponsored jointly by the Centre for Economic Policy Research in London, NBER, and the Tokyo Center for Economic Research. Organizers Shin-ichi Fukuda, University of Tokyo and TCER, Takeo Hoshi, University of California, San Diego and NBER, and Eric Leeper, Indiana University and NBER, chose these papers to discuss:

- **Troy Davig**, Federal Reserve Bank of Kansas City, and **Eric Leeper**, "Temporarily Unstable Government Debt and Inflation"
- **Shin-ichi Fukuda** and **Junji Yamada**, University of Tokyo and TCER, "'Stock Price Targeting' and Fiscal Deficit in Japan: Why was Japan's Fiscal Deficit Accelerated in the Lost Decades?"
- **Masaya Sakuragawa**, Keio University, and **Kaoru Hosono**, Gakushuin University, "Fiscal Sustainability in Japan"
- **David Cook**, HKUST, and **Michael B. Devereux**, University of British Columbia and NBER, and "Cooperative Fiscal and Monetary Policy at the Zero Lower Bound"
- **Arata Ito** and **Tsutomu Watanabe**, Hitotsubashi University, and **Tomoyoshi Yabu**, Keio University, "Estimating Fiscal Policy Rules for Japan, US, and UK"
- **Stefano Eusepi**, Federal Reserve Bank of New York, and **Bruce Preston**, Columbia University and NBER, "The Maturity Structure of Debt, Monetary Policy, and Expectations Stabilization"
- **Takero Doi**, Keio University and TCER; **Takeo Hoshi**; and **Tatsuyoshi Okimoto**, Hitotsubashi University, "Japanese Government Debt and Sustainability of Fiscal Policy"

Summaries of the papers are available at: http://www.nber.org/confer/2010/TRIO10/summary.html

Twelfth Annual Conference in India

On December 19 and 20, 2010 the NBER, along with India's National Council for Applied Economic Research (NCAER) and the Indian Council for Research on International Economic Relations (ICRIER), sponsored a meeting that united NBER researchers with a number of economists from Indian universities, research institutions, and government departments. NBER Research Associates **Abhijit Banerjee** of MIT and **Raghuram Rajan** of the University of Chicago organized the conference jointly with **Suman Bery** and **Anil Sharma** of NCAER.

The NBER participants, in addition to the organizers, were: **Alberto Alesina, Amitabh Chandra, David Cutler**, and **Martin Feldstein,** Harvard University; **Mikhail Golosov** and **Nancy Qian**, Yale University; **Bengt Holmstrom** and **Scott Stern**, MIT; **Chang-Tai Hsieh** and **Steven Kaplan**, University of Chicago; **Anne O. Krueger**, Johns Hopkins University; and NBER Board member **John Lipsky** of the International Monetary Fund.

The topics discussed included global growth and adjustment, the state of the Indian economy, development strategies, and the politics of sustaining growth.

2010 Awards and Honors

A number of NBER researchers received honors, awards, and other forms of professional recognition during 2010 and early 2011. A list of these honors, excluding those that were bestowed by the researcher's home university and listing researchers in alphabetical order, is presented below.

Viral Acharya received the Goldman Sachs International Award at the European Finance Association Meetings for best conference paper in 2010, for "The Seeds of a Crisis: A Theory of Bank Liquidity and Risk Taking over the Business Cycle," joint with Hassan Naqvi.

James D. Adams was appointed ASA/NSF/BEA Senior Research Fellow at the Bureau of Economic Analysis during academic year 2010–11. He also won an American Statistical Association/National Science Foundation Fellowship to conduct research on "Technological Determinants of the Quality and Price of Innovative Industrial Products," at the Bureau of Economic Analysis (BEA) in Washington, DC for 2010-11.

Heitor Almeida received an award from the *Review of Financial Studies* for "Referee of the Year" in 2010.

Douglas Almond won a five-year NSF CAREER Award for "Health Determinants and Research Design." The Faculty Early Career Development (CAREER) Program is an NSF-wide activity that supports the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization.

Joseph Altonji was elected to the American Academy of Arts and Sciences.

Andrew Ang won a three-year grant from Netspar on optimal portfolio strategies.

Orley Ashenfelter became a Fellow of the Labor and Employment Relations Association. He is also president-elect of the American Economic Association.

Jeremy Atack is President-Elect of the Economic History Association (he assumes the Presidency in September 2011).

Katherine Baicker was appointed to the Medicare Payment Advisory Commission and named a member of the Congressional Budget Office's Panel of Health Advisers and a Fellow of TIAA-CREF Institute. She also became Vice Chair of the AcademyHealth Board of Directors. Her paper (with **David Cutler** and Zirui Song) received a prize for "outstanding journal article" by the Continuing Care Alliance.

Spencer Banzhaf won the History of Economic Society's 2010 award for "best paper in the history of economics" for "Objective or Multi-Objective: Two Historically Competing Visions for Benefit-Cost Analysis," published in *Land Economics* in 2009.

Lucien Bebchuk was vice-president of the Western Economic Association International for 2010–11.

