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## Program Report

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### IN THIS ISSUE

Program Report	
Law and Economics	1
Research Summaries	
Happiness Economics	7
Understanding Social Networks	11
NBER Profile	13
Conferences	14
NBER News	24
Program and Working Group Meetings	28
Bureau Books	46

## Law and Economics

Christine Jolls\*

The NBER's Law and Economics Program studies the effects and causes of legal rules, with a special focus on the foundational legal subjects — property law, criminal law, contract law, and tort law — and on the operation of the legal process. In regard to the operation of the legal process, the Program examines topics such as labor markets for lawyers, litigation dynamics, judicial and agency behavior, and the determinants of legislative action. In addition, the Program studies the effects and causes of legal rules across a range of legal subjects beyond property, criminal, contract, and tort law, including corporate law, employment law, health care law, social welfare law, family law, bankruptcy law, patent and copyright law, and antitrust law.

The Program meets twice per year, once at a mid-year program meeting and again at the NBER's Summer Institute. The Program's recent special activities include a project in the area of corporate governance, under the direction of Research Associate Lucian Bebchuk; selected papers from that project are scheduled to appear in a forthcoming issue of the *Review of Financial Studies*.

In this article, I first describe recent research in the foundational legal subjects and then turn to work on the operation of the legal process. I conclude with an overview of work on the effects and causes of legal rules in corporate law, employment law, health care law, social welfare law, family law, bankruptcy law, patent and copyright law, and antitrust law.

In 2007, we converted from issuing quarterly, seasonal issues to a system of numbered issues. This is the second issue of 2008 under the new numbering system: 2008 Number 2.

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\* Jolls directs the NBER's Law and Economics Program and is a professor at Yale Law School. In this article, the numbers in parentheses refer to NBER Working Papers. Steven Shavell, the previous director of the Law and Economics Program, provided extremely helpful feedback on this Program Report.

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## Property Law, Criminal Law, Contract Law, and Tort Law

A fundamental aspect of any legal system is the structure of property rights. Recent work by Oliver Hart (1974) is the latest in an important line of papers by Hart, Sanford Grossman, and John Moore that examine the effects of a particular conception of property rights emphasizing "residual control." In this view, the owner of an asset retains those rights to the asset that are not specifically assigned by any existing contractual commitment. While previous papers in the series have examined the effects of the residual control rights conception of property rights in the face of parties' non-contractible up-front investments, the recent paper by Hart studies the effects of property rights of this form in a model with uncertainty of values and costs of a good to be traded. Hart's model suggests that ex-ante contracting over asset ownership can reduce later incentives to engage in hold-up. A system that did not provide for property rights in the Grossman-Hart-Moore sense (reserving residual rights to the state rather than to the property owner) would be inferior within this framework.

Also central to the structure of property rights is the question of when government may obtain ownership of assets from unwilling private parties. In a recent paper (1974), Steven Shavell models the desirability of allowing government takings of private land by its eminent domain power when the government's information about owners' valuations is imperfect. Shavell shows that eminent domain becomes appealing if the number of property owners is large, in order to overcome a problem of "honest" holdout. This conclusion holds regardless of whether the land that the government seeks is a parcel at a fixed location or instead is located anywhere in a region.

A legal system determines what, if any, conduct should be subject to criminal sanctions and establishes the shape of those sanctions. An extensive recent law and economics literature studies the effects of various forms of criminalization. John Donohue and Justin Wolfers (1982) examine the potential deterrent effects of the ultimate criminal sanction — the death penalty, which is reserved predominantly for homicides. While there is some variation in the use of capital punishment, both across time and across states with different legal regimes,

Donohue and Wolfers conclude that this variation is small when compared with the large swings in the homicide rate; even when the use of the death penalty increases, the absolute number of executions remains quite small. Thus, existing results linking capital punishment to reductions in the homicide rate prove to be extremely fragile, and the data that are presently available do not allow any strong inference about even the sign of the deterrent effect of capital punishment.

Current law subjects criminal sex offenders to a variety of registration and notification laws that, respectively, require convicted sex offenders to provide valid contact information to law enforcement authorities and mandate that information about sex offenders be made public. In recent work, J.J. Prescott and Jonah E. Rockoff (13803) offer new evidence on these laws' effects. Using fine-grained information on state registration and notification laws, Prescott and Rockoff present evidence that sex offenses against neighbors declined with the adoption of registration laws and that notification laws deter potential offenders with no prior record while increasing recidivism among those who have previously committed sex offenses.

As the property rights work described earlier reveals, the value of property rights is intertwined with the ability of parties to enter into contracts governing the use of their property. Contract law determines whether and how agreements among parties will be legally enforced. A major part of the function of contract law is to determine whether and how to fill gaps in parties' contracts. Are the existing gap-filling rules of contract law efficient? Work by Surajeet Chakravarty and Bentley MacLeod (13960) provides an affirmative answer with respect to a range of contract law rules—including the important rule setting “expectation damages” as the standard measure of damages for breach of contract—in a model informed by standard industry contracting practices.

Tort law imposes civil—as distinguished from criminal—liability on certain forms of behavior that society wishes

to deter. Civil liability creates obligations of one private party to another rather than liability of an individual to the state, as in criminal law. Much recent work in tort law has been in the area of products liability—the liability of firms to consumers for injuries sustained in using a firm's products. Firms' liability generally will affect the price of products, and in recent work Andrew Daughety and Jennifer Reinganum examine consumer inferences about product quality from price variation.<sup>1</sup> In Daughety and Reinganum's model, price is a signal of product quality. Instead of signaling quality through price, though, firms may choose to disclose quality directly. Daughety and Reinganum show that firms may inefficiently choose signaling over disclosure of product quality when marginal cost, including the cost of legal liability, is increasing in product safety.

A. Mitchell Polinsky and Shavell (12776) also examine the relationship between products liability law and firms' disclosure behavior. In the absence of liability for product harms, there is a tradeoff between forced sharing of information and firms' willingness to accumulate information in the first place. When firms face liability irrespective of their degree of fault for the harms caused by products, by contrast, mandatory disclosure does not affect the information that is disclosed and, thus, does not affect the information that is accumulated.

In many circumstances, products liability law does make firms, irrespective of their degree of fault, liable to consumers for the harms caused by products—a regime called “strict liability.” This form of liability for product harms is ordinarily justified by reference to informational and cognitive failures of consumers, but in recent work Cass Sunstein and I (11738) explore the potential effects of responding to these failures, not with strict liability, but rather with requirements to engage in “debiasing” communications designed to reduce consumer errors. We distinguish such debiasing communications from conventional informational mechanisms and suggest that legal debiasing strategies hold significant promise

for understanding and improving diverse forms of regulation of risky products.

## The Operation of the Legal Process

The legal process involves many players, including lawyers, litigants, judges, agencies that administer federal and state statutes, and legislatures. In regard to lawyers, a number of recent papers have analyzed labor markets for lawyers. In one paper, Jesse Rothstein and Albert Yoon provide empirical evidence on the so-called “mismatch hypothesis”—that affirmative action in law school admissions hurts minority students who attend more selective schools than they otherwise would have and, as a result, experience lower graduation rates and less success in passing the bar.<sup>2</sup> According to Rothstein and Yoon, mismatch effects in fact are observed only for minority students with the weakest entering credentials—students who, without affirmative action, often would not have been admitted to any law school. For minority students with moderate or strong entering credentials, Rothstein and Yoon find no evidence of mismatch effects in either graduation or bar passage rates.

Christopher Avery, Richard A. Posner, Alvin E. Roth, and I (13213) examine another aspect of the labor market for lawyers—the market for federal judicial law clerks. The hiring process for law clerks has long been characterized by the type of unraveling of transaction times that has also been observed in many other entry-level labor markets. Avery, Posner, Roth, and I surveyed both federal appellate judges and clerkship applicants and found clear evidence of substantial non-adherence to official judicial timing guidelines intended to prevent the hiring of clerks before a designated time. We describe, however, ways that judges and clerks might settle at an equilibrium level of imperfect, but still meaningful, adherence to the designated start date regime.

Lawyers, along with the clients they represent, resolve many of the lawsuits in which they are involved without any recourse to the courtroom. In fact, the

overwhelming majority of lawsuits are settled by the parties prior to trial. An important set of law and economics papers has modeled the bargaining process between opposing parties over whether to agree to a pretrial settlement. In recent work, Yasutora Watanabe fits a dynamic model of such litigant bargaining to data on the time, mode, cost, and terms of settlement of a large set of legal disputes.<sup>3</sup> The model's fit with the data suggests that asymmetric initial beliefs and the opportunity for learning over time are important features of litigation-settlement bargaining.

Turning to judicial behavior, a line of recent papers by Andrei Shleifer and coauthors has examined common law decisionmaking in a system of judge-made law. The first paper in this series, by Shleifer and Nicola Gennaioli, models the evolution of legal rules in common law courts (11265); in the most recent work, Shleifer, Anthony Nisbett, and Richard Posner turn to a specific set of decided cases to examine the evolution of a particular legal rule in action (13856). The theoretical model provides a foundation for the evolutionary adaptability of common law, while in the actual set of decided cases there was no evidence of convergence to any stable resting point.

Judges often make decisions in groups, and in recent work Edward Glaeser and Sunstein (13687) model the evolution of group members' views as a result of deliberations. One common effect of group deliberation is polarization, in which individuals' pre-deliberation views become more extreme as a result of the deliberations. Glaeser and Sunstein show that polarization may, but need not, follow from rational Bayesian updating by group members.

Glaeser and Sunstein's analysis has implications for decisionmaking not only by judges but also, as they note, by members of decisionmaking bodies within government agencies. Other recent work in law and economics has studied a variety of effects of government agency action. For instance, Rafael La Porta, Florencio Lopez-de-Silanes, and Shleifer (9882) examine the relationship between government agency enforcement

activity and stock market development across nations. Using measures of the legal powers of government agencies charged with enforcement of securities laws, they find little relationship. Howell Jackson and Mark Roe, by contrast, use measures of budgets and staffing of such securities enforcement agencies in several samples of about 40 nations and find significant association between enforcement agencies' resources and those nations' financial market outcomes.<sup>4</sup>

A third type of body engaged in law making and law enforcement, alongside courts and government agencies, is the legislature. Legislative behavior may be influenced by, among other things, campaign contributions and the information that legislators receive from lobbyists and other interest-group actors. Recent work by Charles Cameron and John de Figueiredo offers empirical evidence on the second, information-mediated type of influence.<sup>5</sup> They find strong evidence that interest-group expenditures on informational lobbying vary with legislative budget cycles—rather than electoral cycles—as well as with the ideological distance between the interest group and the party in legislative power. Cameron and de Figueiredo's empirical results are consistent with leading theoretical models on informational lobbying.

### **Corporate Law, Employment Law, Health Care Law, Social Welfare Law, Family Law, Bankruptcy Law, Patent and Copyright Law, and Antitrust Law**

An extremely active area of research considers the effects and causes of corporate law. Papers in this area have been featured both in regular Law and Economics Program sessions and in sessions conducted by the Corporate Governance Project.

In studying the effects of corporate law rules, much recent attention has been paid to legal rules—many of them enacted in the wake of the collapse of Enron—requiring increased trans-

parency of corporate financial information. Benjamin Hermalin and Michael Weisbach (12875) offer a model in which such increased transparency may, contrary to its presumed intent, reduce firm profits and increase executive compensation. Increased transparency in Hermalin and Weisbach's model may also increase the rate of turnover of chief executive officers.

Backdating of stock option grants has been a source of substantial Securities and Exchange Commission activity, as well as private litigation, in recent years. In a pair of studies (12771, 12811), Bebchuk, Yaniv Grinstein, and Urs Peyer document both the frequency and the corporate governance correlates of option grant backdating and other forms of opportunistic option grant timing. The correlates of such behavior include a smaller fraction of independent members of the board of directors (for both CEO option grants and director option grants) and longer CEO tenure (for CEO option grants).

Corporate law structures the exercise of shareholder votes, and recent work by Yair Listokin studies the effects of the existing structure on voting outcomes.<sup>6</sup> Listokin examines the results of shareholder voting on management-sponsored resolutions in “close” cases, in which management's share of the vote is within 10 percentage points of the cutoff point for success (which is typically 50 percent). He finds that management overwhelmingly wins these close votes. His conclusion is that the existing structure of shareholder voting is not effective in producing voting outcomes that mirror underlying shareholder preferences.

Alongside the study of the effects of corporate law, recent research examines the causes of corporate law. In a model of interest group lobbying in the context of corporate lawmaking (13702), Bebchuk and Zvika Neeman identify a range of circumstances under which such lobbying leads to an inefficiently low level of investor protection. Their model indicates that observed correlations between countries' levels of investor protection and these countries' economic performance may reflect the effects of the second factor on

the first as well as (what has been emphasized by the existing literature) the effects of the first factor on the second.

In addition to managers and shareholders, firms are populated by employees, whose relationship with their firm is regulated by employment law. Many provisions of employment law mandate that particular benefits be provided to employees. One very economically significant mandate in the employment context is the Social Security program, which requires payroll deductions to fund government benefits upon disability or retirement of employees. Research by David Autor and Mark Duggan (12436) analyzes upward trends in the level of Social Security disability payments in recent decades. Autor and Duggan link these increases to changes in legal qualification standards, in real benefit levels, and in the size of the workforce.

Recent work by Louis Kaplow (12452) analyzes Social Security using a model that incorporates myopia on the part of employees. Kaplow studies the effect of Social Security on labor supply in the presence of myopic employees who give excessive weight to present payroll deductions that finance distant future benefits. Kaplow's model shows that even with myopia, Social Security may cause labor supply either to rise or to fall depending on the curvature of individuals' utility as a function of consumption and on whether individuals' myopia extends to labor supply choice as well as savings decisions.

Another important federal employment mandate involves medical leave under the Family and Medical Leave Act of 1993 (FMLA), which I study in a recent paper.<sup>7</sup> Exploiting variation across states in the presence or absence of mandated medical leave at the state level prior to the FMLA's enactment, I find positive employment effects of mandated medical leave for individuals with disabilities. I suggest that this result may reflect the absence of hiring disincentives from mandated medical leave given the limited observability of many leave-necessitating medical conditions at the time of hiring.

Health care law is a rapidly grow-

ing field spanning an enormous range of research questions. One important question concerns the effects of legal rules intended to increase the availability to patients of health-care-related information. Recent work by M. Kate Bundorf, Natalie Chun, Gopi Shah Goda, and Daniel P. Kessler (13888) studies the effects of mandated health care provider "report cards" that include detailed information on medical outcomes. Using a unique identification strategy, the authors find that mandated birth-rate information for infertility treatment centers increases the market share of centers with high success rates.

Medical malpractice is another major aspect of health care law (as well as an aspect of tort law). In a recent paper, Janet Currie and MacLeod (12478) study the effects of medical malpractice law reform within the field of obstetrics—a branch of medicine thought to have been particularly hard hit by the "liability crisis" in medical malpractice law. Thus, Currie and MacLeod examine how reform in this area has affected the types of procedures performed in childbirth and the ensuing health outcomes. They introduce a model of physician behavior that allows for differential effects across patient characteristics and that provides a new way to model alternative liability rules. Empirically, Currie and MacLeod find that while some medical malpractice reforms have positive effects on health outcomes, imposing caps on non-economic damages has negative effects.

Patricia Born, W. Kip Viscusi, and Tom Baker (12086) also examine the effects of medical malpractice law reform. While a substantial literature examines the effects of such reform on insurers' incurred losses, Born, Viscusi, and Baker are able to look at longer-term effects. They find these longer-term effects to be especially significant for non-economic damage caps.

Another important category of law is social welfare law, which mandates benefits for children, for individuals who at the age of majority are not able to live independently, and for adults who, though free of any recognized disabil-

ity, have not achieved financial independence. Steven D. Levitt and Joseph J. Doyle (12519) analyze the likely effects of an important mandate intended to protect children—the requirement that children under specified ages (which vary across states in the United States) ride in child safety seats. Using several datasets containing information on auto accident injuries and types of child restraint in use, Levitt and Doyle find that standard lap-and-shoulder seat belts perform as well as child safety seats in preventing serious injury for children aged 2 through 6. Child safety seats, however, are more effective in preventing less serious injury for this age group. Thus, Levitt and Doyle's findings suggest that existing mandates of child safety seats have some effect in reducing injury, though perhaps not the primary sort of effect legislators intended.

Family law is another active area of law and economics research, and changes in divorce law in recent decades have been a particular focus of study. Betsey Stevenson examines the effect on investment in marriage-specific capital of the move to divorce "on demand."<sup>8</sup> She finds that this change reduced the number of children produced by the marriage, spouses' willingness to invest in their partners' education, and spouses' likelihood of choosing to have one partner remain out of the labor force.

The effects of bankruptcy law have been the subject of several recent papers. Within the United States, both federal and state law are relevant to the bankruptcy process. Recent work by Edward Morrison shows that most distressed firms use state law to liquidate or reorganize and that the attractiveness of state law varies in predictable ways with its nature—and particularly with the degree of transparency of the state insolvency process.<sup>9</sup> Because the choice between federal and state regimes turns on a comparison of the two, reform of federal bankruptcy law may have unanticipated effects if some firms switch away from the federal regime in response to the reform.

Around the world, bankruptcy regimes exhibit a range of features, and a

recent paper by Simeon Djankov, Caralee McLiesh, and Shleifer explores how the legal rights of creditors in bankruptcy relate to the level of credit extended in a country. In a sample of 129 countries over a quarter century, the authors find a positive effect of legal protection of creditors on the level of credit extended. That effect is observed both in the cross section and longitudinally when a given country expands the legal protection it affords to creditors.

Patent and copyright law govern the circumstances under which inventors and creators will be awarded special property rights. With respect to inventions, patent law requires that an invention be “non-obvious” in order to receive patent protection. Nisvan Erkal and Suzanne Scotchmer suggest that models in which invention is a product solely of investments in research and development fail to capture the full scope of the non-obviousness requirement.<sup>10</sup> In their analysis, invention is a product not only of financial investments but also of scarce, creative ideas. When an idea comes along, a potential innovator faces a choice of whether to invest in the idea or to take the chance that the market niche in question may be filled by someone else who comes along later with a substitute idea. In Erkal and Scotchmer’s model, conditioning the reward for innovation on the level of non-obviousness is shown to be optimal.

A longstanding focus within law and economics has been antitrust law. In recent work, Tomas Philipson and Richard Posner continue in this line

(12132). Philipson and Posner address a basic question: should antitrust law apply in the same way to non-profit firms as to for-profit firms? In their model, not only is there no ground for lesser antitrust scrutiny of non-profit firms, but also in some circumstances the welfare gains from antitrust regulation are greater than in the case of for-profit firms.

In antitrust law as in many other areas of law, the social welfare effects of legal regulation depend in part on the character of market relationships in the absence of regulation. Within the antitrust domain, a major question for researchers has been the degree to which incumbent monopolists can succeed in excluding rivals through contracts with downstream buyers. Complementing a line of important theoretical models analyzing this question, Claudia Landeo and Kathryn Spier offer recent experimental evidence on the use of exclusionary contracts.<sup>11</sup> They find that such exclusionary contracts do occur both when downstream buyers are not able to communicate with one another and when they can engage in such communication. Their results complement theoretical models suggesting that regulation of exclusive dealing contracts may be welfare enhancing.

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<sup>1</sup> A. Daughety and J. Reinganum, “Products Liability, Signaling, and Disclosure,” NBER Summer Institute Law and Economics Workshop 2007.

<sup>2</sup> J. Rothstein and A. Yoon, “Mismatch in Law School,” NBER Law and Economics Program Meeting 2007.

<sup>3</sup> Y. Watanabe, “Learning and Bargaining in Dispute Resolution: Theory and Evidence from Medical Malpractice Litigation,” NBER Summer Institute Law and Economics Workshop 2006.

<sup>4</sup> H. Jackson and M. Roe, “Public and Private Enforcement of Securities Laws: Resource-Based Evidence,” NBER Summer Institute Law and Economics Workshop 2008.

<sup>5</sup> J. de Figueiredo and C. Cameron, “Endogenous Cost Lobbying: Theory and Evidence,” NBER Law and Economics Program Meeting 2007.

<sup>6</sup> Yair Listokin, “Management Always Wins the Close Ones,” NBER Summer Institute Law and Economics Workshop 2007.

<sup>7</sup> C. Jolls, “Mandated Medical Leave in the Workplace,” NBER Summer Institute Law and Economics Workshop 2006.

<sup>8</sup> B. Stevenson, “The Impact of Divorce Laws on Marriage-Specific Capital,” NBER Summer Institute Law and Economics Workshop 2006.

<sup>9</sup> E. Morrison, “Bargaining Around Bankruptcy: Small Business Distress and State Law,” NBER Law and Economics Program Meeting 2007.

<sup>10</sup> N. Erkal and S. Scotchmer, “Scarcity of Ideas and Options to Invest in R&D,” NBER Law and Economics Program Meeting 2008.

<sup>11</sup> C. Landeo and K. Spier, “Naked Exclusion: An Experimental Study of Contracts with Externalities,” NBER Summer Institute Law and Economics Workshop 2008.

### Happiness Economics

David G. Blanchflower\*

Despite Thomas Carlyle's claim, when he was arguing that slavery was morally superior to the market, economics is no longer the *dismal science*.<sup>1</sup> A growing body of literature in the economics of happiness and mental well-being has emerged. It is now fashionable to try to understand the pursuit of happiness, and, after a long delay, the ideas promoted originally by Richard Easterlin are attracting worldwide attention.<sup>2</sup> There is even a World Database of Happiness.

Anyway, I came to the topics of happiness and well-being as a labor economist who had mostly worked on wages, and who early on was struck by the stability of the Mincerian earnings function across time and space. The basic structure of a log earnings equation, no matter what dataset was used and what country it is estimated for, has a similar structure. It turns out that there are patterns in the well-being data. I am struck by the fact that there is a great deal of stability in happiness and life-satisfaction equations, no matter what country we look at, what dataset or time period, whether the question relates to life satisfaction or happiness, and how the responses are coded whether in three, four, five or even as many as ten categories.

In general, economists have focused on modeling three fairly simple questions on life satisfaction and happiness, and that is what I have done mostly in my

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research, primarily with Andrew Oswald at the University of Warwick, but also with David Bell at the University of Stirling; Chris Shadforth at the Bank of England, and Richard Freeman from Harvard.

Typical questions are: 1) Happiness — for example from the General Social Survey, *Taken all together, how would you say things are these days — would you say that you are very happy, pretty happy, or not too happy?* 2) Life satisfaction — for example from the European Eurobarometer Surveys, *On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?* 3) Psychological health and mental strain — for example from the British Household Panel Survey, *Such as the GHQ score, which amalgamates answers to questions about how well people have been sleeping, their level of confidence, feelings of depression, among others.*<sup>3</sup>

The micro data on happiness are easily obtainable from most data archives including ICPSR for the GSS and the Eurobarometers, the Data Archive at the University of Essex and ZACAT in Germany for the Eurobarometers, ISSP, European Social Survey, BHPS, GSOEP, European Quality of Life Survey, European Social Surveys and so on. Life satisfaction data are also now available annually from the Latinobarometers, while happiness data are also available annually in the Asianbarometers. Several of the data series extend back at least to the early 1970s. Some are panels (BHPS, GSOEP).

Economists have had longstanding reservations about the reliability of

interpersonal comparisons of well-being. Psychologists, however, view it as natural that a concept such as happiness should be studied in part by asking people how they feel. One definition of happiness is the degree to which an individual judges the overall quality of his or her life as favorable. As a validation of the answers to recorded happiness levels, it turns out that answers to happiness and life satisfaction questions are correlated with: 1) objective characteristics such as unemployment; 2) assessments of the person's happiness by friends and family members; 3) assessments of the person's happiness by his or her spouse; 4) heart rate and blood-pressure measures of response to stress; 5) the risk of coronary heart disease; 6) duration of authentic or so-called Duchenne smiles (a Duchenne smile occurs when both the zygomatic major and orbicularis oris facial muscles fire, and human beings identify these as "genuine" smiles); 7) skin-resistance measures of response to stress; 8) electroencephalogram measures of prefrontal brain activity.

It is apparent that most people are happy (or, more precisely, mark themselves fairly high up on a scale). This finding has subsequently been replicated in many datasets over many time periods and for numerous countries. For example, in the United States in 2006 only 13 percent of people in the GSS said they were not very happy, 56 percent were pretty happy, and 31 percent very happy. In Eurobarometer 67.2 for April-May 2007 (ICPSR#21160) for the European Union (EU) 15 in 2007, for example, 3 percent said they were not

at all satisfied, while 12 percent were not very satisfied, 60 percent fairly satisfied, and 24 percent very satisfied. In the 2005 *Latinobarometers*, which also asked the same 4-step life satisfaction question in eighteen Latin American countries, 4.6 percent said they were not at all satisfied, 25.4 percent were not very satisfied, 39.7 percent were fairly satisfied, and 30.3 percent very satisfied.

There are a number of common patterns in the determinants of happiness, which have been replicated in a number of other papers. Happiness and life satisfaction tends to be higher among a) women, b) people with lots of friends, c) the young and the old, d) married and cohabiting people, e) the highly educated, f) the healthy, g) those with high income, h) the self-employed, i) people with low blood pressure, j) those who have sex at least once a week with the same partner, k) right-wing voters, l) the religious, m) members of non-church organizations, n) volunteers, o) those who take exercise, and p) those who live in western countries.<sup>4</sup> The self-employed especially value their independence.<sup>5</sup> It turns out that the main findings from responses on both happiness and life satisfaction are also broadly replicated in data on unhappiness, hypertension, stress, depression, anxiety, and pain from a considerable number of cross-country data sources.<sup>6</sup> Happy people are less likely to commit suicide.<sup>7</sup>

There is also evidence of adaptation. Good and bad life events wear off, at least partially, as people get used to them. Oswald and Powdthavee provide longitudinal evidence that people who become disabled go on to exhibit considerable recovery in mental well-being.<sup>8</sup> In fixed-effects equations they estimate the degree of hedonic adaptation at — depending on the severity of the disability — approximately 30 percent to 50 percent.

I recently compared the results using data on life satisfaction and happiness with those from evaluated time use<sup>9</sup> and in particular the U-index (for “unpleasant” or “undesirable”) as propounded by Krueger et al for use in *National Time Accounting*.<sup>10</sup> The U-index is designed to measure the proportion of time an individual spends in

an *unpleasant* state. Encouragingly, there are many similarities in the findings. For example, both the U-index and conventional measures show higher levels of well-being among wealthier, higher educated and older individuals. One attraction of the evaluated time use data, though, is that it can be used to understand why some groups are happier than others.

In the United States happiness has trended downward over time, but the picture is rather more mixed in Europe: using the Eurobarometer life satisfaction questions, when an ordered logit is estimated with controls for education, age, gender, schooling, marital status, and labor market status, nine countries have positive time trends (Denmark; Finland; France; Italy; Luxembourg; Netherlands; Spain; Sweden; and the United Kingdom.) Austria and Ireland have no significant time trend while Belgium, Germany, Greece, and Portugal have significant *downward* trends. There is evidence from developing countries of a steeper upward trend in happiness. This is especially apparent in Latin America and among the eight Eastern European countries that joined the European Union in 2004.<sup>11</sup>

There is evidence though of a downward trend in happiness for women and an upward trend for men in the United States<sup>12</sup>. Betsey Stevenson and Justin Wolfers confirmed this finding for the United States and also found that women’s declining relative well-being is found in multiple countries, datasets, and measures of subjective well-being, and is pervasive across demographic groups.<sup>13</sup> Relative declines in female happiness have eroded a gender gap in happiness in which women in the 1970s typically reported higher subjective well-being than did men. These declines have continued and a new gender gap may be emerging, one with higher subjective well-being for men.

A small literature, begun by Rafael Di Tella and his co-authors, has found that both unemployment and inflation lower happiness.<sup>14</sup> This is true even after controlling for country fixed effects and year effects. My paper extends the literature by looking at more countries over a longer time period. It also considers the impacts

on happiness of GDP per capita and interest rates.<sup>15</sup> I find, conventionally, that both higher unemployment and higher inflation lower happiness. Interest rates are also found to enter happiness equations negatively. Changes in GDP per capita have little impact on more economically developed countries, but do have a positive impact in the poorest countries — consistent with the Easterlin hypothesis. I find that unemployment depresses well-being more than inflation. The least educated and the old are more concerned about unemployment than inflation. Conversely, the young and the most educated are more concerned about inflation. An individual’s experience of high inflation over their adult lifetime lowers their current happiness over and above the effects from current inflation and current unemployment. Unemployment appears to be more costly than inflation in terms of its impact on wellbeing.

Oswald and I found that the well-being of the young had risen both in the United States and Europe.<sup>16</sup> Explaining why was difficult. This is still the case: in the GSS the time trend is positive for those aged under 30 and flat for those aged 30 and higher. In Europe using pooled Eurobarometers there is a significant upward time trend for both but much stronger for the young. We ruled out that it was explained by a decline in the chance of war with the Eastern bloc, falling discrimination, changing education and work, or the rise in youth-oriented consumer goods. The paper demonstrated that most of the increase is to be found in the group who were unmarried.

In a 2004 paper, Oswald and I estimated the dollar values of events like unemployment and divorce.<sup>17</sup> They are large. For the typical individual, a doubling of salary makes a lot less difference than life events like marriage or unemployment. A lasting marriage (compared to widowhood as a “natural” experiment), for example, is estimated to be worth \$100,000 a year. Further calculation suggests that to “compensate” men exactly for unemployment would take a rise in income of \$60,000 per annum, and to “compensate” for being black would take \$30,000 extra per annum. Oswald and Powdthavee find



that using GHQ mental distress as the measure of well-being, the hedonic compensation annual amount *in the first year* for the death of a child might be of the order of £100,000 (\$200,000).<sup>18</sup> These are all large sums, and in a sense reflect the low (happiness) value of extra income. Money, it seems, does not buy more sexual partners or more sex.<sup>19</sup>

The data show that richer people are happier and healthier, but can we be sure about causality? As in other areas of economics, this is both of central importance and difficult to establish beyond all doubt. One attempt, by Jonathan Gardner and Oswald, found that Britons who receive lottery wins of between £1,000 and £120,000 go on, compared to those who receive tiny wins, to exhibit better psychological health.<sup>20</sup> But Oswald and I found that individuals in the United States were found to be less happy if their incomes are far above those of the poorest people. However, people do appear to compare themselves more with well-off families, so that perhaps they get happier the closer their income comes to that of rich people around them. Relative income certainly appears to matter. Erzo Luttmer finds, for the United States, that higher earnings of neighbors are associated with lower levels of self-reported happiness, controlling for an individual's own income.<sup>21</sup> Alberto Alesina and his co-authors find, using a sample of individuals across the United States (1981–96) and Europe (1975–92) that individuals have a lower tendency to report themselves as happy when inequality is high, even controlling for individual income. The effect is stronger in Europe than in the United States.<sup>22</sup>

Life satisfaction scores predict reasonably well the scale of the flow of workers coming to the United Kingdom from the eight Accession countries of the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. These countries joined the European Union in 2004 and only the United Kingdom and Ireland gave them the right to work. In these countries the levels of happiness are low.<sup>23</sup> The propensity to migrate is more highly correlated with life satisfaction scores than it is with GDP

per capita, the unemployment rate, or the employment rate.<sup>24</sup>

Consistent with other research, Oswald and I recently documented, using evidence on over two million people, that psychological well-being is U-shaped through life.<sup>25</sup> A difficulty with research on this issue is that there are likely to be omitted cohort effects (earlier generations may have been born in, say, particularly good or bad times). First, using data on 500,000 randomly sampled Americans and West Europeans, the paper designs a test that can control for cohort effects. Holding other factors constant, we show that a typical individual's happiness reaches its minimum on both sides of the Atlantic and for both males and females in middle age. Second, evidence is provided for the existence of a similar U-shape through the life-course in East European, Latin American, and Asian nations. Third, a U-shape in age is found in separate well-being regression equations in 72 developed and developing nations. Fourth, using measures that are closer to psychiatric scores, we document a comparable well-being curve across the life cycle in two other datasets: 1) in GHQ-N6 mental health levels among a sample of 16,000 Europeans, and 2) in reported depression-and-anxiety levels among one million UK citizens. Fifth, we discuss some apparent exceptions, particularly in developing nations, to the U-shape. Sixth, we note that American male birth-cohorts seem to have become progressively less content with their lives. More, truly longitudinal research on this topic would be valuable.

In surveys of well-being, countries such as Denmark and the Netherlands emerge as particularly happy while nations like Germany and Italy report lower levels of happiness. But are these kinds of findings credible? Oswald and I provide some evidence suggesting that the answer is yes.<sup>26</sup> Using data on 16 countries, we show that happier nations report systematically lower levels of hypertension. As well as potentially validating the differences in measured happiness across nations, this suggests that blood-pressure readings might be valuable as part of a national well-being index.

In a pair of articles Oswald and I studied well-being in Australia along with a published response by Andrew Leigh and Justin Wolfers.<sup>27</sup> According to the HDI, Australia now ranks third in the world. That places the country above all the other English-speaking nations. This article raises questions about that assessment. It reviews the new work on happiness economics, considers implications for policymakers, and examines where Australia lies in international subjective well-being rankings. Using new ISSP data on approximately 50,000 randomly sampled individuals from 35 nations, the article shows that Australia lies close to the bottom of an international ranking of job satisfaction levels. Among a sub-sample of English-speaking nations, where a common language should help subjective well-being measures to be reliable, Australia performs fairly poorly on a range of happiness indicators. Moreover, Australia has the highest overall suicide rate. This appears to be a paradox.

The literature on the economics of well-being is currently growing at a remarkable rate. If one takes the view that human happiness is ultimately the most important topic in social science, perhaps — after decades where economists lagged behind other social scientists — this should not be surprising. However, we still have a great deal to learn. Is the Easterlin Paradox — that happiness at a national level does not increase with wealth once basic needs are fulfilled — correct or only an approximation to the truth? Are relative-wage effect comparisons always harmful to people? How should we think about the connections between mental health and what economists have traditionally called utility? What are the deep links between money and happiness? The next decade is likely to see a great deal of work on these important topics.

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<sup>1</sup> “...I should say, like some we have heard of, no, a dreary, desolate, and indeed, quite abject and distressing one, what we might call, by way of eminence, the dismal science” Thomas Carlyle, 1849.

<sup>2</sup> R.A. Easterlin, “Does Economic Growth Improve The Human Lot?”

*Some Empirical Evidence*” in *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz*, P. A. David and M. W. Reder, eds. New York: Academic Press (1974), and R. A. Easterlin, “Will Raising the Incomes of All Increase the Happiness of All?” *Journal of Economic Behavior and Organization*, 27 (June 1995), pp. 35–48.

<sup>3</sup> For economists who want a readable way into the literature, introductions to it can be found in sources such as A. J. Oswald, “Happiness And Economic Performance”, *Economic Journal*, 107 November 1997, pp. 1815–31; B. S. Frey and A. Stutzer, *Happiness and Economics*, Princeton and Oxford: Princeton University Press, (2002); and A. E. Clark, P. Frieters, and M. A. Shields, “Relative Income, Happiness, and Utility: An Explanation for the Easterlin Paradox And Other Puzzles”, *Journal of Economic Literature*, 46(1), (2008), pp. 95–144.

<sup>4</sup> D. G. Blanchflower and A. J. Oswald, “Well-Being Over Time in Britain and the United States”, *Journal of Public Economics*, Volume 88, Issues 7–8, July 2004, pp. 1359–86; and P. Dolan, T. Peasgood, and M. White, “Do We Really Know What Makes Us Happy? A Review of the Economic Literature on the Factors Associated with Subjective Well-Being”, *Journal of Economic Psychology*, 29, (2008), pp. 94–122.