Francine D. Blau is the 2010 winner of the IZA (Institute for the Study of Labor) Prize in Labor Economics.

Alan S. Blinder received the Doctor of Humane Letters (honoris causa) from Bard College in 2010. He also delivered the Homer Jones Memorial Lecture at the Federal Reserve Bank of St. Louis in April 2010.

Nick Bloom won an Alfred Sloan Fellowship, an NSF Career Grant, and the Frisch Medal from the Econometric Society.

Michael Brandt, Ralph Koijen, and **Jules van Binsbergen**, won the 2010 Swiss Finance Institute Award for the best paper of the year for "On the Timing and Pricing of Dividends."

Jeffrey R. Brown was appointed to the Board of Trustees of TIAA (the insurance company side of TIAA-CREF) and was elected to the Board of Directors of the American Risk and Insurance Association.

Markus K. Brunnermeier received a Guggenheim Fellowship for studying "Financial Frictions and the Macroeconomy." He also received the 2010 T.W. Schultz Prize from the University of Chicago and became a Fellow of the Econometric Society.

Richard V. Burkhauser was the 2010 President of the Association for Public Policy Analysis and Management. His co-authored paper "Minimum Wages and Poverty: Will a $9.50 Federal Minimum Wage Really Help the Working Poor?" won the 2010 best article award from the *Southern Economic Journal*.

Leonard E. Burman is president of the National Tax Association.

Ricardo Caballero was elected a fellow of the American Academy of Arts and Sciences. He also delivered the Paolo Baffi Lecture at the Bank of Italy and the Mundell Fleming Lecture at the IMF.

Murillo Campello received the RPI/NYU-Stern "Rising Star" award, awarded bi-annually to researchers in Finance. He also received a Distinguished Referee Award from the *Review of Financial Studies*.

Francesco Caselli was elected a fellow of the British Academy. He also delivered the 2010 CREI (Centre de Recerca en Economia Internacional) Lectures in Barcelona, and became a managing editor of the *Review of Economic Studies*.

Judith A. Chevalier and Dina Mayzlin were selected as recipients of the 2011 William F. O'Dell Award for their article "The Effect of Word of Mouth on Sales: Online Book Reviews," which appeared in the 2006 *Journal of Marketing Research*. The honor goes to the article published in 2006 that has made the most significant, long-term contribution to marketing theory, methodology, and/or practice.

John H. Cochrane was elected president of the American Finance Association.

Iain Cockburn and **Rebecca Henderson** are recipients of the Dan and Mary Lou Schendel Best Paper Prize from the *Strategic Management Journal* for 2010. Their paper is titled "Measuring

Competence: Exploring Firm Effects in Pharmaceutical Research."

Courtney Coile and **Kevin Milligan** were awarded the 2010 Kendrick Prize, a bi-annual award given to the best paper published in the *Review of Income and Wealth*, for "How Portfolios Evolve after Retirement: The Effect of Health Shocks"

Diego Comin won the inaugural award of the Institute for New Economic Thinking (INET).

George Constantinides received an Honorary Degree from the International Hellenic University in Greece in May 2010.

Arnaud Costinot was selected a 2010–12 Alfred P. Sloan Research Fellow.

Mario J. Crucini was appointed co-editor of the *Canadian Journal of Economics* on July 1, 2010.

Janet Currie is Vice President of the American Economic Association for 2010. She also became the editor of the *Journal of Economic Literature* in July 2010 and delivered a keynote lecture at the German Economic Association meetings in September 2010.

Angus S. Deaton became a Distinguished Fellow of the American Economic Association in 2010. He also was elected to a Corresponding Fellowship in the Royal Society of Edinburgh (amongst whose founders were Adam Smith and David Hume) and to an Honorary Fellowship at Fitzwilliam College, Cambridge.

Michael Devereux was awarded the John Rae Prize by the Canadian Economics Association.

Francis X. Diebold was elected President of the Society for Financial Econometrics for a three-year term beginning in June 2011.

David Donaldson received the 2010 WTO [World Trade Organization] Young Economists Award.

John J. Donohue is President-elect of the American Law and Economics Association.

Esther Duflo received the John Bates Clark Medal from the American Economic Assocation in 2010 and a Doctorat honoris causa from Université Catholique de Louvain.

Mark Duggan was awarded the ASHEcon Medal from the American Society of Health Economists in spring 2010. It is awarded every two years "to the economist age 40 or under who has made the most significant contributions to the field of health economics."

Susan Dynarski was elected to the board of the Association for Education Finance and Policy and appointed to MDRC advisory board.

Janice Eberly joined the Panel of Economic Advisors of the Congressional Budget Office in spring 2010.

Ronald G. Ehrenberg was confirmed by the New York State Senate for a term on the State University of New York (SUNY) Board of Trustees in March 2010.

Barry Eichengreen was awarded the Schumpeter Prize of the International Schumpeter Society in January 2010.

Henry Farber was selected as a Fellow of the Labor and Employment Relations Association for 2010 for his lifetime contributions to research on the employment relationship. Only three academics are elected each year across all disciplines.

Emmanuel Farhi won a Sloan Fellowship and the Bernacer Prize for the best European economist under the age of 40.

Jesus Fernandez-Villaverde received the Herrero Prize, awarded yearly to the best Spanish social scientist under the age of 40.

Daniel K. Fetter received the Allan Nevins Prize for the Best Dissertation in U.S. or Canadian Economic History from the Economic History Association. He also won the 2010 American Real Estate and Urban Economics Association Dissertation award.

Erica Field was awarded the Elaine Bennett Research Prize in 2010, given by the Committee for the Status on Women in the Economics Profession every other year to a female economist "to recognize, support, and encourage outstanding contributions by young women in the economics profession."

David Figlio received the "Outstanding Service Award" from the American Education Finance Association. He was the first person younger than 50 to win this award.

Amy Finkelstein was honored with a Presidential Early Career Award for Scientists and Engineers.

Mark Gertler was elected to the American Academy of Arts and Sciences.

Linda S. Goldberg joined the Board of Directors of CSWEP (Committee on the Status of Women in the Economics Profession, AEA).

Pinelopi Goldberg received the John Simon Guggenheim Memorial Fellowship for 2010–11. She also was appointed next Editor-in-Chief of the *American Economic Review*.

William N. Goetzmann was awarded the annual Graham and Dodd Award for Best Article from the *Financial Analysts Journal*. His article, co-authored by Stephen Brown, Bing Liang, and Christopher Schwarz, was "Estimating Operational Risk for Hedge Funds: The ?-Score."

Marvin Goodfriend was appointed an Honorary Advisor to the Institute for Monetary and Economic Studies, Bank of Japan.

Yuriy Gorodnichenko won the Russian National Prize in Applied Economics.

Michael Grossman completed his term as President of the American Society of Health Economists. He also gave the presidential address at the Third Biennial Conference of the American Society of Health Economists at Cornell University. The title of his address was "It's Better to be the First, or One of the First, Even if You're Wrong."

James J. Heckman became a member of the National Academy of Education in 2010. He was also a Keynote Speaker at the First Annual MOVE Distinguished Visitor's Lecture in Barcelona, Spain; the Italian Statistical Society's Scientific Meeting in Padua, Italy; and at a conference on Understanding Ageing: Health, Wealth, and Wellbeing to Age Fifty and Beyond held at St. Catherine's College Oxford, UK. In addition, Heckman became an Honorary Academician, Academica Sinica, Republic of China/Taiwan in July, 2010; an Honorary Professor, Renmin University, P. R. China, in June, 2010; and an Honorary Professor, Beijing Normal University, P. R. China in June, 2010.

Rebecca Henderson and **Iain Cockburn** received the Dan and Mary Lou

Schendel Best Paper Prize from the *Strategic Management Journal* for 2010.

Kate Ho won the Arrow Award for best paper of the year from the International Health Economics Association for "Insurer-Provider Networks in the Medical Care Market." The paper appeared in the *American Economic Review* in 2009.

Bengt Holmstrom was elected President of the Econometric Society for 2011. His book with Jean Tirole, *Inside and Outside Liquidity,* was published by the MIT Press in 2010.

Douglas Irwin delivered the 2010 Ohlin Lectures at the Stockholm School of Economics.

Nobuhiro Kiyotaki and co-author John Moore received the 2010 Stephen A. Ross Prize in Financial Economics from the Foundation for the Advancement of Research in Financial Economics for "Credit Cycles" which was published in1997.

Michael Klein has been appointed Chief Economist in the Office of International Affairs of the United States Treasury.

Edward J. Kane received an Outstanding Author Contribution Award from Emerald Literati Network in 2010.

Charles D. Kolstad and **Robert N. Stavins** were elected/appointed Fellows of the Association of Environmental and Resource Economists (AERE) at the January 2010 ASSA meetings.

Kevin Lang became a Fellow of the Society of Labor Economists.

Edward Lazear received an honorary doctorate from the University of Zurich.

Josh Lerner was elected a Fellow of the European Corporate Governance Institute. He also won the Global Entrepreneurship Research Award of the Government of Sweden. He received the Axiom Business Book Award Gold Medal in the Entrepreneurship Category and the 2009 PROSE Award for Excellence in the Business, Management, & Finance Category from the Association of American Publishers, both awarded in 2010, for *Boulevard of Broken Dreams.*

Christian Leuz and his coauthor Luzi Hail were awarded the AAA's 2010 Notable Contributions to Accounting Literature Award, which is given annually for research that displays originality, breadth of interest and impact, and soundness of methodology.

Gary Libecap is the Pitt Professor of American History and Institutions at Cambridge University for 2010–11. The Pitt Professor was established in 1946 to build stronger academic links between the US and UK—an economist is selected for this honor every four years.

Frank R. Lichtenberg received a 2010 Garfield Economic Impact Award from The Eugene Garfield Foundation and "Research!America" for the publication "The Effect of New Cancer Drug Approvals on the Life Expectancy of American Cancer Patients, 1978 –2004."