<sup>5</sup> D. G. Blanchflower and A. J. Oswald, “What Makes An Entrepreneur?” *Journal of Labor Economics*, January 1998, 16(1), pp. 26–60; D. G. Blanchflower, “Self-Employment: More May Not Be Better”, *Swedish Economic Policy Review*, 11(2), Fall 2004, pp. 15–74; and D. G. Blanchflower and C. Shadforth, “Entrepreneurship in the UK”, *Foundations and Trends in Entrepreneurship*, 3(4), (2007), pp. 1–108.

<sup>6</sup> D. N. F. Bell and D. G. Blanchflower, “The Scots May Be Brave But They Are Neither Healthy Nor Happy”, *Scottish Journal of Political Economy*, 54(2), pp. 151–307, May 2007; and D. G. Blanchflower, “International Evidence on Well-Being”, presented to an NBER conference, forthcoming in *National Time*

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<sup>7</sup> H. H. Koivuma, R. Honkanen, H. Viinamaeki, K. Heikkalae, J. Kaprio, and M. Koskenvuo, “Life Satisfaction and Suicide: a 20-Year Follow-Up Study”, *American Journal of Psychiatry*, 1589(3), 2001, pp. 433–9.

<sup>8</sup> A. J. Oswald and N. Powdthavee, “Does Happiness Adapt? A Longitudinal Study Of Disability with Implications for Economists and Judges”, *Journal of Public Economics*, 92, (2008), pp. 1061–77.

<sup>9</sup> D. G. Blanchflower, “International Evidence on Well-Being.”

<sup>10</sup> A. B. Krueger, D. Kahneman, D. Schkade, N. Schwarz, and A. A. Stone, “National Time Accounting: The Currency of Life”, in *National Time Accounting and Subjective Well-Being*, A. B. Krueger, ed. University of Chicago Press, forthcoming.

<sup>11</sup> D. G. Blanchflower and C. Shadforth, “Fear, Unemployment, and Migration”, NBER Working Paper No. 13506, September 2007; and D. G. Blanchflower, “International Evidence on Well-Being.”

<sup>12</sup> D. G. Blanchflower and A. J. Oswald “Well-Being Over Time in Britain and the United States.”

<sup>13</sup> B. Stevenson and J. Wolfers, “The Paradox Of Declining Female Happiness”, mimeo, University of Pennsylvania, 2007.

<sup>14</sup> R. Di Tella, R. J. MacCulloch, and A. J. Oswald, “Preferences Over Inflation and Unemployment: Evidence from Surveys of Happiness”, *American Economic Review*, 91, 2001, pp. 33–41. See also J. Wolfers, “Is Business Cycle Volatility Costly? Evidence from Surveys of Subjective Wellbeing”, *International Finance*, 6:1, 2003, pp. 1–26.

<sup>15</sup> D. G. Blanchflower, “Is Unemployment More Costly Than Inflation?” NBER Working Paper No. 13505, September 2007.

<sup>16</sup> D. G. Blanchflower and A. J. Oswald, “The Rising Well-Being Of The Young”, in *Youth Employment and Joblessness in Advanced Countries*, D. G. Blanchflower and R. B. Freeman, eds., University of Chicago Press, 2000.

<sup>17</sup> D. G. Blanchflower and A. J. Oswald “Well-Being Over Time in Britain and the

*United States.*”

<sup>18</sup> A. J. Oswald and N. Powdthavee, “Death, Happiness, and the Calculation of Compensatory Damages”, *Journal of Legal Studies*, forthcoming.

<sup>19</sup> D. G. Blanchflower and A. J. Oswald, “Money, Sex and Happiness”, *Scandinavian Journal of Economics*, 106(3), 2004, pp. 393–415.

<sup>20</sup> J. Gardner and A. J. Oswald, “Money And Mental Well-Being: A Longitudinal Study of Medium Sized Lottery Wins”, *Journal of Health Economics*, 26, 2007, pp. 49–60.

<sup>21</sup> E. Luttmer, “Neighbors As Negatives; Relative Earnings and Well-Being”, *Quarterly Journal of Economics*, August 2005, 120(3), pp. 963–1002.

<sup>22</sup> A. Alesina, R. Di Tella, and R. J. MacCulloch, “Inequality and Happiness: Are Europeans and Americans Different?” *Journal of Public Economics*, 88, 2004, pp. 2009–42.

<sup>23</sup> D. G. Blanchflower, “Unemployment, Well-Being and Wage Curves in Eastern and Central Europe”, *Journal of Japanese and International Economics*, 15(4), December 2001, pp. 364–402.

<sup>24</sup> D. G. Blanchflower and C. Shadforth “Entrepreneurship in the UK”.

<sup>25</sup> D. G. Blanchflower and A. J. Oswald, “Is Well-Being U-Shaped over the Life Cycle?” *Social Science and Medicine*, 66(8), pp. 1733–1749, April 2008.

<sup>26</sup> D. G. Blanchflower and A. J. Oswald, “Happiness and Hypertension Across Nations”, *Journal of Health Economics*, 27(2), March 2008, pp. 218–33.

<sup>27</sup> D. G. Blanchflower and A. J. Oswald, “Happiness and the Human Development Index: the Paradox of Australia”, *The Australian Economic Review*, 38(3), September 2005, pp. 307–18; D. G. Blanchflower and A. J. Oswald, “On Leigh-Wolfers and Well-Being in Australia”, *The Australian Economic Review*, 39(2), June 2006, pp. 185–6; and A. Leigh and J. Wolfers, “Happiness and the Human Development Index: Australia is not a Paradox”, *Australian Economic Review*, 39(2), June 2006, pp. 176–84.

# Understanding Social Networks

Dora L. Costa\*

## Heroes and Cowards: The Social Face of War

When are men willing to sacrifice for the common good? What are the benefits to men of friendship? How do communities deal with betrayal? And what are the costs and benefits of being in a diverse community? Matthew Kahn and I answer these questions in an interdisciplinary book, *Heroes and Cowards: The Social Face of War* (forthcoming, Princeton University Press for NBER). Building on a series of joint NBER Working Papers, we weave a single narrative from the life histories of 41,000 Union Army soldiers, diaries and letters, and government documents.

One summer we both read Robert Putnam's thought-provoking book *Bowling Alone* (2000). We were fascinated by Putnam's account of the decline in American civic engagement over time. Putnam emphasized the growing popularity of television as a pivotal cause of the decline in community participation, but we wondered whether an unintended consequence of the rise of women working in the paid labor market was that PTAs and neighborhood associations lost their "volunteer army." We started to write a paper testing whether the rise in women's labor force participation explained the decline in residential community participation.<sup>1</sup> To our surprise, we found little evidence supporting this claim. Instead, our analysis of long-run trends in volunteering, joining groups, and trust suggested that, all else equal, people who live in cities with more

income inequality were less likely to be civically engaged. These results contributed to a growing literature in economics documenting the disturbing fact that people are less likely to be "good citizens" when they live in more diverse communities.

Our early work on community participation attracted academic and popular media attention. Although we were flattered, we were aware that our measures of "civic engagement" bordered on "small potatoes." We were examining low stakes outcome measures such as entertaining in the household, joining neighborhood associations, and volunteering for local clubs.

In the summer of 2001, we realized that the American Civil War, 1861 to 1865, provided the ideal "laboratory." The setting was high stakes—roughly one out of every six Union Army soldiers died during the war. Unlike people in civilian life today, Union Army soldiers could not pick and choose their communities. Even when they signed up with friends, some men ended up in homogenous units and others in heterogenous units and they could not leave their units unless they deserted. Their "communities" were the roughly 100 men in their units—men they lived with 24 hours a day.

We answer the question of when men are willing to sacrifice for the common good by examining why men fought in the Civil War.<sup>2</sup> During this war most soldiers stood by their comrades even though a rational soldier would have deserted. Punishments were too rare and insufficiently severe to deter men from deserting. What then motivated these men to stand their ground? Was it their commitment to the cause, having the "right stuff," high morale, officers, or comrades? We examine all of these explanations and find that loyalty to comrades trumped cause, morale,

and leadership. But loyalty to comrades extended only to men like themselves—in ethnicity, social status, and age.

Sacrifices for the common good are costly. Standing by their comrades raised men's chances of dying. What then are the benefits to men of friendship? We can reply by looking at who survived the extreme conditions of Civil War POW camps.<sup>3</sup> We can see the effects of age, social status, rank, camp population, and the presence of own officers on survival. We can also see that the fellowship of their comrades helped soldiers survive POW camps and, the deeper the strength of ties between men, the higher their probability of survival. Ties between kin and ties between comrades of the same ethnicity were stronger than ties between other men from the same company.

If loyalty toward your own kind is admirable, how do communities deal with betrayal? In the Civil War companies were raised locally and hometowns were well aware of who was a "coward" and who was a "hero" during the war. Some towns were pro-war and others anti-war. Men who betrayed their pro-war neighbors by deserting moved away, driven out by shame and ostracism.<sup>4</sup> Community codes of conduct are re-enforced not just by loyalty but also by punishments.

By examining men's lives during the war we saw that more diverse communities are less cohesive. Their members are less willing to sacrifice and derive fewer benefits from being part of the community. Are there then any benefits to being in a diverse community? When we look at the lives of black soldiers after the Civil War we can understand the tensions between the short-run costs of diversity and its long-run benefits. Men did not like to serve with those who were different from them, so

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much so that they were more likely to desert, but in the long-run the ex-slaves who joined the Union Army learned the most from being in units with men who were different from themselves.<sup>5</sup>

Whether diversity fosters understanding or distrust is a long standing question in the social sciences that has become particularly timely with rising immigration and growing income inequality. We find that the same types of social network variables that determined who deserted from the Union Army and who survived POW camps predict commitment to organizations in civilian life today. Organizational membership is lower in metropolitan areas with greater racial and ethnic diversity and higher income inequality; support for income redistribution is higher when the aid recipients are from the same racial and ethnic group; and laboratory games show that trust is higher when the players look like each other.<sup>6</sup>

Our work emphasized the importance of ethnicity, state of birth, occupation, age, and kinship for the formation of social ties in the past. We are not claiming these were the only factors that influenced the formation of social ties among Union Army soldiers. Nor are we claiming that these factors are as important now as they were in the past. Race and ethnicity no longer predetermine friendships and marriages. Although racial and ethnic diversity still affect community participation, they have become less important relative to income.<sup>7</sup>

Although people want to be friends with others they can relate to, they may learn the most from those who are different. In recent Supreme Court cases a brief filed by eight universities emphasized that students educate each other, that cross-racial learning takes place, and that this learning is valued by students and by the labor market. Nevertheless, few large-scale studies actually measure the benefits of diversity in either a university or an employment setting and campus newspaper accounts suggest large amounts of racial self-segregation.

Like college students, Civil War soldiers preferred to interact with others who looked like them. For white Union Army soldiers, similar men were those of the

same ethnicity, occupation, and age group. For black soldiers, similar men were those from the same state or even plantation and from the same slave or free background. But, in the long run (and studies of college roommates have never been able to examine the long run), Union Army soldiers benefited from their interactions with men who were different. Freeman taught the former slaves to write and helped them forge a freeman's identity. Both slaves and freemen first learned of new cities and states from their comrades who had come from those places.

There is increasing interest in building "good" communities today. The World Bank, on its social capital Web site, writes "Increasing evidence shows that social cohesion—social capital—is critical for poverty alleviation and sustainable human and economic development" (<http://web.worldbank.org>). This social capital has both positive and negative consequences. Union Army deserters were never re-integrated into their communities, not because of legal punishments, but because of shame and ostracism.

We have highlighted the tensions between cohesion and diversity. A community of similar people is likely to be cohesive and its members are likely to sacrifice time, effort, and even their lives for each other. But in a diverse community members can learn from one another.

## Health and Social Networks

Our research agenda on social networks does not end with our book. Our new NIA-funded research combines our interests in social networks with my research agenda on the determinants of health at older ages. Using data on Union Army veterans, I find that a large proportion of the poor health and longevity experience of men in the past relative to men in more recent cohorts can be explained by such early life experiences as infectious disease, poor nutritional intake, and physical job demands. For example, Joanna Lahey and I found that season of birth had a strong effect on the older age mortality rates of men who lived to age 60. This effect was much more pro-

nounced among Union Army veterans than it is among more recent populations, probably because of the elimination of the summer-time diarrheal deaths with the improvement in sanitation and because of the improvement in vitamin levels among women pregnant during the long winter months.<sup>8</sup> Lorens Helmchen, Sven Wilson, and I found that being born in the second relative to the fourth quarter predicted the probability of Union Army veterans developing arteriosclerosis at older ages, perhaps because nutritional deprivation in utero leads to compromised immune function and higher inflammation rates.<sup>9</sup>

If older age health and longevity is partially determined by earlier life conditions, then senescent processes may be plastic and highly controllable and life expectancy rates are likely to continue to rise until improvements in early life conditions have been exhausted. Older age mortality rates may therefore not decrease as rapidly for the post-baby-boom cohort as they have for earlier cohorts. However, because of rising incomes, the value of even marginal improvements in life expectancy is now higher than the value of the very large increases in life expectancy experienced at the beginning of the twentieth century.<sup>10</sup>

Early life conditions may also partially explain observed racial health disparities in modern populations and among Union Army veterans. Data on Union Army veterans reveal very high rates of arteriosclerosis among black relative to white veterans, differences that can be explained by blacks' greater life long burden of infectious disease.<sup>11</sup> The effects of infectious disease rates are clearly observed in black-white differentials in birth weights, prematurity rates, and stillbirths among children born in the first third of the twentieth century under the auspices of Johns Hopkins University Hospital.<sup>12</sup>

Economic and epidemiological research has linked social networks to health. People who report themselves to be socially isolated, both in the number and quality of their personal relationships face a higher mortality risk from all causes and from several infectious, neoplastic, and cardiovascular diseases. A large body of literature links stress, whether in the form

of war, natural disasters, divorce, lack of control on the job, or even disrupted sleep patterns, to cardiovascular disease. Social networks could either mitigate or accentuate the effects of stress. They could mitigate the effects of stress through beneficial effects on psychological and physical well-being. But, they could accentuate the effects of stress if the stressor leads to the loss of friends or family (for example the well-established effect of death of a spouse on the mortality of a survivor).

By studying how the interactions between unit cohesiveness and combat mortality, and between POW camp experience and the strength of social networks within the POW camp, affected older age mortality and morbidity, we can investigate the interaction between stress and social networks in one of the few human populations to provide us with measures of stress, of long-run outcomes, and of exogenous social networks. We are finding that being in a more cohesive company reduced the negative, long-term consequences of wartime stress on older age mortality and morbidity, particularly from cardiovascular causes.<sup>13</sup> Focusing on the role of stress factors in health and mortality may be a fruitful line of research, particularly as we exhaust the gains from public health advances.

<sup>1</sup> D.L. Costa and M.E. Kahn, "Understanding the American Decline

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<sup>2</sup> D.L. Costa and M.E. Kahn, "Cowards and Heroes: Group Loyalty in the American Civil War," NBER Working Paper No. 8627, December 2001, and *Quarterly Journal of Economics*, 118(2) (May 2003), pp. 519–48.

<sup>3</sup> D.L. Costa and M.E. Kahn, "Surviving Andersonville: The Benefits of Social Networks in POW Camps," NBER Working Paper No. 11825, December 2005, and *American Economic Review*, 97(4) (2007), pp. 1467–87.

<sup>4</sup> D.L. Costa and M.E. Kahn, "Shame and Ostracism," NBER Working Paper No. 10425, April 2004, and "Deserters, Social Norms, and Migration," *Journal of Law and Economics*, 50 (2007), pp. 323–53.

<sup>5</sup> D.L. Costa and M.E. Kahn, "Forging a New Identity: The Costs and Benefits of Diversity in Civil War Combat Units for Black Slaves and Freeman," NBER Working Paper No. 11013, December 2004, and *Journal of Economic History*, 66(4): pp. 936–62.

<sup>6</sup> For a summary of social capital research see D. L. Costa and M.E. Kahn, "Civic Engagement and Community Heterogeneity," *Perspectives on Politics*, 1(1) (March 2003).

<sup>7</sup> D.L. Costa and M.E. Kahn, "Understanding the American Decline in *Social Capital, 1952–1988*."

<sup>8</sup> D.L. Costa and J.N. Lahey, "Becoming Oldest-Old: Evidence from Historical U.S. Data," NBER Working Paper No. 9933, September 2003, and *Genus*, 61(1) (2005), pp. 21–38, and D.L. Costa and J.N. Lahey, "Predicting Older Age Mortality Trends," *Journal of the European Economic Association*, 3(2–3) (March–April 2005).

<sup>9</sup> D.L. Costa, L. Helmchen, and S. Wilson, "Race, Infection, and Arteriosclerosis in the Past," *Proceedings of the National Academy of Sciences*, 104 (2007), pp. 13219–24. Written for the NBER conference, *Economics of Health and Mortality*, <http://www.nber.org/books.html>

<sup>10</sup> D.L. Costa and M.E. Kahn, "Changes in the Value of Life, 1940–1980," NBER Working Paper No. 9396, December 2002, and *Journal of Risk and Uncertainty*, 29(2) (September 2004), pp. 159–80.

<sup>11</sup> D.L. Costa, L. Helmchen, and S. Wilson, "Race, Infection, and Arteriosclerosis in the Past."

<sup>12</sup> D.L. Costa, "Race and Pregnancy Outcomes in the Twentieth Century: A Long-Term Comparison," NBER Working Paper No. 9593, March 2003, and *Journal of Economic History*, 64(4) (December 2004), pp. 1056–86.

<sup>13</sup> D.L. Costa and M.E. Kahn, "Health, Stress, and Social Networks: Evidence from Union Army Veterans," NBER Working Paper No. 14053, June 2008.

## NBER Profile: David G. Blanchflower

David G. Blanchflower is a Research Associate in the NBER's Program on Labor Studies and the Bruce V. Rauner Professor of Economics at Dartmouth College. He is also a Visiting Professor at the University of Stirling and a member of the Monetary Policy Committee at the Bank of England.

Blanchflower obtained his BA at the University of Leicester, a Masters from the University of Wales, and PhD from the University of London. He received an honorary Doctor of Letters in 2008 from the University of Leicester and will be awarded

an honorary Doctor of Science degree at the University of London in 2009.