Sydney C. Ludvigson won the Richard Stone Prize in Applied Econometrics for the best paper in the *Journal of Applied Econometrics* in 2008 and 2009 (with Xiaohong Chen).

Jens Ludwig received an Investigator Award in Health Policy Research from the Robert Wood Johnson Foundation and was selected as a visiting scholar to the Russell Sage Foundation in New York City.

Hanno Lustig, Hal Cole, and Yi-Li Chien won the NASDAQ OMX Award for Best Paper on Asset Pricing for "Is the Volatility of the Market Price of Risk due to Intermittent Portfolio Rebalancing?"

Ulrike Malmendier was selected a 2010–12 Alfred P. Sloan Research Fellow.

Robert C. Merton delivered the Kolmogorov Lecture at the University of London, the Nathan and Beatrice Keyfitz Lecture at the Fields Institute in Toronto, the 9th Carroll Round Lecture at Georgetown University, the CME Group Lecture on Financial Markets at the Chicago Council on Global Affairs, and the Hamilton Lecture at the Royal Irish Academy, Dublin.

Atif Mian and Jose Liberti won the Brattle Distinguished Paper Prize at the American Finance Association meetings for their article, "Collateral Spread and Financial Development."

Grant Miller, Diana Pinto, and Marcos Vera-Hernández received the Inter-American Prize for Research on Social Security given by the Conferencia Interamericana de Seguridad Social (CISS) based in Mexico.

Olivia Mitchell received the Retirement Income Industry Association's Award for Achievement in Applied Retirement Research and was named one of the Top 50 Women in Wealth by the Wealth Management Association.

Dale T. Mortensen, Christopher Pissarides, and **Peter Diamond** were awarded the 2010 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for their analysis of markets with search frictions.

Emi Nakamura received an NSF Career Award for "Integrating Micro and Macro Evidence on Price Dynamics."

Joseph P. Newhouse is Co-chair of the Medicare Trustees Advisory Panel, 2010-11.

Philip Oreopoulos is the 2010-11, and youngest-ever, William Lyon Mackenzie King Visiting Professor of Canadian Studies at Harvard University.

Daniel Paravisini and co-authors won First Prize, the Brattle Award, for best paper in corporate finance published in the *Journal of Finance* in 2010. Their paper was "Information and Incentives inside the Firm: Evidence from Loan Officer Rotation.

Thomas Philippon was appointed to serve on the Commission on Key National Indicators. The eight members of this bipartisan commission are selected by Congressional leaders; the Key National Indicator System will be executed by the National Academy of Sciences. He also received the Michael Brennan & BlackRock Award, Best Paper, *Review of Financial Studies*, 2010, for "The Economics of Fraudulent Accounting," joint with Simi Kedia.

Giorgio Primiceri was selected a 2010–12 Alfred P. Sloan Research Fellow.

Carmen M. Reinhart and **Kenneth S. Rogoff** were selected by the TIAA-CREF Institute as winners of the fifteenth annual TIAA-CREF Paul A. Samuelson Award for Outstanding Scholarly Writing on Lifelong Financial Security. They were recognized for their best-selling book, *This Time is Different: Eight Centuries of Financial Folly.*

Kenneth S. Rogoff also was elected a member of National Academy of Sciences.

Allison B. Rosen received the Outstanding Junior Investigator Award from the Society of General Internal Medicine for her research on measuring and improving the value of U.S. health care spending. The

award recognizes early career achievements and an overall body of work that has made a national impact on generalist research.

Emmanuel Saez won a MacArthur Grant.

Richard Schmalensee gave one of three keynote addresses at the 4th World Congress of Environmental and Resource Economists, as well as the IV Stackelberg Lecture at the University of Milan, Bicocca.

G. William Schwert gave the keynote speech at the European Financial Management meetings in Aarhus, Denmark in June 2010.

Robert Shimer was elected a member of the American Academy of Arts and Sciences and received the Sherwin Rosen Prize for Outstanding Contributions in the Field of Labor Economics from the Society of Labor Economists.

Christopher Sims is now president-elect of the American Economic Association — he assumes the presidency in 2012. **Orley Ashenfelter** is the current president.

Neeraj Sood and Jose Escarce were finalists for the 16th Annual NIHCM Health Care Research Award for "Employer Sponsored Insurance, Health Care Cost Growth, and the Economic Performance of U.S. Industries" which was co-authored with Arkadipta Ghosh and published in the journal *Health Services Research*.

Pablo T. Spiller was a president of the International Society for New Institutional Economics.

Robert Stambaugh was elected Vice President of the American Finance Association and a Fellow of the Financial Management Association.

Robert N. Stavins was inducted as a Fellow of the Association of Environmental Economists.

Betsey Stevenson received the John T. Dunlop Outstanding Scholar Award, awarded by the Labor and Employment Relations Association.

Richard Sylla was elected Chairman of the board of trustees of the Museum of American Finance, a Smithsonian affiliate located on Wall Street.

Adam Szeidl is a 2010 Alfred P. Sloan Research Fellow.

M. Scott Taylor was awarded an honorary doctorate by the University of Basel "In acknowledgement of his pioneering contributions to International Trade, the Environment and Renewable Resources, which have sparked and shaped research in this field, and how it is taught on the graduate level, all over the world."

Richard Thaler received an honorary Doctor of Science degree by the University of Rochester, the Tjalling Koopmans Asset Award by Tilburg University, and he was elected Vice President of the American Economic Association.

John Tyler was awarded a William T. Grant Foundation Distinguished Fellowship to study the design and implementation of new teacher evaluation systems that incorporate student performance data in the evaluation process.

John VanReenen was elected a Fellow of the British Academy, the oldest and most prestigious society in the UK devoted to advancement of the social sciences.

Jacob Vigdor received the 2009 IPUMS-USA Research Award for best published work for his book, *From Immigrants to Americans: The Rise and Fall of Fitting In*. IPUMS-USA is a project dedicated to collecting and distributing United States census data.

Gianluca Violante was an invited speaker (to the session on Macroeconomics) at the 2010 World Congress of the Econometric Society.

Martin L. Weitzman won the FEEM 20th Anniversary Prize for Most Outstanding Contributions to Environmental Economics in Last Twenty Years.

Dean Yang received an award for the best paper on the economics of food safety or nutrition from the Agricultural and Applied Economics Association (AAEA) for "Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall" (*American Economic Review*, 2009, with Sharon Maccini).

NBER Announces Nonprofit Fellowships

The NBER has awarded four dissertation fellowships to graduate students whose research focuses on "The Economics of the Nonprofit Sector." The four students are: Nikhil Agarwal, Harvard University, whose topic is "Centralized Matching Markets"; Nicholas Duquette, University of Michigan, who is studying "Direct Grants to Nonprofit Organizations and Government Crowd-Out: Evidence from The War on Poverty"; Ben Marx, Columbia University, whose dissertation examines "Regulation, Taxation, and Private Charitable Foundations"; and Benjamin Schoefer, Harvard University, who is studying "Herd Behavior in the Market for Nonprofit Funding".

The selection committee for the NBER Nonprofit Fellowships was composed of four NBER Research Associates: James Andreoni, University of California, San Diego; David M. Cutler, Harvard University; Caroline M. Hoxby , Stanford University; and John List, University of Chicago.

Program and Working Group Meetings

Economic Fluctuations and Growth Research Meeting

The NBER's Program on Economic Fluctuations and Growth met at the Federal Reserve Bank of New York on February 4, 2011. NBER Research Associates Russell Cooper of European University Institute and Mark Gertler of New York University organized the meeting. These papers were discussed:

- **Robert Shimer**, University of Chicago and NBER, "Wage Rigidities and Jobless Recoveries"
- **Alan B. Krueger**, Princeton University, and **Andreas Meuller**, Stockholm University, "Job Search and Job Finding in a Period of Mass Unemployment: Evidence from High-Frequency Longitudinal Data"
- **Virgiliu Midrigan** and **Daniel Xu**, New York University and NBER, "Finance and Misallocation: Evidence from Plant-level Data" (NBER Working Paper No. 15647)
- **Craig Burnside**, Duke University and NBER, and **Martin S. Eichenbaum** and **Sergio Rebelo**, Northwestern University and NBER, "Understanding Booms and Busts in Housing Markets" (NBER Working Paper No. 16734)
- **Andrew Glover**, University of Minnesota; **Jonathan Heathcote**, Federal Reserve Bank of Minneapolis; **Dirk Krueger**, University of Pennsylvania and NBER; and **Jose-Victor Rios-Rull**, University of Minnesota and NBER, "Inter-generational Redistribution in the Great Recession"
- **Vasco M. Carvalho**, CREI, and **Xavier Gabaix**, New York University and NBER, "The Great Diversification and Its Undoing" (NBER Working Paper No. 16424)

Summaries of these papers may be found at: http://www.nber.org/confer/2011/EFGw11/summary.html

Industrial Organization Program Meeting

The NBER's Program on Industrial Organization, directed by Nancy Rose of MIT, met in Stanford, CA on February 25 and 26, 2011. John Asker, NBER and New York University, and Tom Hubbard, NBER and Northwestern University, organized the meeting. These papers were discussed:

- **Alessandro Gavazza**, New York University, "An Empirical Equilibrium Model of a Decentralized Asset Market"
- **Joseph A. Cullen**, Harvard University, "Dynamic Response to Environmental Regulation in the Electricity Industry"
- **Ryan C. McDevitt**, University of Rochester, "'A' Business by Any Other Name: Firm Name Choice as a Signal of Firm Quality"
- **Allan Collard-Wexler**, New York University and NBER, "Mergers and Sunk Costs: An Application to the Ready-Mix Concrete Industry"

- **Mark R. Cullen** and **Liran Einav**, Stanford University and NBER; **Amy Finkelstein** and **Stephen P. Ryan**, MIT and NBER; and **Paul Schrimpf**, MIT, "Selection on Moral Hazard in Health Insurance"