His main areas of research interest are happiness economics; wage determination; unemployment; discrimination; trade unions, and entrepreneurship. His book *The Wage Curve* with Andrew Oswald won Princeton University's Richard A. Lester prize.

Blanchflower has two daughters and a son.



## Conferences

### Twenty-third Annual Conference on Macroeconomics

The NBER's twenty-third Annual Conference on Macroeconomics, organized by NBER Research Associates Daron Acemoglu of MIT, Kenneth Rogoff of Harvard University, and Michael Woodford of Columbia University, took place in Cambridge on April 4 and 5. The program was:

**Giuseppe Moscarini**, Yale University and NBER, and **Fabien Postel-Vinay**, University of Bristol, "The Timing of Labor Market Expansions: New Facts and a New Hypothesis"

Discussants: Robert E. Hall, Stanford University and NBER, and Robert Shimer, University of Chicago and NBER

**Jean Boivin**, HEC Montréal and NBER; **Marc P. Giannoni**, Columbia University and NBER; and **Benoit Mojon**, Federal Reserve Bank of Chicago, "Macroeconomic Dynamics in the Euro

Area"  
Discussants: Lucrezia Reichlin, European Central Bank, and Harald Uhlig, University of Chicago

**Quamrul H. Ashraf** and **Ashley Lester**, Brown University, and **David N. Weil**, Brown University and NBER, "When Does Improving Health Raise GDP?"  
Discussants: Hoyt Bleakley, University of Chicago and NBER, and Simon Johnson, IMF and NBER

**Jeremy Greenwood**, University of Pennsylvania and NBER, and **Nezih Guner**, Universidad Carlos III de Madrid, "Marriage and Divorce since World War II: Analyzing the Role of Technological Progress on the Formation of Households"  
Discussants: Stefania Albanesi, Columbia University and NBER, and Justin Wolfers, University of Pennsylvania and NBER

**Markus K. Brunnermeier**, Princeton University and NBER; **Stefan Nagel**, Stanford University and NBER; and **Lasse H. Pedersen**, New York University and NBER, "Carry Trades and Currency Crises"  
Discussants: A. Craig Burnside, Duke University and NBER, and Hanno Lustig, University of California, Los Angeles and NBER

**Andrew Atkeson**, University of California, Los Angeles and NBER, and **Patrick J. Kehoe**, Federal Reserve Bank of Minneapolis and NBER, "On the Need for a New Approach to Analyzing Monetary Policy" (No abstract is available for this paper.)  
Discussants: John H. Cochrane, University of Chicago and NBER, and Bennett T. McCallum, Carnegie Mellon University and NBER

**Moscarini** and **Postel-Vinay** document three new facts about aggregate dynamics in U.S. labor markets over the last 15 years, drawing in part from newly available datasets. The new facts concern a strong co-movement between the employer-to-employer worker transition rate, various measures of wages, and the share of employment at large firms. All three remain below trend several years into the expansion. Then, simultaneously, large firms take over employment, workers start quitting more from job to job, and wages accelerate. The researchers investigate whether this new view of how business cycles evolve and mature is consistent with the transitional dynamics of the Burdett and Mortensen (1998) equilibrium search model, analyzed in a companion paper (Moscarini and Postel-Vinay, 2008). In their model, following a positive aggregate shock to labor demand,

wages respond little on impact, and start rising only when firms run out of cheap unemployed hires and start competing to poach and retain employed workers. Aggregate shocks thus are propagated by the hiring behavior of large firms. A calibrated example shows that the model qualitatively captures the essence of the three facts.

**Boivin** and his co-authors characterize the transmission mechanism of monetary and oil-price shocks across countries of the euro area, document how this mechanism has changed with the introduction of the euro, and explore some potential explanations. The framework they use allows them to jointly model the euro area dynamics and permit the transmission of shocks to be different across countries. They find important heterogeneity across countries in the effect of macroeconomic shocks before the launch

of the euro. In particular, they find that German interest-rate shocks triggered stronger responses of interest rates and consumption in some countries, such as Italy and Spain, than in Germany itself. According to their estimates, the creation of the euro has contributed to a greater homogeneity of the transmission mechanisms across countries and to an overall reduction in the effects of this shock. Using a structural open-economy model, they argue that the combination of a change in the policy reaction function, mainly toward a more aggressive response to inflation and output, and the elimination of an exchange rate risk can explain the evolution of the monetary transmission mechanism observed empirically.

**Ashraf** and his co-authors quantitatively assess the effect of exogenous health improvements on output, through demographic channels and changes in worker

productivity. They consider both changes in general health, proxied by changes in life expectancy, and changes in the prevalence of two particular diseases: malaria and tuberculosis. In general, they find that the effects of health improvements on income are substantially lower than those that are often quoted by policymakers, and may not emerge at all for a third of a century or more after the initial improvement in health.

Since World War II there has been: a rise in the fraction of time that married households allocate to market work; an increase in the rate of divorce; and a decline in the rate of marriage. **Greenwood** and **Guner** argue that labor-saving technolog-

ical progress in the household sector can explain these facts. This makes it more feasible for singles to maintain their own home, and for married women to work. To address this question, the authors develop a search model of marriage and divorce, which incorporates household production. An extension of the model looks back at the prewar era.

**Brunnermeier** and his co-authors document that carry traders are subject to crash risk—that is, that exchange rate movements between high interest rate and low interest rate currencies are negatively skewed. They argue that this negative skewness is attributable to sudden unwinding of carry trades, which tend to

occur in periods in which investor risk appetite and funding liquidity decrease. Carry-trade losses reduce future crash risk, but increase the price of crash risk. The researchers also document excess comovement among currencies with similar interest rates. Their findings are consistent with a model in which carry traders are subject to funding liquidity constraints.

These papers will appear in an annual volume published by the University of Chicago Press. Its availability will be announced in a future issue of the *Reporter*. They will also be found at “Books in Progress” on the NBER’s website.

## Demography and the Economy

NBER Research Associate John B. Shoven of Stanford University organized a conference on “Demography and the Economy” that took place in California on April 11 and 12. These papers were discussed:

**Sam H. Preston** and **Caroline R. Sten**, University of Pennsylvania, “The Future of American Fertility”  
Discussant: Gopi Shah Goda, Harvard University

**Larry E. Jones**, University of Minnesota and NBER; **Alice Schoonbroodt**, Southampton University; and **Michele Tertilt**, Stanford University and NBER, “Fertility and Income in the Cross Section: Evidence and Theory”  
Discussant: Amalia Miller, University of Virginia

**Adam Isen** and **Betsey Stevenson**, University of Pennsylvania, “Women’s Education and Family Behavior: Trends in Marriage, Divorce, and Fertility”  
Discussant: Enrico Moretti, University

of California, Berkeley and NBER

**Gopi Shah Goda** and **John B. Shoven**, “Adjusting Government Policies for Age Inflation”  
Discussant: Warren Sanderson, SUNY Stony Brook

**Axel Börsch-Supan**, University of Mannheim and NBER, and **Alexander Ludwig**, University of Mannheim, “Old Europe Ages. Can it Still Prosper?”  
Discussant: Alan J. Auerbach, University of California, Berkeley and NBER

**Shripad Tuljapurkar**, Stanford University, “The Final Inequality: Changes in the Variance in Age at Death over Time”  
Discussant: Victor R. Fuchs, Stanford University and NBER

**James M. Poterba**, MIT and NBER; **Steven F. Venti**, Dartmouth College and NBER; and **David A. Wise**, Harvard University and NBER,

“Demographic Trends, Housing Equity, and the Financial Security of Future Retirees”  
Discussant: Thomas Davidoff, University of California, Berkeley

**Sylvester J. Schieber**, Social Security Advisory Board, “Richer or Poorer When Death Do Us Part?”  
Discussant: Steven F. Venti

**Orazio Attanasio**, University College London and NBER; **Sagiri Kitao**, University of Southern California; and **Giovanni L. Violante**, New York University and NBER, “Financing Medicare: A General Equilibrium Analysis”  
Discussant: Moshe Bushinsky, University of California, Los Angeles and NBER

**Francesco C. Billari** and **Guido Tabellini**, Università Bocconi, “Italians are Late: Does it Matter?”  
Discussant: Luigi Pistaferri, Stanford University

The level of fertility is the principal determinant of the shape of a population’s

age structure, which in turn is a critical factor in the terms-of-trade within a

pay-as-you-go system of public pensions. Social Security Administration simula-

tions show that the 75-year actuarial balance of the social security system would be \$2.6 trillion higher in present value if fertility were high (2.3 children/woman) rather than low (1.7). Partly because of their long-run effects on population age structure, national fertility levels are considered “too low” by a majority of governments in developed countries. **Preston** and **Sten** review the major factors that appear to be affecting fertility levels in the United States, with an eye towards making defensible statements about future directions of fertility. There is no single widely accepted framework for analyzing the determinants of fertility at the level of a population. In its place, the authors pursue an eclectic, inductive approach, surveying the landscape of fertility variation in search of clues about its principal drivers. Their search considers variation over time and space and across individuals.

**Jones** and his co-authors revisit the relationship between income and fertility. There is overwhelming empirical evidence that fertility is negatively related to income in most countries at most times. Several theories have been proposed to explain this somewhat puzzling fact. The most common is based on the opportunity cost of time being higher for individuals with higher earnings. Alternatively, people might differ in their desire to procreate and, accordingly, some people will invest more in children and less in market-specific human capital and thus have lower earnings. The authors revisit these and other possible explanations. They find that these theories are not as robust as is commonly believed, and that they often depend on assumptions that are open to question.

The production efficiencies of household specialization have declined with the development of technologies that simplify household production and the increase in market substitutes for goods previously provided by homemakers. Additionally, the opportunity cost of having a household specialist has risen as the barriers to women in the workplace have eroded. These developments, which have made way for an increase in the relative importance of the consumption benefits

from marriage, have not affected all families similarly. **Isen** and **Stevenson** examine how marital and fertility patterns have changed along racial and educational lines for men and women. Marriage and remarriage rates have risen for women with a college degree relative to those with fewer years of education, eroding a long-standing gap caused by greater marriage propensities among less educated women. In contrast, there has been little change in marital patterns by education among men. Divorce has been falling for all groups, but fell earlier and more sharply among college graduates. Further, the authors find that total fertility relative to women’s educational attainment has changed little, even though women’s educational attainment has been increasing and women have fewer children at higher levels of educational attainment. There has been a widely noted rise in the age of mothers, and the authors show that most of it comes from an increase in the age of childbirth for women with more education, with little change in fertility timing for those with less education.

Government policies based on age do not adjust to the fact that, because of improvements in mortality, a given age is associated with higher remaining life expectancy and lower mortality risk relative to earlier time periods. **Goda** and **Shoven** examine four possible methods for adjusting the eligibility ages for Social Security, Medicare, and Individual Retirement Accounts to determine what eligibility ages would be today, and in 2050, if adjustments for mortality improvement were taken into account. They find that historical adjustment of eligibility ages for age inflation would have increased ages of eligibility by approximately 0.15 years annually. Failure to adjust for mortality improvement implies that the percent of the population eligible to receive full Social Security benefits and Medicare will increase substantially relative to the share eligible under a policy of age adjustment.

Population aging will be a major determinant of long-run economic development in industrial and developing countries. The extent of the demographic

changes is dramatic in some countries and will deeply affect future labor, financial, and goods markets. The expected strain on public budgets and especially social security already has received prominent attention, but aging poses many other economic challenges that threaten productivity and growth if they are not addressed. There is no shortage of policy proposals to address population aging. However, little is known about behavioral reactions, for example, to pension and labor market reform. **Börsch-Supan** and **Ludwig** shed light on such reactions in three large Continental European countries. France, Germany, and Italy have large pay-as-you-go pension systems and vulnerable labor markets. At the same time, they show remarkable resistance against pension and labor market reform. The key issues discussed in this paper are: interactions between pension and labor market policies, and the behavioral reactions to reform. Which behavioral reactions will strengthen, and which will weaken reform policies? Can Old Europe prosper even if behavioral reactions counter current reform efforts?

**Tuljapurkar** attempts to show that the variance in age at death for adults is a useful and important dimension of mortality change. Trends in this variance are informative about the speed and the age-pattern of mortality change. The decomposition of this variance with respect to risk factors provides useful insights into the explanatory power of different factors that are correlated with mortality. Historical and economic analyses can benefit from an examination of variance in age at death in addition to the traditionally important studies of life expectancy.

**Poterba**, **Venti**, and **Wise** have two key goals in this paper: 1) to understand the extent of uncertainty about home equity at older ages; and 2) to explore how one might project the trend in the home equity of younger cohorts as they approach retirement. They begin by describing the change over time in the relationships between age, home ownership, and home values. They find that the age profile of home ownership rates has changed little over the past two de-



On the other hand, there have been very large increases in the *value* of owner-occupied homes, and in home equity, over the past two decades. Using cohorts attaining retirement age in 1990 and in 2010, the authors simulate the evolution of home values over the course of a typical retirement to explore the relationship between home equity at retirement and home equity at older ages, when it tends to be drawn down. Because real home prices rose during the sample period they use to forecast future price patterns, for both cohorts, their projections suggest that home equity at older ages is likely to be much greater than equity at retirement. Even when they truncate their sample of house price changes before the most recent market declines, their projections suggest a probability of between 10 and 14 percent that real home equity will decline between the ages of 59 and 79. That probability rises substantially when they expand their sample of housing returns to include the experience of the most recent two years. Cross-section and cohort data also show that over a 20-year period marked by very large fluctuations in the growth rate of home value, very large increases in household wealth, and a large decline in mortgage rates, the ratio of home equity to total non-pension wealth remained remarkably stable. This empirical regularity leads them to consider whether projections of the home equity of future retirees might be based on forecasts of the wealth of future households. The recent turmoil in the housing market adds interest to such projections but also, by drawing attention to the large changes in home value and home equity that can occur over a short period of time, raises speculation about whether the past empirical regularity will continue in the future.

Some analysts conclude that aging societies must radically modify their retirement systems in order to deal with new economic realities. There are several examples where the response to population aging has been to restructure pay-as-

you-go pension programs toward greater funding. From a microeconomic perspective, many workers may not discern any practical effect from the restructuring of the approach to financing their pensions. Even from a macroeconomic perspective, there are questions over whether some of the move toward pension funding that has arisen in recent years is more cosmetic than real. Whether pension plans are funded or not, population aging will likely result in slower labor force growth in most cases. This slower labor force growth has two important implications. First, labor force growth rates are one of the primary drivers that underlie economic growth. Second, a growing aged population in the face of a stable or diminished work force implies significant increases in aged dependency. The combination of these forces will limit future growth in living standards in the developed economies of the world. If our economies cannot meet public expectations about economic performance, pension policy will play a major role in allocating the economic disappointment. **Schieber** suggests that some countries face such significant demographic shifts toward older populations that pension funding will offer little practical relief. In these cases, the whole concept of retirement that has persisted over much of the past century will have to be revisited.

**Attanasio** and his co-authors develop a general equilibrium, overlapping-generations model of the U.S. economy where households face uncertain health status that in turn determines their mortality rate and their medical expenditures. Households make consumption and labor supply decisions, and can imperfectly insure health shocks through markets. The government provides partial insurance through Medicare and “social assistance,” and runs a Pay-As-You-Go social security system. The authors calibrate the model based on the projected demographic and medical expenditures trends for the next 75 years. The model is used to study the macroeconomic and

welfare implications of alternative funding schemes for Medicare. In the baseline closed-economy model, they find, the labor income tax will have to increase from 23 percent in 2005 to 36 percent in 2080 to finance the rising costs of Medicare. However, under an open-economy scenario, the tax would have to rise by much less. Limiting the increase in the wage tax through either a rise in the Medicare premium or a delay in the age of retirement is welfare improving.

Italians start adult activities, such as leaving the parental home, at a much later age than is common in other countries at comparable levels of development. **Billari** and **Tabellini** ask whether this late transition into adulthood influences the lifetime economic opportunities of individuals. A priori, it is not clear if such influence exists, and what its direction is. After providing stylized cross-country evidence on the potential negative impact of the late transition to adulthood, the authors consider a longitudinal survey of Italian men in their mid-30s. As a measure of transition into adulthood, they focus on leaving the parental home for the first time; they find that individuals who leave the parental home earlier in life earn a higher income in their mid-30s. Estimation by instrumental variables suggests that the authors capture a causal effect, from the age of leaving the parental home to subsequent economic outcomes, and the result is robust to various specification of the model. The authors speculate on the potential mechanisms through which this effect might operate. Given these results, policies that aim at speeding up the transition to adulthood of young Italians might have positive economic effects.

These papers will appear in an NBER Conference Volume published by the University of Chicago Press. Its availability will be announced in a future issue of the NBER Reporter. They will also be available at “Books in Progress” on the NBER’s website.

## Innovation Policy and the Economy

The NBER's ninth annual Conference on Innovation Policy and the Economy took place in Washington on April 15. The conference was organized by NBER Research Associates Adam B. Jaffe of Brandeis University, Joshua Lerner of Harvard University, and Scott Stern of Northwestern University. The following papers were discussed:

**Richard Freeman**, Harvard University and NBER, and **John Van Reenen**, London School of Economics and NBER, "What if Congress Doubled R and D Spending on the Physical Sciences?"

**Joseph Farrell**, University of California, Berkeley, "Intellectual Property as a Bargaining Environment"

**Douglas Lichtman**, University of California, Los Angeles, "Pricing Patents"

**Alvin Roth**, Harvard University and NBER, "What Have We Learned from Market Design?"

**Peter Cramton**, University of Maryland, "Innovation and Market Design"

Many business, academic, and scientific groups have recommended that the Congress substantially increase R and D spending in the near future. President Bush's American Competitiveness Initiative calls for a doubling of spending over the next decade in selected agencies that deal with the physical sciences, including the National Science Foundation. **Freeman** and **Van Reenen** consider the rationale for increased R and D spending in the context of the globalization of economic activity. To assess the likely consequences of a large increase in R and D spending, they examine how the 1998–2003 doubling of the NIH budget affected the bio-medical sciences. They find that the rapid increase and ensuing deceleration in NIH spending created substantial adjustment problems in the market for research, particularly for younger investigators, and failed to address long-standing problems with scientific careers that are likely to deter many young persons from choosing a scientific career. They argue that funding agencies should tilt their awards to younger researchers on the grounds that any research project does two things: it produces knowledge and adds to the human capital of researchers, which has greater value for younger persons because of their longer future career life-spans.

Patent (and other intellectual property) policy anticipates and relies on firms negotiating "in the shadow of the law" when it comes to licensing and using existing patents, and the economics of that process have been studied

extensively. But there has been much less study of private agreements that go deeper than that and agree in advance on how future patents, or patents not yet identified, will be treated. One can think of such agreements as setting up a zone of "private law". This can be either good or bad, and a traditional antitrust-based approach tries to ban the bad ones and allow the good ones. But because private negotiation is often imperfect and difficult, it makes sense to consider whether and how public policy can facilitate beneficial private agreements and learn from them, not merely allow them. **Farrell** explores some of these issues.

**Lichtman** notes that over the last many years, patent reform efforts have focused primarily and understandably on the problem of incorrectly issued patents. These efforts have pointed out fundamental flaws in the system for evaluating patent applications, rightly exhibiting concern that many patents are issued today despite the fact that the purported inventions are not meaningfully different from what was known before. There is a second substantial problem undermining the patent system, however, and that is the mistaken approach to setting damages and influencing the terms of licensing arrangements. In this regard, the patent system is built on an intuition that prices and other deal terms ought to be set in the market, and thus that patent remedies ought to be designed with an eye toward driving parties to engage in market-based negotiation. But that is quite simply a mistake.

In theory, markets would be a preferred mechanism for setting the terms of patent deals. In a host of common infringement situations, however, market-based negotiation is either not an option or not a trustworthy measure of patent value.

**Roth** discusses some things we have learned about markets, in the process of designing marketplaces to fix market failures. To work well, marketplaces have to provide thickness, that is they need to attract a large enough proportion of the potential participants in the market; they have to overcome the congestion that thickness can bring, by making it possible to consider enough alternative transactions to arrive at good ones; and they need to make it safe and sufficiently simple to participate in the market, as opposed to transacting outside of the market, or having to engage in costly and risky strategic behavior. Roth draws on recent examples of market design ranging from labor markets for doctors and new economists, to kidney exchange, and school choice in New York City and Boston.

Market design plays an essential role in promoting innovation. **Cramton** examines emission allowance auctions, air slot auctions, spectrum auctions, and electricity markets, and demonstrates how the market design can encourage innovation. Improved pricing information is one source of innovation. Enhancing competition is another driver of innovation seen in all of the applications. Market design fosters innovation in other ways as well by addressing other

potential market failures.

These papers will appear in an annual volume published by the University

of Chicago Press. Its availability will be announced in a future issue of the *Reporter*. They can also be found at

“Books in Progress” on the NBER’s website.

## Risks of Financial Institutions

The NBER held a conference on “Risks of Financial Institutions” at the University of Chicago’s Gleacher Center on April 24. Conference organizers Mark Carey, Federal Reserve Board of Governors, and Rene M. Stulz, NBER and Ohio State University, chose these papers for discussion:

**Markus K. Brunnermeier**, Princeton University and NBER, “Deciphering the 2007/8 Liquidity and Credit Crunch”

Discussant: Raghuram Rajan, University of Chicago and NBER

**Atif Mian**, University of Chicago and NBER, and **Amir Sufi**, University

of Chicago, “The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis” (NBER Working Paper No. 13936)

Discussant: Stuart Gabriel, University of California, Los Angeles

**Robert H. Litzengerger**, Azimuth Asset Management, and **David M. Modest**, J.P. Morgan Chase, “Crisis and Non-Crisis Risk in Financial Markets: A Unified Approach to Risk Management”

Discussant: Philippe Jorion, University of California, Irvine

**Philippe Jorion**, and **Gaiyan Zhang**, University of Missouri, “Credit

Contagion from Counterparty Risk”  
Discussant: Richard Cantor, Moody’s Investors Service

**Amir Khandani**, MIT, and **Andrew Lo**, MIT and NBER, “What Happened to the Quants in August 2007?”

Discussant: Kent Daniel, Northwestern University

**Monica Billio** and **Loriana Pelizzon**, University of Venice, and **Mila Getmansky**, University of Massachusetts, “Crises and Hedge Fund Risk”

Discussant: Tobias Adrian, Federal Reserve Bank of New York

**Brunnermeier** studies the underlying forces that drove adverse events in the financial markets in 2007 and 2008. He explains how new structured financial products, off-balance sheet vehicles, and the transformation from a classical banking model to an “originate and distribute model” led to a deterioration of lending standards and to a boom in house prices. He provides an event-log book about the current market turmoil and identifies various amplification mechanisms that explain how shocks to the financial system could cause such large dislocations. The first mechanism is attributable to borrowers’ balance sheet effects involving liquidity spirals. When asset prices and market liquidity drop during times of crisis, funding requirements for financial institutions increase. This happens because the collateral value of the assets on borrowers’ balance sheets erodes, and margins rise, or investors are unable to roll over their short-term liabilities. Higher

margins force financial institutions to cut back on leverage, exacerbating the initial price decline. A key problem is the maturity mismatch caused by leveraged financing. The second set of amplification mechanisms works through the lending channel. Uncertainty about future funding needs, combined with potentially limited access to the lending market at that time, can lead to hoarding and interest rate surges in the interbank market. Brunnermeier also discusses runs on financial institutions. Runs occur when each individual financier has an incentive to curtail funding before others. Finally, when financial institutions are lenders and borrowers at the same time, network and gridlock risk might emerge. In a gridlock situation, each individual institution is not able to pay its obligation only because the others are not paying theirs. While coordination might resolve this, it is difficult to achieve in today’s complex and interweaved financial system.

**Mian** and **Sufi** offer evidence that a rapid expansion in the supply of mortgages driven by disintermediation explains a large fraction of recent U.S. house price appreciation and subsequent mortgage defaults. They identify the effect of shifts in the supply of mortgage credit by exploiting within-county variation across zip codes that differed in latent demand for mortgages in the mid-1990s. From 2001 to 2005, high latent-demand zip codes experienced large relative decreases in denial rates, increases in mortgages originated, and increases in house price appreciation, despite the fact that these zip codes experienced significantly negative relative income and employment growth over this time period. These patterns for high latent-demand zip codes were driven by a sharp relative increase in the fraction of loans sold by originators shortly after origination, a process that the authors refer to as “disintermediation.” The increase in disintermediation-driven

mortgage supply to high latent-demand zip codes from 2001 to 2005 led to subsequent large increases in mortgage defaults from 2005 to 2007. The results suggest that moral hazard on behalf of originators selling mortgages is a main culprit for the U.S. mortgage default crisis.

**Litzenberger** and **Modest** develop an analytically tractable risk management metric that measures potential exposures to financial crises and also captures volatility during non-crisis times. Their multiple-regime stress-loss risk framework assumes markets are characterized by quiescent (non-crisis) periods most of the time, interspersed with infrequent crisis periods where 4-5 sigma events can occur with non-negligible probabilities. The framework is flexible and can incorporate arbitrary numbers and types of crises. One of the primary lessons of 1998 and 2007 is that returns can be correlated because collections of trades (or strategies) are sometimes financed from a common pool of capital, even though returns to the strategies have low correlations during quiescent periods.

Standard credit risk models cannot explain the observed clustering of default, sometimes described as “credit contagion.” **Jorion** and **Zhang** provide the first empirical analysis of credit contagion via direct counterparty effects. Using a unique database, they examine the wealth effects of bankruptcy announcements on creditors. On average, creditors experience

severe negative abnormal equity returns and increases in CDS spreads. In addition, creditors are more likely to suffer from financial distress later. These effects are stronger for industrial creditors than financials. Simulations calibrated to these results indicate that counterparty risk can potentially explain the observed excess clustering of defaults. This suggests that counterparty risk is an important additional channel of credit contagion and that current portfolio credit risk models understate the likelihood of large losses.

During the week of August 6, 2007 a number of quantitative long/short equity hedge funds experienced unprecedented losses. Based on TASS hedge-fund data, TAQ data, and simulations of a specific long/short equity strategy, **Khandani** and **Lo** hypothesize that the losses were initiated by the rapid “unwind” of one or more sizable quantitative equity market-neutral portfolios. Given the speed and price impact with which this occurred, it was likely the result of a forced liquidation by a multi-strategy fund or proprietary-trading desk, possibly because of a margin call or a risk reduction. These initial losses then put pressure on a broader set of long/short and long-only equity portfolios, causing further losses by triggering stop/loss and de-leveraging policies. A significant rebound of these strategies occurred on August 10, which is also consistent with the unwind hypothesis. The dislocation was triggered by events out-

side the long/short equity sector—in a completely unrelated set of markets and instruments—suggesting that systemic risk in the hedge-fund industry may have increased in recent years.

**Billio**, **Pelizzon**, and **Getmansky** study the effect of financial crises on hedge fund risk. Using a regime-switching beta model, they separate systematic and idiosyncratic components of hedge fund exposure. The systematic exposure to various risk factors is conditional on market volatility conditions. They find that in the high-volatility regime (when the market is rolling-down and is likely to be in a crisis state) most strategies are negatively and significantly exposed to the Large-Small and Credit Spread risk factors. This suggests that liquidity risk and credit risk are potentially common factors for different hedge fund strategies in the down-state of the market, when volatility is high and returns are very low. They further explore the possibility that all hedge fund strategies exhibit a high volatility regime of the idiosyncratic risk, which could be attributed to contagion among hedge fund strategies. In their sample, this event happened only during the Long-Term Capital Management crisis of 1998. Other crises, including the recent subprime mortgage crisis, affected hedge funds only through systematic risk factors and did not cause contagion among hedge funds.

## Climate Change: Past and Present

An NBER/Universities Research Conference on “Climate Change: Past and Present,” organized by Gary D. Libecap, University of California, Santa Barbara and NBER, and Richard H. Steckel, Ohio State University and NBER, took place in Cambridge on May 30 and 31. These papers were discussed:

**Richard H. Steckel**, “Tree Rings Climate Change and Impacts: Sketching a Research Agenda”

**Melissa Dell**, MIT; **Benjamin F. Jones**, Northwestern University and NBER; and **Benjamin A. Olken**, Harvard University and NBER, “Climate Change and Economic Growth: Evidence from the Last Half Century”

**Zeynep K. Hansen**, Boise State University and NBER; **Gary D. Libecap**; and **Scott E. Lowe**, Boise State University, “Climate Variability and Water Infrastructure: Historical Experience in the Western United States”

**Richard Sutch**, University of California, Riverside and NBER, “Henry Agard Wallace, the Iowa Corn Yield Tests, and the Adoption of

Hybrid Corn: American Corn Yields, 1866–2002”

**Raghav Gaiha**, **Vani S. Kulkarni**, and **Kenneth Hill**, Harvard University; and **Shantanu Mathur**, International Fund for Agricultural Development, “On Devastating Droughts”

**Alan L. Olmstead**, University of California, Davis and NBER, and **Paul W. Rhode**, University of Arizona and NBER, “Adjusting to Climatic Variation: Historical Perspectives from North American Agricultural Development”

**Wolfram Schlenker**, Columbia University and NBER, and **Michael Roberts**, USDA, “Estimating the Impact of Climate Change on Crop Yields: The Importance of Nonlinear Temperature Effects” (NBER Working Paper No. 13799)

**Hoyt Bleakley**, University of Chicago and NBER, and **Sok Chul Hong**, University of Chicago, “The Impact of Weather on U.S. Farm Productivity: Historical Patterns and Relation to the Changing Disease Environment”

**Karen Clay**, Carnegie Mellon and NBER, and **Werner Troesken**, George Mason University and NBER, “On the Seasonality of Disease: Implications for the Effects of Climate Change on Health”

**Haggay Etkes**, Hebrew University, “The Impact of Short-Term Climate Fluctuations on Rural Population in the Desert Frontier Nahiye of Gaza (ca. 1519–57)”

**Price Fishback**, University of Arizona and NBER; **Trevor Kollman**, University of Arizona; **Michael Haines**, Colgate College and NBER; **Paul W. Rhode**; **Melissa Thomasson**, Miami University and NBER; and **Shawn Kantor**, University of California, Merced and NBER, “The Health Consequences of Natural and Economic Disasters: 1930–1940”

**Valerie A. Mueller** and **Daniel E. Osgood**, Columbia University, “Long-term Consequences of Short-term Precipitation Shocks: Evidence from Brazilian Migrant Households”

Economists and other social scientists who seek to measure the relationship between climate and socioeconomic activity are limited to somewhat more than one century of data from instrument records. Fortunately for this research agenda, dendrochronologists have been rapidly expanding our knowledge of past precipitation and temperature. Tree rings reliably reconstruct the Palmer Drought Severity Index (PDSI), which measures effective or net precipitation. Dendrochronologists have estimated the PDSI in North America for a grid of 286 locations based on 835 tree-ring chronologies that go back hundreds of years. **Steckel** briefly explains the methodology of climate reconstruction in

North America based on tree rings, discusses various databases that are available, and considers some applications of these data for studying settlement of the continent; demographic patterns of health and migration; agricultural prices; financial stress; and government responses to climate change.

**Dell** and her co-authors use annual variation in temperature and precipitation over the past 50 years to examine the impact of climatic changes on economic activity throughout the world. They find three primary results. First, higher temperatures substantially reduce economic growth in poor countries but have little effect in rich countries. Second, higher

temperatures appear to reduce growth rates, rather than just the level of output, in poor countries. Third, higher temperatures have wide effects in poor nations, reducing agricultural output, industrial output, and aggregate investment, and increasing political instability. Should future impacts of climate change mirror these historical effects, the negative effect on poor countries might be substantial.

**Hansen** and his co-authors have constructed (and are still expanding) an integrated dataset on water supply and water infrastructure in the states west of the one hundredth meridian. This county-level dataset includes details on all the constructed dams and canals as well as aquifer

fers and streams. The dam data starts in 1850 and goes through 2001. This extensive dataset will account for the entire water supply and water distribution infrastructure in the western United States. The dataset is spatially linked to topographic characteristics, historical climate data, historical agricultural data, and historical population data at a county level using GIS. The authors use this dataset to seek answers to several questions. First, they are interested in understanding the historical pattern of these construction projects. Specifically, they examine the factors and influences that explain the timing and the location decisions of these dams and canals. They are most interested in investigating and establishing the potential link between the climate variability (changes in annual precipitation totals and mean monthly temperatures) and the construction of water infrastructure in the western states. In addition, they analyze the impact of the water infrastructure construction on agricultural production, and on flood control. They also are interested in analyzing other determinants of investment in water storage and distribution channels, including population growth and the increased electrification of urban residences. They have detailed information on the purpose of dam construction, ranked in terms of priority. Thus, they can separately focus on dams constructed mostly for flood control, for irrigated agriculture, and water/power supply for the areas with larger populations. They hypothesize that counties, which are included in the water supply and distribution infrastructure, were better able to deal with the problems of short-term climatic variability (either because of natural variability in the hydrologic cycle or disruptions of the cycle) in terms of smoothing out agricultural production over time relative to similar counties without such infrastructure. Having identified major drought periods over time, they can look at the variation in agricultural production during these periods before and after dam/canal construction as well as during normal climatic times in a difference-in-difference setting. Similarly, they hypothesize that the problems related to flooding

in flood-prone counties would lessen after the construction of dams. Since they have all the major dams and canals constructed in last 150 years in their dataset, they will examine the impact of the growth in water infrastructure construction on agricultural composition and production, and on flood control over time.

**Sutch** [2007] makes the following claims: 1) There was *not* an unambiguous yield advantage of hybrid corn over the open-pollinated varieties before 1936. 2) The early adoption of hybrid corn can be explained better by a sustained propaganda campaign conducted by the U.S. Department of Agriculture at the direction of the Secretary of Agriculture, Henry Agard Wallace. The Department's campaign echoed that of the commercial seed companies. 3) The early adopters of hybrid seed were followed by later adopters as a consequence of the droughts of 1934 and 1936. The eventual improvement of yields as newer varieties were introduced explains the continuation and acceleration of the process.

Droughts often turn into famines. Loss of agricultural output and food shortage are, however, not the only consequences. There are often large second round effects, some of which persist over time. By the time these effects play out, the overall economic loss is substantially greater than the first round loss of income. Hardships manifest in malnutrition, poverty, disinvestment in human capital (for example, withdrawal of children from school), liquidation of assets (for example, sale of livestock) with impairment of future economic prospects, and, in extreme cases, mortality, given the incompleteness of credit and insurance markets. **Gaiha** and his co-authors build on the extant literature. While the frequency of droughts has risen, their deadliness has declined. This paper sheds light on the underlying geographical, institutional, development indicators in explaining inter-country differences in mortality. The analysis also confirms the favorable effects of openness in saving human lives, and that much of this devastation appears to be avoidable through a timely and speedy entitlement protection strategy. Furthermore, even

moderate learning has the potential to avert a large fraction of deaths. But capacity building—synonymous with availability of more resources for disaster prevention—also has considerable potential in averting deaths. In fact, these findings are broadly consistent with the view that fatalities are greater in countries with weak governments and pervasive poverty.

Providing greater historical perspective would enlighten current discussions about future human responses to climatic variation. During the nineteenth and twentieth centuries, new biological technologies allowed North American farmers to push cropping into environments previously thought too arid, too variable, and too harsh to cultivate. **Olmstead** and **Rhode** document these changes for three major staple crops, noting that the climatic challenges that previous generations of farmers overcame often rivaled the climatic changes predicted for the next hundred years in North America. Further analysis is needed to understand the timing, causes, and costs of these adjustments, they conclude.

The United States produces 41 percent of the world's corn and 38 percent of the world's soybeans, so any impact on U.S. crop yields will have implications for world food supply. **Schlenker** and **Roberts** pair a panel of county-level crop yields in the United States with a fine-scale weather dataset that incorporates the whole distribution of temperatures between the minimum and maximum within each day and across all days in the growing season. Yields increase in temperature until about 29C for corn, 30C for soybeans, and 32C for cotton, but temperatures above these thresholds become very harmful. The slope of the decline above the optimum is significantly steeper than the incline below it. The same nonlinear and asymmetric relationship is found whether the authors consider time-series or cross-sectional variation in weather and yields. This suggests limited potential for adaptation within crop species because the latter includes farmers' adaptations to warmer climates and the former does not. Area-weighted average yields given current growing regions are predicted to

decrease by 31–43 percent under the slowest warming scenario and 67–79 percent under the most rapid warming scenario by the end of the century.