- **Brett R. Gordon**, Columbia University; and **Wesley R. Hartmann**, Stanford University, "Advertising Effects in Presidential Elections"

Summaries of these papers may be found at: http://www.nber.org/confer/2011/IOs11/summary.html

IFM Program Meeting

The NBER's Program on International Finance and Macroeconomics met in Cambridge on March 4, 2011. NBER Research Associates Roberto Chang, Rutgers University, and Kristin Forbes, MIT, organized the meeting. These papers were discussed:

- **Gianluca Benigno**, London School of Economics; **Huigang Chen**, JD Power; **Christopher Otrok**, University of Virginia; **Alessandro Rebucci**, Inter-American Development Bank; and **Eric Young**, University of Virginia, "Financial Crises and Macro-Prudential Policies"

- **Olivier Jeanne**, Johns Hopkins University and NBER, and **Anton Korinek**, University of Maryland, "Managing Credit Booms and Busts: A Pigouvian Taxation Approach"

- **Barry Eichengreen**, University of California, Berkeley and NBER, and **Hui Tong**, International Monetary Fund, "The Impact of Chinese Exchange Rate Policy on the Rest of the World: Evidence from Firm-Level Data"

- **Daniel Paravisini** and **Daniel Wolfenzon**, Columbia University and NBER; **Veronica Rappoport**, Columbia University; and **Philipp Schnabl**, New York University, "Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data"

- **Charles Engel**, University of Wisconsin, Madison and NBER, "The Real Exchange Rate, Real Interest Rates, and the Risk Premium"

- **Michael Kumhof**, International Monetary Fund, "International Currency Portfolios"

- **Andrew K. Rose**, University of California, Berkeley and NBER, and **Tomasz Wieladek**, Bank of England, "Financial Protectionism: the First Tests"

- **Stephanie E. Curcuru** and **Charles P. Thomas**, Federal Reserve Board, and **Francis E. Warnock**, University of Virginia and NBER, "On Returns Differentials"

Summaries of these papers may be found at: http://www.nber.org/confer/2011/IFMs11/summary.html

Labor Studies Program Meeting

The NBER's Program on Labor Studies, directed by David Card of the University of California, Berkeley, met in San Francisco on March 4, 2011. These papers were discussed:

- **Douglas Miller, Marianne E. Page,** and **Ann Huff Stevens,** University of California, Davis and NBER, and **Mateusz Filipski,** University of California, Davis, "The Best of Times, the Worst of Times: Understanding Pro-cyclical Mortality"
- **Philippe Belley,** Kansas State University; **Marc Frenette,** Social Research & Demonstration Corporation; and **Lance Lochner,** University of Western Ontario and NBER, "Post-Secondary Attendance by Parental Income in the U.S. and Canada: What Role for Financial Aid Policy?"
- **Nicholas J. Sanders,** Stanford University, "What Doesn't Kill You Makes You Weaker: Prenatal Pollution Exposure and Educational Outcomes"
- **Florian Hoffman,** University of British Columbia, "An Empirical Model of Life-Cycle Earnings and Mobility Dynamics"
- **Camille Landais,** Stanford University; **Henrik Kleven,** London School of Economics; and **Emmanuel Saez,** University of California, Berkeley and NBER, "Taxation and International Migration of Superstars: Evidence from the European Football Market" (NBER Working Paper No. 16545)
- **Peter J. Kuhn**, University of California, Santa Barbara and NBER, and **Kailing Shen**, Xiamen University, "Gender Discrimination in Job Ads: Theory and Evidence"

Summaries of these papers may be found at: http://www.nber.org/confer/2011/LSs11/summary.html

Monetary Economics Program Meeting

The NBER's Monetary Economics Program met in Chicago on March 4, 2011. NBER Research Associate Valerie A. Ramey of the University of California, San Diego and Jon Steinsson of Columbia University, organized this program:

- **Harrison Hong**, Princeton University and NBER, and **David Sraer**, Princeton University, "Quiet Bubbles"
- **Judith Chevalier**, Yale University and NBER, and **Anil K Kashyap**, University of Chicago and NBER, "Best Prices"
- **Douglas Davis** and **Oleg Korenok**, Virginia Commonwealth University, "Nominal Price Shocks in Monopolistically Competitive Markets: An Experimental Analysis"
- **James D. Hamilton**, University of California, San Diego and NBER, and **Jing Wu**, University of California, San Diego, "The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment"
- **Karel O. Mertens**, Cornell University, and **Morten Ravn**, University College London, "Fiscal Policy in an Expectations Driven Liquidity Trap"
- **Isabel Correia**, Universidade Catolica Portuguesa; **Emmanuel Farhi**, Harvard University and NBER; **Juan Pablo Nicolini**, Federal Reserve Bank of Minneapolis; and **Pedro Teles**, Universidad di Tella, "Unconventional Fiscal Policy at the Zero Bound"

Summaries of these papers may be found at: http://www.nber.org/confer/2011/MEd11/summary.html