**Bleakley** and **Hong** consider the impact of weather on farm values. Using both cross-sectional and panel methods, they document economically and statistically significant differences in the response of farm productivity to weather over time. In recent decades, farm value has been (weakly) increasing in temperature and rainfall. On the other hand, high levels of temperature or rain depressed farm value in the nineteenth century. This suggests an important role for technological adaptation in reducing the impact on farm productivity of hotter and wetter weather (a possible outcome of climate change in some places). One particular adaptation—the eradication of malaria—accounts for a substantial fraction of this difference over time. These results also suggest that malaria reduced farm productivity by a factor of 2–3 in the most malarious parts of the South relative to the Plains in the late 1800s.

**Clay** and **Troesken** hope to establish the robustness of the seasonality of disease and to better understand the mechanisms that underlie the connection between climatic variation and disease. Their paper has three parts. Part I explores the seasonal patterns in deaths from six causes: pneumonia, typhoid fever, scarlet fever, diphtheria, infant mortality, and smallpox. They find that these infectious diseases are highly sensitive to seasonal variation in temperature or rainfall but that the effects of temperature are not uniform or linear. Part I also asks why seasonal variation in temperature affects disease rates. The central finding here is that exposure to organic and inorganic pathogens depends heavily on temperature. Part II looks for evidence of what demographers and epidemiologists refer to as harvesting, such that unusually high or low temperatures are killing only the weakest and most unhealthy individuals, people who

would have died anyway even without the extremes in temperature. Part II also asks a related question: whether poor socioeconomic groups were more vulnerable to changes in temperature than wealthier groups. Part III explores how public health interventions altered seasonal disease patterns and helped protect populations against the diseases related to temperature change.

**Etkes** explores the impact of short-term climate fluctuations on rural population by examining the differences in the latter's growth rates within the Gaza *nabiye* (ca. 1519–57). This small administrative unit (a trapezoid of about 60x35 Km) borders the desert and included both southern semi-arid and northern Mediterranean climate zones. The demographic data—the number of rural taxpayers—were deciphered from Ottoman tax surveys, and the indications for historical climate fluctuations include tree rings, grain prices, and qualitative evidence derived from historical documents. The study shows that the population in southern semi-arid villages was more sensitive to climate fluctuations than the population in northern Mediterranean villages. In other words, dry years were followed by a relatively slow demographic growth in southern villages, while bountiful years were followed by accelerated southern demographic growth. The study interprets this pattern as south-north migration aimed at smoothing consumption across wet and dry years. Similar circular migration are familiar as survival strategy in other regions such as the Sahel in Sub-Saharan Africa.

During the 1930s, the economy experienced the worst Depression in U.S. history. In addition, the American population faced the trials of Job as it was struck by a series of natural disasters. Everybody remembers the Dust Bowl as it kicked up huge amounts of particulates into the air, but this was only the most famous of many other disasters. Other parts of the country were struck by extreme and

severe droughts. Meanwhile, excessive flooding and severe rainfall struck other sections. Recent corrections to the climate data show that the 1930s included several of the hottest years on record in American climate history. **Fishback** and his co-authors examine the impact of natural disasters and economic disasters on infant mortality rates and adult mortality rates during the course of the 1930s. They have constructed an annual panel dataset for over 3000 counties for the years 1930 through 1940. The dataset includes annual data on infant mortality rates in both rural and city areas within the counties. When they examine the pure relationships between climate and natural disasters and infant mortality, they find that high temperatures and severe wetness and flooding were associated with higher infant mortality. After controlling for income and many government programs during the 1930s, they find that climate has very little impact on infant mortality rates. These preliminary results suggest that climate variation and natural disasters influence infant mortality by affecting income and other economic features, while having only a small direct effect after controlling for those factors.

**Mueller** and **Osgood** find that large short-term precipitation shocks damage the long-term income of households that have permanently migrated from rural to urban areas. This outcome is consistent with the behavior of credit-constrained rural households who are willing to accept lower long-term income in urban areas following the depletion of their productive assets during an adverse shock. The acceptance of lower income persists into the long term, as long as mechanisms for rebuilding capital remain unavailable. Their empirical evidence suggests that there may be a link between large precipitation shocks in rural areas and urban poverty. Further exploration is warranted on the mechanisms by which natural disasters cause these long-term losses.

### 2007–8 Awards and Honors

A number of NBER researchers received honors, prizes, awards, and professional kudos during 2007 and early 2008. In alphabetical order, those so honored (excluding honors by the individual's own university) are:

**Alberto Abadie** was awarded the 2007 Gosnell Prize by the Society of Political Methodology for “the best work in methods presented at any political science conference during the preceding year” for his paper, “Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program,” with Alexis Diamond and Jens Hainmueller.

**John M. Abowd** was elected a Fellow of the Society of Labor Economists in 2007.

**Katharine Abraham** became a Fellow of the Society of Labor economists.

**Daron Acemoglu** received an honorary doctorate from the University of Utrecht, Netherlands.

**Yacine Ait-Sahalia** was awarded a Guggenheim Fellowship for 2008–9 for his work on jump and volatility. He also was elected a Fellow of the American Statistical Association.

**Heitor Almeida, Murillo Campello,** and Crocker Liu won the Goldman Sachs Prize for the best paper published in the *Review of Finance* in 2007 for “The Financial Accelerator: Evidence from International Housing Markets.”

**Lee J. Alston** gave his Presidential Address to the International Society for the New Institutional Economics in Reykjavik, Iceland in June 2007.

**Orley Ashenfelter** is a Distinguished Fellow of the American Economic Association.

**Susan Athey** received the American Economic Association’s John Bates Clark Medal in 2007.

**David Autor** was awarded the 2008 Sherwin Rosen Prize by the Society of Labor Economists “In recognition of outstanding contributions to the field of labor economics.” He also was selected by the American Economic Association to

become Editor-in-Chief of the *Journal of Economic Perspectives*.

**Laurence Baker** will receive the American Society of Health Economists (ASHE) Medal at their meeting in June 2008. The ASHE Medal is awarded biennially “to the economist age 40 or under who has made the most significant contributions to the field of health economics.”

**Katherine Baicker** was named to the Editorial Board of *Health Affairs*; she also was named a Commissioner of the Robert Wood Johnson Commission to Build a Healthier America, and was appointed to the Institute of Medicine’s Committee on the Effects of Lacking Health Insurance Coverage.

**Lucian Bebchuk** was elected President of the American Law and Economics Association.

**Roland Benabou** delivered the Joseph Schumpeter lecture at the meetings of the European Economic Association in Budapest, August 2007.

**Jonathan Berk’s** paper, “A Critique of Size Related Anomalies,” was selected as one of 100 seminal papers published in Oxford University Press’s 100-year history.

**David G. Blanchflower** was awarded an honorary Doctor of Letters from his alma mater, the University of Leicester, in the UK.

**Nick Bloom** won an Alfred P. Sloan Research Fellowship.

**Howard Bodenhorn** received a John Simon Guggenheim Fellowship for a project titled “The Political Economy of Reform in Jacksonian New York.”

**John Y. Campbell** delivered the luncheon address to the annual meeting of the Western Finance Association in 2007.

**Murillo Campello** won the 2007 Goldman Sachs Best Paper Award from the *Review of Finance* for the article

“The Financial Accelerator: Evidence From International Housing Markets,” co-authored with **Heitor Almeida** and Crocker Liu.

**David Card** won the Econometric Society’s Ragnar Frisch Prize.

**Amitabh Chandra** and **Douglas Staiger** won the Arrow award for the best published paper in Health Economics. The paper was “Productivity Spillovers in Healthcare: Evidence from Heart-Attack Treatments” appearing in the February 2007 *Journal of Political Economy*.

**Lauren Cohen** won the 2007 Smith Breeden Prize (distinguished paper) in the *Journal of Finance* for her paper, “Supply and Demand Shifts in the Shorting Market” (with Karl Diether, Ohio State and Christopher Malloy, of HBS); she also won the 2007 Barclays Global Investors Prize from the European Finance Association for Best Paper on Asset Pricing for, “The Small World of Investing: Board Connections and Mutual Fund Returns” (with Andrea Frazzini of Chicago GSB and Christopher Malloy, of HBS) and the 2007 Society of Quantitative Analysts Award from the Western Finance Association for Best Paper in Quantitative Investments for, “Attracting Flows by Attracting Big Clients: Conflicts of Interest and Mutual Fund Portfolio Choice” (with Breno Schmidt from USC).

**Maureen Cropper** was elected to The National Academy of Sciences in April 2008. The National Academy of Sciences is “a private organization of scientists and engineers dedicated to the furtherance of science and its use for the general welfare. It was established in 1863 by a congressional act of incorporation signed by Abraham Lincoln that calls on the Academy to act as an official adviser to the federal government, upon request, in



any matter of science or technology.”

**David M. Cutler** was elected into the American Academy of Arts and Sciences.

**Angus Deaton** was elected President-Elect of the American Economic Association. His term as President will begin in 2009. He received a Laurea Honoris Causa from the University of Rome, Tor Vergata, in June 2007, and an Honorary D.Sc (Econ.) from University College, London, in September 2007.

**Stefano DellaVigna** was awarded a Sloan Research Fellowship in February 2008.

**Darrell Duffie** was elected a Fellow of the American Academy of Arts and Sciences in 2007.

**Esther Duflo** is the Inaugural holder of the Chair “Knowledge against Poverty” in the College de France, Paris, for 2008/9.

**Esther Duflo, Jeffrey Liebman,** and **Emmanuel Saez** (along with Peter Orszag and William Gale) received the 2007 TIAA-CREF Paul A. Samuelson Certificate of Excellence for their paper “Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block,” published in the *Quarterly Journal of Economics* in November 2006.

**William Easterly** delivered the D. Gale Johnson Lecture at the University of Chicago and the Zale Lecture at Stanford University.

**Sebastian Edwards** delivered the Figuerola Lecture at the Universidad Carlos III in Madrid in September 2007; he also delivered the Corden Lecture at the University of Melbourne in October 2007.

**Ronald G. Ehrenberg** was awarded an Honorary Doctor of Science degree by the State University of New York in May 2008.

**Isaac Ehrlich** has been selected by the Comptroller of the State of New York to be in charge of developing an independent annual forecast of the state’s tax revenue (a job similar to that of the CBO), heading a team of professors from the Center of Human Capital at SUNY Buffalo. The assignment follows a budget reform act enacted by the legislature

of the state of New York, empowering the Comptroller to offer an independent and binding forecast in case the Executive and Legislative branches fail to reach a consensus forecast by March 1 of each year. The Center’s forecast has had an important impact this year.

**Robert C. Feenstra** presented the Zeuthen Lectures at the University of Copenhagen in April 2007. Those lectures will be published as an MIT Press book.

**Amy Finkelstein** received a 2007–9 Alfred P. Sloan Research Fellowship.

**Kristin Forbes** was selected as a member of the Trilateral Commission in 2007.

**Barbara Fraumeni** is the incoming Chair of the Committee on the Status of Women in the Economics Profession (CSWEP), a committee of the American Economic Association.

**Victor Fuchs** gave the 2007 John Eisenberg Legacy Lecture on December 13, 2007. That Lecture honors Dr. John Eisenberg, a renowned internist and health services researcher who directed the Agency for Healthcare Research and Quality (AHRQ) from 1997 to 2002. Also, the American Society of Health Economists (part of the International Health Economics Association) has named a Lifetime Achievement Award after him: the Victor R. Fuchs ASHE Career Award for Lifetime Contributions to the Field of Health Economics. It is to be awarded biennially to an economist who has made significant lifetime contributions to the field of health economics.

**Martin Gaynor, Jian Li, and William B. Vogt** received the first annual Victor R. Fuchs Research Award from RAND and the Forum for Health Economics and Policy for their paper, “Substitution, Spending Offsets, and Prescription Drug Benefit Design.” This \$10,000 prize, sponsored by RAND, goes to the authors of the best paper with the potential to spawn new research in an underdeveloped area of health economics or health policy. The winning paper was published in *Forum for Health Economics & Policy*: Vol. 10: Iss. 2, Article 4.

**Matthew Gentzkow** and **Jesse**

**Shapiro** received the 2007 Robert H. Durr Award from the Midwest Political Science Association.

**Mark Gertler** was awarded a Guggenheim Fellowship for 2007.

**Robert Gibbons** became a Fellow of the Society of Labor Economists in spring 2008.

**Roger Gordon** became a Fellow of the American Academy of Arts and Sciences.

**Pierre-Olivier Gourinchas** was runner up for the 2007 prize for the best French young economist (under 40) awarded by Cercle des Economistes and Le Monde. He won the 2008 Bernacer Prize for the best European economist under 40 working on finance and macroeconomics.

**Jeffrey Grogger** won the 2007 Outstanding Statistical Application Award from the American Statistical Association for his paper with Greg Ridgeway entitled “Testing for Racial Profiling in Traffic Stops from Behind a Veil of Darkness” (*Journal of the American Statistical Association*, 101 (475), September 2006, pp. 878–87.)

**Reuben Gronau** received the Jacob Mincer Award for lifetime contribution to Labor Economics from the Society of Labor Economics.

**Gene M. Grossman** delivered the Condliffe Memorial Lecture at the University of Canterbury in November 2006 and the Walras-Pareto Lectures at the University of Lausanne in May 2007.

**Michael Grossman** received the 2008 Victor R. Fuchs Award. This Award for Lifetime Contributions to the Field of Health Economics is presented biennially “to an economist who has made significant lifetime contributions to the field of health economics.” He also became President-elect of the American Society of Health Economists in the fall of 2006 and will be President of that organization as of June 26, 2008. Grossman served as President of the Eastern Economic Association from February 2007 through March 2008 and delivered the presidential address at the annual conference of that association in Boston in March 2008.

**Michael R. Haines** continues as

Treasurer of the Social Science History Association (since 2005). Also, *Historical Statistics Of The United States*, Millennial edition (NY: Cambridge University Press, 2006), in 5 volumes and an electronic edition, won the Thomas Jefferson Prize from the Society for History in the Federal Government. The award was presented in Washington, D.C. in March 2008. Among the editors-in-chief of this publications are several NBER Research Associates: **Richard Sutch, Gavin Wright, Alan Olmstead, Michael Haines.**

**Oliver Hart** was the Sukhamoy Chakravarty Memorial Lecturer, Delhi School of Economics, and the (Inaugural) Coase Lecturer at the London School of Economics in 2007.

**Igal Hendel** and **Aviv Nevo** were awarded the *Compass Prize* 2007 (prize for the paper making the most significant contribution to the understanding and implementation of competition policy) for “Measuring the Implications of Sales and Consumer Inventory Behavior.”

**Robert Inman** was appointed a Fellow of the Rockefeller Foundation, Bellagio, Italy for the Fall, 2007.

**Panle Jia** received the Zellner Thesis Award for Best Dissertation in Business and Economics Statistics from the American Statistical Association in 2007.

**Sebnem Kalemli-Ozcan** received two European awards: the 2008 Wim Duisenberg Research Fellow (of the European Central Bank, or ECB) for leading economists in academia, central banks, and top research institutions who are recognized international experts in their field; and the Marie Curie Reintegration Award (of the European Commission, or EC) designed to attract top-class researchers from third countries to work and undertake research in Europe.

**Edward J. Kane** was named the 2008 Midwest Financial Association Distinguished Scholar.

**Timothy J. Kehoe** was made Doctor Honoris Causa by the Universidad de Vigo in February 2008.

**Per Krusell** received the Sööderberg Prize in economic sciences. It is given every four years to an economist with a connection to Sweden.

**Kevin Lang** won Honorable Mention (runner-up) for the best new Professional/Academic Book in Sociology and Social Work from the Association of American Publishers.

**David S. Lee** and **Adriana Kugler** both won the Labor and Employment Relations Association’s 2007 John T. Dunlop Scholar Award for “outstanding academic contributions to research by recent entrants to the field.”

**Ronald Demos Lee** became a member of the American Philosophical Society.

**Eric M. Leeper** has been offered a Professorial Fellowship in Monetary and Financial Economics by the Reserve Bank of New Zealand and Victoria University and will spend fall 2008 in Wellington, NZ.

**Jeffrey Liebman, Esther Duflo, Emmanuel Saez** (along with Peter Orszag and William Gale) received the 2007 TIAA-CREF Paul A. Samuelson Certificate of Excellence for their paper “Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block,” published in the *Quarterly Journal of Economics* in November 2006.

**Andrew W. Lo** won the 2007 Smith-Breeden Distinguished Paper award (with Jiang Wang); the Boston Security Analysts Society Honorary Member award; and the Market Technicians Association Annual Award.

**Annamaria Lusardi** and **Olivia Mitchell** won the Fidelity Pyramid Prize, a \$50,000 award given to authors of published applied research that best helps address the goal of improving lifelong financial well-being for Americans.

**Lisa M. Lynch** received the 2007 Susan C. Eaton Scholar-Practitioner award from the Labor and Employment Relations Association.

**N. Gregory Mankiw** was inducted as a Fellow in the American Academy of Arts and Sciences in 2007.

**Robert C. Merton** was awarded the honorary degree, Doctor of Science Honoris Causa, by Claremont Graduate University, Claremont California at a ceremony on May 17, 2008.

**Olivia S. Mitchell** and **Annamaria Lusardi** won the 2007 Fidelity Pyramid Prize for their paper “Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth” (which appeared in the *Journal of Monetary Economics*, Volume 54, Issue 1, Pages 205–24 in January 2007.) The prize was given for their work on advancing an understanding of the importance of financial literacy and planning in helping Americans to reach their financial goals. Mitchell also received the 2008 Roger F. Murray Prize from the Institute for Quantitative Research in Finance (1st Prize); and the 2008 Carolyn Shaw Bell Award of the Committee on the Status of Women in the Economics Profession.