DAE Program Meeting

The NBER's Program on the Development of the American Economy, directed by Claudia Goldin of Harvard University, met in Cambridge on March 5, 2011. These topics were discussed:

- **Richard C. Sutch**, University of California, Riverside and NBER, "Hard Work, Nonemployment, and the Wealth-Age Profile: Evidence of a Life-Cycle Strategy in the United States During the Nineteenth Century"
- **Daniel K. Fetter**, Wellesley College and NBER, "How Do Mortgage Subsidies Affect Home Ownership? VA Home Loans and the Mid-20th Century Transformation in U.S. Housing Markets"
- **Leah Platt Boustan**, University of California, Los Angeles and NBER, and **Robert A. Margo**, Boston University and NBER, "White Suburbanization and African-American Home Ownership, 1940–1980" (NBER Working Paper No. 16702)
- **Karen Clay**, Carnegie Mellon University and NBER; **Jeff Lingwall**, Carnegie Mellon University; and **Melvin Stephens**, University of Michigan and NBER, "Compulsory Attendance Laws and Nineteenth Century Schooling"
- **Erik Heitfield**, Federal Reserve Board of Governors; **Gary Richardson**, University of California, Irvine and NBER; and **Shirley Wang**, Cornell University, "Contagion During the Initial Banking Panic of the Great Depression"
- **Douglas A. Irwin**, Dartmouth College and NBER, "Did France Cause the Great Depression?"(NBER Working Paper No. 16350)

Summaries of these papers may be found at: http://www.nber.org/confer/2011/DAEs11/summary.html

Productivity Program Meeting

The NBER's Program on Technological Progress and Productivity Measurement, directed by NBER Research Associates Nick Bloom of Stanford University and Josh Lerner of the Harvard Business School, met in Cambridge on March 11, 2011. These papers were discussed:

- **Oriana Bandiera and Andrea Prat**, London School of Economics; **Luigi Guiso**, European University Institute; and **Raffaella Sadun**, Harvard University and NBER, "What Do CEOs Do?"
- **Yi Qian**, Northwestern University and NBER, "Counterfeiters: Foes or Friends"(NBER Working Paper No. 16785)
- **Nicola Lacetera**, University of Toronto, and **Justin Sydnor**, Case Western Reserve University, "Is High-Quality Production Location-Specific? Evidence from the Automobile Industry"
- **Leonardo Iacovone**, The World Bank; **Wolfgang Keller**, Princeton University and NBER; and **Ferdinand Rauch**, London School of Economics, "Innovation Responses to Import Competition"
- **Iwan Barankay**, University of Pennsylvania, "Rank Incentives: Evidence from Field Experiments"

Summaries of these papers may be found at: http://www.nber.org/confer/2011/PRs11/summary.html

International Trade and Investment

The NBER's Program on International Trade and Investment met in Cambridge on March 25 and 26, 2011. Program Director Robert C. Feenstra of the University of California, Davis organized the meeting. These papers were discussed:

- **Matthieu Bussiere** and **Giulia Sestieri**, Banque de France; **Giovanni Callegari,** IMF; **Fabio Ghironi**, Boston College and NBER; and **Norihiko Yamano**, OECD, "Estimating Trade Elasticities: Demand Composition and the Trade Collapse of 2008–9"

- **Daniel Paravisini** and **Daniel Wolfenzon**, Columbia University and NBER; **Veronica Rappoport**, Columbia University; and **Philipp Schnabl**, New York University, "Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data"

- **Arnaud Costinot**, MIT and NBER; **Jonathan Vogel**, Columbia University and NBER; and **Su Wang**, MIT, "An Elementary Theory of Global Supply Chains"

- **Richard Baldwin**, Graduate Institute, Geneva and NBER, and **Anthony Venables**, University of Oxford, "Relocating the Value Chain: Offshoring and Agglomeration in the Global Economy" (NBER Working Paper No. 16611)

- **Beatriz de Blas**, Universidad Autonoma de Madrid, and **Katheryn Russ**, University of California, Davis and NBER, "Teams of Rivals: Endogenous Markups in a Ricardian World" (NBER Working Paper No. 16587)

- **David H. Autor**, MIT and NBER; **David Dorn**, CEMFI and IZA; and **Gordon H. Hanson**, University of California, San Diego and NBER, "The China Syndrome: Local Labor Market Effects of Import Competition in the U.S."

- **John McLaren**, University of Virginia and NBER, and **Shushanik Hakobyan**, University of Virginia, "Looking for Local Labor-Market Effects of the NAFTA" (NBER Working Paper No. 16535)

- **Kyle Handley**, University of Maryland, and **Nuno Limao**, University of Maryland and NBER, "Trade and Investment under Policy Uncertainty: Theory and Firm Evidence"

Summaries of these papers may be found at: www.nber.org/confer/2011/ITIs11/summary.html

Bureau Books

The following five volumes may be ordered directly from the University of Chicago Press Distribution Center, at
Telephone: 1-800-621-2736
Email: custserv@press.uchicago.edu

For more information on ordering and electronic distribution, see
http://www.press.uchicago.edu/Misc/Chicago/infopage.html

Commodity Prices and Markets

Commodity Prices and Markets, edited by Takatoshi Ito and Andrew K. Rose, is currently available from the University of Chicago Press for $99.00. This is the twentieth volume in the NBER's East Asia Seminar on Economics series.

Commodity Prices and Markets helps us to understand the consequences of fluctuations in commodity prices, including the price of oil, and provides both a general analysis and a particular focus on the countries of the Pacific Rim. The volume addresses three subjects in particular: the difficulties in forecasting commodity prices; the effects of commodity price shocks on the domestic economy; and the relationship between price shocks and monetary policy.

Ito and Rose are both Research Associates in the NBER's Program on International Finance and Macroeconomics. Ito is also a professor of economics at the University of Tokyo and Rose is a professor of economic analysis and policy at the University of California, Berkeley's Haas School of Business.

Explorations in the Economics of Aging

Explorations in the Economics of Aging, edited by David A. Wise, will be available this spring from the University of Chicago Press for $110.00.

As baby boomers become eligible for Social Security and Medicare over the next twenty years, the United States will undergo a dramatic demographic transition. This NBER Conference Report includes important new findings on how economic decisions by households and policy choices by governments will influence the effects of that shift in the population.

Wise directs the NBER's Program on the Economics of Aging and is the John F. Stambaugh Professor of Political Economy at Harvard University's Kennedy School of Government.

The Economics of Climate Change: Adaptations Past and Present

The Economics of Climate Change: Adaptations Past and Present, edited by Gary D. Libecap and Richard H. Steckel, is available from the University of Chicago Press this spring for $110.00.

This NBER Conference Report takes a close look at the ways in which economies—particularly that of the United States—have adjusted to the challenges posed by climate change, including developing new crop varieties, using both irrigation and flood control, and creating ingenious ways to extend cultivation to new geographic areas.

Libecap and Steckel are Research Associates in the NBER's Program on the Development of the American Economy. Libecap is also a professor of economics at the University of California, Santa Barbara. Steckel is a professor of economics at Ohio State University.

Economic Aspects of Obesity

Economic Aspects of Obesity, edited by Michael Grossman and Naci Mocan, will be available this spring from the University of Chicago Press for $110.00.

Over the past thirty years, the number of obese adults in the United States has doubled; the number of obese children has nearly tripled. Economic analysis has shown that weight gain results from individual choices that respond to the economic environment, and that incentives can influence individual behaviors, which in turn will affect weight. Food prices, the availability of food outlets and recreational facilities, health insurance, and minimum wage levels all influence what we eat, whether we exercise, and how we control our weight.

This timely NBER Conference Report provides a strong foundation for evaluating the costs and benefits of various proposals designed to control obesity rates. Editor Michael Grossman directs the NBER's Program on Health Economics, of which co-editor Naci Mocan is a member. Grossman also directs the Ph.D. Program in Economics at City University of New York Graduate Center, and Mocan is a professor of economics at Louisiana State University.

Accelerating Energy Innovation: Insights from Multiple Sectors

Accelerating Energy Innovation: Insights from Multiple Sectors, edited by Rebecca M. Henderson and Richard G. Newell, will be available from the University of Chicago Press this spring for $99.00.

This NBER Conference Report explores the roles of public and private policy in enabling and sustaining innovation in a variety of industries, from agriculture and the life sciences to information technology. The book includes chapters highlighting the factors that have determined the impact of past policies. The research results reported here suggest that effectively managed federal funding, strategies for increasing customer demand, and enabling aggressive competition from new firms are all important for encouraging innovative activity.

Henderson is a Research Associate in the NBER's Program on Productivity and Heinz Professor of Environmental Management at Harvard Business School. Newell is the Gendell Associate Professor of Energy and Environmental Economics at Duke University and administrator of the U.S. Energy Information Administration.

The following volume may be ordered directly from the University of Chicago Press Journals Division.

To order by telephone, call Monday through Friday, 8 am to 5 pm Central Time, (773) 753-3347; or toll-free in the U.S. and Canada, (877) 705-1878. To order by mail, the address is: University of Chicago Distribution Center, 11030 South Langley Avenue, Chicago, IL 60628, (773)702-7000

NBER Macroeconomics Annual 2010, Volume 25

NBER Macroeconomics Annual 2010, Volume 25, edited by Daron Acemoglu and Michael Woodford, is available this spring, both in paperback for $60.00 and online at this address: http://www.jstor.org/action/showPublication?journalCode=nbermacrannu

Among the topics discussed in this volume are: what fiscal policy is effective at zero interest rates; the relationship between technology diffusion and postwar growth; how oil, automobiles, and the U.S. economy interact; and some macroeconomic lessons from the Great Deviation.

Both volume editors are NBER Research Associates in the Program on Economic Fluctuations and Growth. Acemoglu is also a professor at MIT and Woodford is at Columbia University.

NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue
Cambridge, Massachusetts 02138-5398
(617) 868-3900

Change Service Requested