**Randall Morck** received an “All Star Paper Award” from *The Journal of Financial Economics* for cites to his 2000 article with Bernard Yeung and Wayne Yu: “The Information Content of Stock Markets: Why Do Emerging Markets Have Synchronous Stock Price Movements?” It appeared in the *Journal of Financial Economics*, 58(1), pp. 215-60.

**Dale Mortensen** and **Finis Welch** shared the 2007 Society of Labor Economists’ Jacob Mincer prize honoring lifetime achievements in the field of labor.

**Stefan Nagel** and **Jonathan Lewellen** won the Fama/DFA prize for the best paper in asset pricing in the *Journal of Financial Economics* for “The conditional CAPM does not explain asset pricing anomalies.”

**Derek Neal** is President-Elect of the Midwest Economics Association and a new Fellow of the Society of Labor Economists.

**Joseph Newhouse** was named to the Congressional Budget Office’s Board of Health Advisers and to the Comptroller General’s Advisory Board.

**Ariel Pakes** was selected as the Distinguished Fellow of the Industrial Organization Society for 2007.

**Stavros Panageas** won the 2007 Geewax-Terker Prize in Investment Research for the best paper published in the Rodney White Working Paper Series at Wharton that year. The paper

is titled “Optimal Retirement Benefit Guarantees.”

**Mark Pauly** received the National Institute of Health Care Management Foundation’s Research Award for “Is Health Insurance Affordable for the Uninsured?” with M. Kate Bundorf (*Journal of Health Economics*, July 2006), in May 2007; the John M. Eisenberg Excellence in Mentorship Award, Agency for Health Care Research and Quality in June 2007; and the Distinguished Investigator Award, AcademyHealth, also in June 2007.

**Lubos Pastor** (and co-author **Robert Stambaugh**) received the Goldman Sachs Asset Management Award for the best paper in empirical investments presented at the 2007 meetings of the Western Finance Association.

**John Pencavel** won the Society of Labor Economists’ Mincer Award for Lifetime Achievement.

**Tomas Philipson** received the Garfield Award from Research America for best health economics paper in a given year.

**Joshua D. Rauh** received the Brattle Prize, First Prize Paper, for the best corporate finance paper published in the *Journal of Finance* in 2006. The award was announced on January 6, 2007.

**Jonah Rockoff** received a Smith Richardson Public Policy Fellowship, given annually to three young economists working in public economics and public policy in the United States, in 2007.

**Dani Rodrik** won the inaugural Albert O. Hirschman award of the Social Science Research Council in 2007, presented for “outstanding contributions to international, interdisciplinary social science research, theory, and public communication, in the tradition of Albert Hirschman.”

**Harvey S. Rosen** won the National Tax Association’s Daniel M. Holland Medal for distinguished lifetime contributions to the study and practice of public finance in 2007.

**Steve Ross** won the Jean-Jacques Laffont Prize, 2007.

**Jose A. Scheinkman** was awarded a John Simon Guggenheim Memorial

Fellowship in 2007. In April 2008 he was elected a member of the National Academy of Sciences.

**Anna J. Schwartz** was inducted into the American Academy of Arts and Sciences on October 6, 2007.

**Fiona M. Scott Morton** and co-authors **Florian Zettelmeyer** and **Jorge Silva-Risso** received the 2007 Green Award for their article “How the Internet Lowers Prices: Evidence from Matched Survey and Automobile Transaction Data,” published in the May 2006 issue of the *Journal of Marketing Research*.

**Jesse Shapiro** and **Matthew Gentzkow** received the 2007 Robert H. Durr Award from the Midwest Political Science Association for their paper “What Drives Media Slant?” The award is given “for the best paper applying quantitative methods to a substantive problem.”

**Robert J. Shiller** was named “Global Risk Manager of the Year” by the Global Association of Risk Managers in 2007. He is the first academic to receive this honor.

**Hans-Werner Sinn** delivered the Thuenen Lecture to the German Association of Economists (Verein für Socialpolitik) in Munich in October 2007.

**James M. Snyder** was inducted into the American Academy of Arts and Sciences in 2007.

**Gary R. Solon** was elected a Fellow of the Society of Labor Economists.

**Douglas O. Staiger** and **Amitabh Chandra** received the Kenneth J. Arrow Award in Health Economics from the International Health Economics Association for the best paper in health economics in 2007: “Productivity Spillovers in Health Care: Evidence from the Treatment of Heart Attacks,” published in the *Journal of Political Economy*, February 2007.

**Robert Stambaugh** (and co-author **Lubos Pastor**) received the Goldman Sachs Asset Management Award for the best paper in empirical investments presented at the 2007 meetings of the Western Finance Association.

**Robert Stavins**, Charles Kolstad, and **Joseph Stiglitz** served as Lead Authors for

the Intergovernmental Panel on Climate Change, which was the co-recipient (with Albert Gore Jr.) of the 2007 Nobel Peace Prize. Stavins also became the founding Editor of the *Review of Environmental Economics and Policy*.

**Jeremy C. Stein** was named a Fellow of the American Academy of Arts and Sciences in 2008, and was also elected president of the American Finance Association.

**Andrew Sweeting** won the Austin Robinson Memorial Prize for the best paper by an economist within five years of Ph.D. published in the *Economic Journal* in 2007. The paper was “Market Power in the England and Wales Wholesale Electricity Market 1995–2000.”

**Richard Sylla** was elected vice chairman of the board of trustees of the Museum of American Finance, a Smithsonian affiliate located at 48 Wall Street, New York City. The election occurred in October 2007.

**Michele Tertilt** was awarded the NSF CAREER grant (the NSF’s major award in support of early-career scientists). She is also the W. Glenn Campbell and Rita Ricardo-Campbell National Fellow at the Hoover Institution during academic year 2007/8.

**Laura Veldkamp**, **Patrick Bolton**, and **Markus Brunnermeier**’s paper “Leadership, Coordination and Mission-Driven Management” won the J.P. Morgan Prize for the best paper at the Utah Winter Finance Conference.

**Pietro Veronesi** received the Fama/DFA Prize for the best paper in the *Journal of Financial Economics* in the Areas of Capital Markets and Asset Pricing (second prize) for “Was There a NASDAQ Bubble in the Late 1990s?” (with Lubos Pastor), 2006, *Journal of Financial Economics* 81, 61–100. (The prize is awarded in 2007 for a publication in 2006.)

**W. Kip Viscusi** was appointed as an Honorary Member, Academy of Economics and Finance.

**Joel Waldfoegel** and his co-author Lu Chen won the *Journal of Industrial Economics*’s “Best Article of the Year” Prize for 2006 for “Does Information Undermine Brand? Information Inter-

mediary Use and Preference for Branded Web Retailers”, which appeared in the December 2006 issue (Volume LIV No. 4).

**Jiang Wang** received the 2007 Smith Breeden Prize for distinguished paper in the *Journal of Finance* for “Trading Volume: Implications of An Intertemporal Asset Pricing Model”(with A.W. Lo), 2007 and the New York Stock Exchange Award for the best paper on equity trading, Western Finance

Association Meeting, for “Liquidity and Market Crashes” (with J. Huang), 2007.

**Michael Whinston** was elected a Fellow of the American Academy of Arts and Sciences.

**Michelle J. White** is President-elect of the American Law and Economics Association. (She will succeed Lucian Bebchuk, who is now president.)

**Barbara (Bobbi) Wolfe** has been awarded a Guggenheim Fellowship for 2008.

**Michael Woodford** was awarded the 2007 Deutsche Bank Prize in Financial Economics.

**Stephen R. Yeaple** was awarded the 2008 Bhagwati Award for his paper, “A Simple Model of Firm Heterogeneity, International Trade, and Wages.” This award is given every other year for the best paper in the *Journal of International Economics*.

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## Program and Working Group Meetings

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### Science of Science Day

The NBER’s Program on Productivity held a “Science of Science Day” when it met on March 14. Program Director Ernst R. Berndt and NBER Research Associate Pierre Azoulay, both of MIT, organized the meeting. These papers were discussed:

**Shulamit Kahn**, Boston University, and **Megan J. MacGarvie**, Boston University and NBER, “How Important is Location for Research Productivity in Science?”  
Discussant: Richard B. Freeman, Harvard University and NBER

**Pierre Azoulay; Joshua Graff Zivin**, Columbia University and NBER; and **Jialan Wang**, MIT, “Superstar Extinction”  
Discussant: Lynne G. Zucker, University of California, Los Angeles and NBER

**Liam Brunt**, University of Lausanne; **Josh Lerner**, Harvard University and NBER; and **Tom Nicholas**, Harvard University, “Inducement Prize and Innovation”  
Discussant: Michael Kremer, Harvard University and NBER

**Laure Turner**, CREST-ENSAE; and

**Jacques Mairesse**, CREST-ENSAE and NBER, “Individual Productivity Differences in Scientific Research: An Econometric Exploration of Publications by French Physicists”  
Discussant: Iain Cockburn, Boston University and NBER

**David Popp**, Syracuse University and NBER, and **Richard Newell**, Duke University, “Where Does Energy R and D Come From? A First Look at Crowding Out from Environmentally-Friendly R and D”  
Discussant: Rebecca Henderson, MIT and NBER

**Kahn** and **MacGarvie** ask whether scientists located outside the United States are at a disadvantage when it comes to research productivity, collaboration, and knowledge diffusion. The principal difficulties of comparing scientists inside the United States with those outside the United States arise from unobserved heterogeneity among scientists and the endogeneity of location choices. This paper

uses a new and unique dataset of foreign-born U.S.-educated scientists that allows its authors to exploit exogenous variation in post-Ph.D. location induced by visa status. They thus are able to compare students who were required by law to leave the United States upon the completion of their studies with similar students who were allowed to remain in the United States. The researchers assess whether stu-

dents who left the United States have more or fewer publications, patents, citations, and collaborators when compared with a control student with the same advisor. They also ask whether these students have more or fewer international collaborations.

**Azoulay** and his co-authors estimate the magnitude of spillovers generated by 137 academic “superstars” in the life sci-

ences onto their coauthors' research productivity. These researchers died while still being actively engaged in science, thus providing an exogenous source of variation in the structure of their collaborators' coauthorship networks. Following the death of a superstar, coauthors suffer a lasting 8 to 18 percent decline in their quality-adjusted publication output. These findings are surprisingly homogeneous across a wide range of coauthor and coauthor/superstar dyad characteristics. Together, they suggest that part of the scientific field embodied in the "invisible college" of coauthors working in that area dies along with the star — a genuine and irreplaceable loss of human capital.

**Brunt** and his co-authors examine prizes as an inducement for innovation, using a novel dataset of awards for inventiveness offered by the Royal Agricultural Society of England from 1839 to 1939. At annual shows, the RASE held competitive trials and awarded medals and monetary prizes (exceeding one million pounds in current prices) to spur technological development. This paper uncovers large effects of the prizes on contest entries, especially for the Society's gold medal. Matching award and patent data, the authors also detect large effects of the prizes on the quality of contemporaneous inventions. These results hold even during the period when prize categories were determined by a strict rotation scheme, thus overcoming the potential confound that awards were offered in "hot" technology sectors. The evidence suggests that prize awards can be a powerful mechanism for encouraging competition and that prestigious non-pecuniary prizes can be a particularly effective inducement for innovation.

An empirical regularity has often been observed in economics of science: productivity differences among researchers are extremely large and persistent, and

a prolific minority of scientists produces most of the publications and accounts for most of citations in almost all research fields. **Turner** and **Mairesse** investigate to what extent such dispersion and persistence can be accounted for by three types of factors in so far as they can measure them: individual variables, mainly age and gender, career stage variables, and laboratory variables. Does individual scientific productivity significantly drop off as scientists become older and more or less advanced in their careers? Is it strongly related or not to career promotions and to the productivity and quality of the laboratories in which scientists work? Even if these factors prove quite significant, is it nonetheless the case that individual productivity differences remain largely unaccounted by them, and that they have to be mostly imputed to unobserved individual circumstances and characteristics, or so called "individual effects"? To answer such questions, the authors have put together a 12-year panel database for 465 condensed matter physicists working in the French public research organization CNRS, and have specified and estimated a simple econometric model for both "productivity" and "quality," measured respectively by the number of publications per scientist per year and by the corresponding average citation impact of these publications.

Recent efforts to endogenize technological change in climate policy models demonstrate the importance of accounting for the opportunity cost of climate R and D investments. Because the social returns to R and D investments are typically higher than the social returns to other types of investment, any new climate mitigation R and D that comes at the expense of other R and D investment may dampen the overall gains from induced technological change. Unfortunately, there has been little empirical work to guide modelers as

to the potential magnitude of such crowding out effects. **Popp** and **Newell** attempt to address this question. They consider the private opportunity costs of climate R and D, asking whether an increase in climate R and D represents *new* R and D spending, or whether some (or all) of the additional climate R and D comes at the expense of other R and D. They begin at the industry level, using sectoral data on R and D expenditures to ask whether increases in energy R and D spending crowd out other R and D spending in various industries. Preliminary results show some evidence of crowding out in sectors active in energy R and D, but not in sectors that do not perform energy R and D. This suggests that funds for energy R and D do not come from other sectors, but may come from a redistribution of research funds in sectors that are likely to perform energy R and D. Given this, the authors proceed with a detailed look at climate R and D in two sectors: automotive manufacturing and alternative energy. Linking patent data and financial data by firm, they examine patenting behavior of large firms. For these firms, they are able to separately identify patents pertaining to innovative energy technology (for example, wind energy and fuel cells) from all other patents. They ask whether an increase in these energy patents leads to a decrease in other types of patenting activity, which would suggest R and D crowding out. Preliminary results show no evidence of crowding out within these firms. Finally, the authors use patent citation data to ask where the most valuable patents in these sectors come from. They find that firms specializing in alternative energy research provide more valuable patents than larger firms for which alternative energy R and D is just part of a broader portfolio.

## Asset Pricing Program Meeting

The NBER's Asset Pricing Program met in Chicago on April 25. Hanno Lustig, University of California, Los Angeles and NBER, and Monika Piazzesi, University of Chicago, organized the meeting. These papers were discussed:

**Zhi Da** and **Pengjie Gao**, University of Notre Dame, and **Ravi Jagannathan**, Northwestern University and NBER, "When Does A Mutual Fund's Trade Reveal its Skill?"

Discussant: Jonathan Berk, University of California, Berkeley and NBER

**Rui Albuquerque** and **Jianjun**

**Miao**, Boston University, "Advance Information and Asset Prices"

Discussant: Snehal Banerjee, Northwestern University

**Zhiguo He** and **Arvind**

**Krishnamurthy**, Northwestern University, "Intermediary Asset Pricing"

Discussant: Stavros Panageas, University of Pennsylvania

**Christine A. Parlour** and **Johan**

**Walden**, University of California, Berkeley, "Capital, Contracts, and the Cross Section of Stock Returns"

Discussant: Adriano Rampini, Duke University

**Pedro Santa-Clara**, University of California, Los Angeles and NBER, and

**Shu Yan**, University of South Carolina, "Crashes, Volatility, and the Equity Premium: Lessons from the S&P 500 Options"

Discussant: Ravi Bansal, Duke University and NBER

**John H. Cochrane** University of Chicago and NBER, "A Mean-Variance Benchmark for Intertemporal Portfolio Theory"

Discussant: Stanley Zin, Carnegie Mellon University and NBER

**Da, Gao, and Jagannathan** conjecture that a mutual fund manager with superior stock selection ability is more likely to benefit from trading in stocks affected by information-events. Taking the probability of informed trading (PIN, Easley, Kiefer, O'Hara, and Paperman, 1996) to measure the amount of informed trading in a stock, and inferring mutual fund trades from a large sample of mutual fund holdings, the authors provide empirical support for the conjecture. Funds trading high-PIN stocks exhibit superior performance on average, and superior performance that is more likely to persist. The findings are not attributable to price momentum or the higher returns earned by high-PIN stocks on average. The conclusions remain the same after testing for alternative measures for the amount of informed trading. Decomposing a fund's stock selection ability into "informed trading" and "liquidity provision" adds further insight into fund's underlying strengths. Impatient informed trading is a significant source of alpha for funds trading high-PIN stocks, while liquidity provision is more important as a source of alpha for funds trading low-PIN stocks.

**Albuquerque** and **Miao** provide an explanation for momentum and reversal in stock returns within a rational expect-

tations equilibrium framework in which investors are heterogeneous in their information and investment opportunities. The authors assume that informed investors privately receive advance information about company earnings that materializes into the future. This information is immediately incorporated into prices, and thus stock prices may move in ways unrelated to current fundamentals. Investors' speculative and rebalancing trades in response to advance information generate short-run momentum, mimicking an underreaction pattern. When this information materializes, the stock price reverts back to its long-run mean, mimicking an overreaction pattern.

**He** and **Krishnamurthy** present an equilibrium asset pricing model in which intermediaries are marginal in setting prices. The intermediaries modeled are hedge funds, mutual funds, banks, or insurance companies. The authors calibrate the model to a hedge fund crisis episode where parameters are chosen so that the marginal investor resembles a hedge fund with leverage. The researchers are able to qualitatively and quantitatively match the behavior of risk premia and interest rates in a financial crisis. Moreover, their model captures the slow mobility of capital during a crisis and can

replicate observed crisis recovery times. They also calibrate their model to a broad intermediation scenario where parameters are chosen so that the marginal investor is an amalgam of the intermediaries we observe in practice. They show that the intermediation effects help to generate a volatile pricing kernel and a market risk premium matching the empirically observed equity premium.

**Parlour** and **Walden** present a tractable, static, general equilibrium model with multiple sectors in which firms offer workers incentive contracts and simultaneously raise capital in stock markets. Workers optimally invest in the stock market and at the same time hedge labor income risk. Firms rationally take agents' portfolio decisions into account. In equilibrium, the cost of capital of each sector is endogenous. The authors compare the first-best, in which workers' effort levels are observable, to an economy in which workers' effort is observed with noise. In the presence of moral hazard, the CAPM fails because firms, by choosing optimal incentive contracts, transfer risk both through wages and through the stock market. This leads to several cross-sectional asset pricing "anomalies," such as size and value effects. As the researchers characterize optimal contracts, they pres-

ent empirical predictions relating workers' compensation, firm productivity, firm size and financial market abnormal returns. They also demonstrate some general equilibrium implications of endogenous contracts; for example the ex-ante value of human capital can be higher in an economy with moral hazard.

**Santa-Clara** and **Yan** use a novel pricing model to imply times series of diffusive volatility and jump intensity from S&P 500 index options. These two measures capture the ex-ante risk assessed by investors. The researchers find that both components of risk vary substantially over time, are quite persistent, and correlate with each other and with the stock index. Using a simple general equilibrium model with a representative investor, they trans-

late the implied measures of ex-ante risk into an ex-ante risk premium. They find that the average premium that compensates the investor for the ex-ante risks implicit in option prices, 11.8 percent, is more than 70 percent higher than the premium required to compensate the same investor for the realized volatility, 6.8 percent. Moreover, the ex-ante equity premium that they uncover is highly volatile, with values between 0.3 and 54.9 percent. The component of the premium that corresponds to jump risk varies between zero and 45.4 percent. The equity premium implied from option prices significantly predicts subsequent stock market returns.

**Cochrane** notes that by reinterpreting the symbols, one-period mean-variance portfolio theory can apply to dynamic

intertemporal problems in incomplete markets, with non-marketed income. Investors first hedge non-traded income and preference shocks. Then, their optimal payoffs are split between an indexed perpetuity and a "long-run mean-variance efficient" payoff, which avoids variation over time as well as variation across states of nature. In equilibrium, the market payoff and the average outside-income hedge payoff span the long-run mean-variance frontier, and long-run expected returns are linear functions of long-run market and outside income-hedge betas. State variables for investment opportunities and outside income are conveniently absent in these characterizations.

## Corporate Finance

NBER's Program on Corporate Finance met in Chicago on April 25. Atif Mian, NBER and University of Chicago, and Manju Puri, NBER and Duke University, organized this agenda:

**Raghuram G. Rajan**, University of Chicago and NBER, and **Rodney Ramcharan**, International Monetary Fund, "Landed Interests and Financial Underdevelopment in the United States"

Discussant: Shawn Cole, Harvard University

**Vojislav Maksimovic** and **N.R. Phabhala**, University of Maryland, and **Gordon Phillips**, University of Maryland and NBER, "Post-Merger, Restructuring and the Boundaries of the Firm"

Discussant: Murillo Campello, University of Illinois

**Lucian A. Bebchuk**, Harvard University and NBER; **Martijn Cremers**, Yale University; and **Urs Peyer**, INSEAD, "CEO Centrality" Discussant: Rajesh Aggarwal, University of Minnesota

**Robin Greenwood** and **Samuel Hanson**, Harvard University, and **Jeremy C. Stein**, Harvard University and NBER, "A Gap-Filling Theory of Corporate Debt Maturity Choice" Discussant: Adriano Rampini, Duke University

**Christopher Mayer**, Columbia University and NBER; **Tomasz Piskorski**, Columbia University; and **Alexei Tchisty**, New York University, "The Inefficiency of Refinancing: Why Prepayment Penalties Are Good for Risky Borrowers" Discussant: Bruce Carlin, UC, Los Angeles

**Benjamin Keys**, University of Michigan; **Tanmoy Mukherjee**, Sorin Capital Management; **Amit Seru**, University of Chicago; and **Vikrant Vig**, London Business School, "Did Securitization Lead to Lax Screening? Evidence From Subprime Loans" Discussant: Daniel Bergstresser, Harvard University

**Atif Mian**, and **Amir Sufi**, University of Chicago, "The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis" (NBER Working Paper No. 13936 — See "Risks of Financial Institutions" earlier in this issue for a description of this paper.) Discussant: Nicholas Souleles, University of Pennsylvania and NBER

It is usually thought that the wealthy have an ability to limit wider access to eco-

nomie institutions only in poor, undemocratic countries. **Rajan** and **Ramcharan**

find that even in the United States in the early decades of the twentieth century,

landed interests seem to play a significant role in the spread of financial institutions. Counties with very concentrated land holdings tended to have disproportionately fewer banks per capita and fewer national banks. Moreover, aggregating land distribution up to the state level, states that had higher land concentration passed more restrictive banking legislation. Finally, financial underdevelopment, as determined historically by land concentration, was negatively correlated with subsequent manufacturing growth, right up to the 1970s. Since these effects are observed across counties possessing similar political and legal institutions at the state level, the evidence is suggestive that the origins of underdevelopment lie, in part, in the historical pattern of constituencies or interests.

Mergers and acquisitions are a fast way for a firm to acquire assets. Using plant-level data, **Maksimovic** and his co-authors examine how firms redraw their boundaries after acquisitions. They find that there is a surprisingly substantial amount of restructuring in a short period after mergers are consummated. Acquirers sell 27 percent and close 19 percent of acquired plants within three years after completing an acquisition. Plants that belong to the target's peripheral divisions, especially in industries in which asset values are increasing and in industries in which the acquirer does not have a comparative advantage, are more likely to be sold by the purchasing firm. Acquirers who exhibit skill in running their peripheral businesses tend to retain acquired plants. Plants retained by acquirers increase in productivity whereas sold plants do not. The extent of post-merger restructuring activities and their cross-sectional variation do not support an empire building explanation for mergers. Acquirers readjust their firm boundaries in ways that are consistent with the exploitation of their comparative advantage across industries.

**Bebchuk** and his co-authors investigate the relationship between CEO centrality—the relative importance of the CEO within the top executive team in terms of ability, contribution, or power—and the value, performance, and behavior of pub-

lic firms. Their proxy for CEO centrality is the fraction of the top-five compensation captured by the CEO. They find that CEO centrality is negatively associated with firm value (as measured by industry-adjusted Tobin's Q). This result is robust to controlling for all standard controls in Q regressions as well as additional controls such as: CEO tenure, whether the CEO is a founder or a large owner, and whether the company's top-five aggregate compensation is high or low relative to peer companies, and in stronger companies with high entrenchment levels. CEO centrality also is richly related to firms' behavior and performance. In particular, CEO centrality is correlated with: lower (industry-adjusted) accounting profitability; lower stock returns accompanying acquisitions announced by the firm and higher likelihood of a negative stock return accompanying such announcements; higher odds of the CEO's receiving a "lucky" option grant at the lowest price of the month; greater tendency to reward the CEO for luck in the form of positive industry-wide shocks; lower likelihood of CEO turnover controlling for performance; and lower firm-specific variability of stock returns over time.

**Greenwood** and his co-authors argue that time-series variation in the maturity of aggregate corporate debt issues arises because firms behave as macro liquidity providers, absorbing the large supply shocks associated with changes in the maturity structure of government debt. The researchers document that when the government funds itself with relatively more short-term debt, firms fill the resulting gap by issuing more long-term debt, and vice-versa. This type of liquidity provision is undertaken more aggressively: 1) in periods when the ratio of government debt to total debt is higher; and 2) by firms with stronger balance sheets. Their theory provides a new perspective on the apparent ability of firms to exploit bond-market return predictability with their financing choices.

**Mayer** and his co-authors explore the practice of mortgage refinancing in a dynamic competitive lending model with risky borrowers and costly default. They

show that prepayment penalties are welfare improving, and are more beneficial to borrowers with higher risk of default. Mobility mitigates the benefits of prepayment penalties only for the safest borrowers. Empirical evidence from more than 43,000 securitized fixed rate mortgages (FRMs) supports the predictions of the model. First, borrowers who receive positive credit shocks are much more likely to prepay their mortgage, the riskier they are. Second, less creditworthy borrowers are most likely to have prepayment penalties, but also receive appreciable benefits. Subprime borrowers with FICO scores below 620 obtain rates as much as 0.7 percent lower than similar borrowers with fully prepayable mortgages and default at a lower rate (13 percent default rate) than comparable borrowers with no prepayment penalties (18 percent default rate). These findings suggest that regulations banning refinancing penalties might have the unintended consequence of raising interest rates, increasing mortgage default, and limiting available credit for the riskiest borrowers.

Theories of financial intermediation suggest that securitization, the act of converting illiquid loans into liquid securities, could reduce the incentives of financial intermediaries to screen borrowers. **Keys** and his co-authors empirically examine this question using a unique dataset on securitized subprime mortgage loan contracts in the United States. They exploit a specific rule of thumb in the lending market to generate an exogenous variation in ease of securitization and compare the composition and performance of lenders' portfolios around the ad-hoc threshold. Conditional on being securitized, the portfolio that is more likely to be securitized defaults by around 20 percent more than a similar risk-profile group with a lower probability of securitization. Crucially, these two portfolios have similar observable risk characteristics and loan terms. Since these findings are conditional on securitization, the researchers conduct additional analyses to address selection on the part of borrowers, lenders, or investors as explanations



## International Trade and Organizations

NBER's Working Group on International Trade and Organizations met in Cambridge on April 26. Pol Antràs, NBER and Harvard University, organized the meeting and chose these papers for discussion:

**Arnaud Costinot**, University of California, San Diego and NBER, "Heterogeneity and Trade"  
Discussant: Oleg Itskhoki, Harvard University

**Natalia Ramondo**, University of Texas, and **Andrés Rodríguez-Clare**, Pennsylvania State University and NBER, "The Gains from Openness:

Trade, Multinational Production, and Diffusion"  
Discussant: Costas Arkolakis, Yale University and NBER

**Paola Conconi** and **Patrick Legros**, ECARES, Université Libre de Bruxelles, and **Andrew F. Newman**, Boston University, "Trade Liberalization and Organizational Choice"  
Discussant: Emanuel Ornelas, London School of Economics

**Andrew B. Bernard**, Dartmouth College and NBER; **J. Bradford Jensen**, Georgetown University and NBER; **Stephen J. Redding**, London School

of Economics, and **Peter K. Schott**, Yale University and NBER, "Intra-Firm Trade and Product Contractibility"  
Discussant: Nathan Nunn, Harvard University and NBER

**Yongmin Chen**, University of Colorado, Boulder; **Ignatius Horstmann**, University of Toronto; and **James Markusen**, University of Colorado, Boulder and NBER, "Physical Capital, Knowledge Capital and the Choice Between FDI and Outsourcing"  
Discussant: Kalina Manova, Stanford University

Aggregate production functions are a standard feature of the trade theorist's toolbox. While this modeling device has generated some fundamental insights, it presents one obvious shortcoming: it necessarily ignores any effect that the distribution of factor endowments across agents may have on international trade flows. **Costinot** develops a general framework that can shed light on these effects and discusses several applications.

**Ramondo** and **Rodríguez-Clare** quantify the role played by trade, multinational production (MP), and diffusion of ideas in generating gains from "openness". They extend the Eaton and Kortum (2002) model of trade by introducing MP and diffusion of ideas. A key contribution is to model the simultaneous role of trade, MP, and diffusion, and explore some of the interactions among these different channels. Both trade and MP are substitutes with diffusion, but the relationship among trade and MP is more complex. Trade and MP are alternative ways to serve a foreign market, which makes them substitutes, but the authors also allow for complementarity by having MP rely on imports of intermediate goods from the home country. They use trade and MP data to estimate the model and quantify the gains from openness, trade, MP, and diffusion.

**Conconi**, **Legros**, and **Newman** embed a simple incomplete-contracts model of organization design in a standard two-country, perfectly-competitive trade model to examine how the liberalization of product and factor markets affects the ownership structure of firms. In their model, managers decide whether to integrate their firms, trading off the pecuniary benefits of coordinating production decisions with the private benefits of operating in preferred ways. The price of output is a crucial determinant of this choice, because it affects the size of the pecuniary benefits. In particular, non-integration is chosen at "low" and "high" prices, while integration occurs only at moderate prices. Organizational choices also depend on the terms of trade in supplier markets, which affect the division of surplus between managers. The authors obtain three main results. First, joint product and factor market integration leads to the convergence of organization design across countries. Second, even in the absence of factor movements, the price changes triggered by liberalization of product markets can lead to significant organizational restructuring within countries. Third, the removal of barriers to factor mobility can induce further organizational changes, sometimes adversely

affecting consumers, which suggests a potential complementarity between trade policy and corporate governance policy.

**Bernard** and his co-authors examine the determinants of intra-firm trade in U.S. imports using detailed country-product data. They create a new measure of product contractibility based on the degree of intermediation in international trade for the product. They find important roles for the interaction of country and product characteristics in determining intra-firm trade shares. Intrafirm trade is high for products with low levels of contractability sourced from countries with weak governance, for skill-intensive products from skill-scarce countries, and for capital-intensive products from capital-abundant countries.

A somewhat older literature, supported by considerable empirical evidence, considered the multinational firm's mode choice for foreign production between an owned subsidiary and a licensing contract in an environment where the firm is transferring primarily knowledge-based assets. An important assumption in this literature is that the relevant knowledge is absorbed by the local manager or licensee over the course of time: knowledge is non-excludable. More recently, a number of papers have adopted a property-

right view of the firm, and assume the application abroad of physical capital and that ownership rights guarantee that the owner retains full and exclusive rights to the capital should a relationship break down. **Chen, Horstmann, and Markusen**

combine both forms of capital assets in a single model. Their model predicts that foreign direct investment (owned subsidiaries) is more likely than licensing when the ratio of knowledge capital to physical capital is high, or when market value

is high relative to the book value of capital (high Tobin's-Q). They believe that this prediction is consistent with existing empirical evidence.

## Education Program Meets

NBER's Program on Education, directed by Caroline M. Hoxby of Stanford University, met in Cambridge on May 1. These papers were discussed:

**John P. Papay** and **John B. Willet**, Harvard University, and **Richard J. Murnane**, Harvard University and NBER, "The Consequences of High School Exit Examinations for Struggling Urban Students: Evidence from Massachusetts"

**Esther Dufló**, MIT and NBER;

**Pascaline Dupas**, Dartmouth College; and **Michael Kremer**, Harvard University and NBER, "Peer Effects and the Impact of Tracking: Evidence from a Randomized Evaluation in Kenya"

**Ofer Malamud**, University of Chicago, and **Kiki Pop-Eleches**, Columbia University and NBER, "The Effect of Computer Use on Child Outcomes"

**Parag A. Pathak**, Harvard University, and **Tayfun Sonmez**, Boston College, "Leveling the Playing Field: Sincere

and Sophisticated Players in the Boston Mechanism"

**C. Kirabo Jackson**, Cornell University, "A Little Now for a Lot Later: A Look at a Texas Advanced Placement Incentive Program"

**Eric P. Bettinger**, Case Western Reserve University and NBER, "Paying to Learn: The Effect of Financial Incentives on Elementary School Test Scores"

The growing prominence of high-stakes exit examinations has made questions about their effects on student outcomes increasingly important. Exit examinations can cause students to drop out of school for several reasons: because they fear taking the test; because they fail it and become discouraged; or because they repeatedly retake the examination and cannot pass it. **Papay** and his co-authors use a natural experiment to evaluate the causal effects of high-stakes testing on high school completion for the cohort scheduled to graduate from Massachusetts high schools in 2006. They find that, for low-income urban students on the margin of passing, failing the tenth grade mathematics examination reduces the probability of on-time graduation by approximately 8 percentage points. Among students who fail the tenth grade mathematics examination, the low-income urban students are just as likely to retake the test as apparently equally skilled suburban students, but are much less likely to

pass the retest. Furthermore, failing the eighth grade mathematics examination reduces by 3 percentage points the probability that low-income urban students stay in school through tenth grade. There are no such effects found for wealthier urban students, or for suburban students regardless of their family income.

**Dufló** and her co-authors provide experimental evidence on the impact of tracking primary school students by initial achievement. In the presence of positive spillover effects from academically proficient peers, tracking may be beneficial for strong students but hurt weaker ones. However, tracking may help everybody if heterogeneous classes make it difficult to teach at a level appropriate to most students. The authors set up a randomized evaluation in Kenya to evaluate these competing claims. A total of 140 primary schools received funds to hire an extra teacher and create an additional section in first grade. In 70 (randomly selected) schools, students were randomly

assigned to a section. In the remaining 70 schools, students were ranked by prior achievement (measured by their first term grades), and the top and bottom halves of the class were assigned to different sections. In all 140 schools, the teachers were randomly assigned to a section. After 18 months, students in tracking schools performed on average 0.13 standard deviations higher than students in the non-tracking schools. Furthermore, students benefited from tracking at all levels of the distribution. In tracking schools, the endline test score of the initially-median student is as high when she was assigned to the "bottom" section as when she was assigned to the "top" section. In non-tracking schools, where peers were randomly assigned to each student, the authors find no impact of the average peer quality either, but they find evidence there as well that heterogeneity hurts test scores.

**Malamud** and **Pop-Eleches** examine the impact of having access to a home

computer on various child outcomes. To avoid the bias attributable to non-random access to home computers, they exploit a unique government program that provided vouchers towards the purchase of a personal computer for low-income children enrolled in Romanian public schools. Since the fixed number of vouchers were allocated based on a simple ranking of family income, this program allows comparisons across students very similar in family income and other respects, but who experienced markedly different access to having a computer at home. In 2007, the authors conducted a household survey of children who participated in the program two years earlier. Using these data, they show that children who received a voucher were 25 percent more likely to own a computer. Next, they show that receipt of a voucher had a large impact on time spent in front of the computer and decreased the amount of time spent watching TV and doing homework. Children in households that won a voucher also report having lower school grades and lower educational aspirations. Finally, there is some suggestive evidence that winning a voucher is associated with negative behavioral outcomes.

Empirical and experimental evidence suggests different levels of sophistication among families in the Boston Public School student assignment plan. **Pathak** and **Sonmez** analyze the preference revelation game induced by the Boston mechanism with sincere players who report their true preferences and sophisticated players who play a best response. They characterize the set of Nash equilibrium outcomes as the set of stable matchings

of a modified economy, where sincere students lose priority to sophisticated students. Any sophisticated student weakly prefers her assignment under the Pareto-dominant Nash equilibrium of the Boston mechanism to her assignment under the recently adopted student-optimal stable mechanism.

**Jackson** analyzes a program that was implemented in schools serving underprivileged populations in Texas that pays both students and teachers for passing grades on advanced placement examinations. Exploiting the fact that different schools adopted the program at different times, he uses a difference-in-differences strategy. He compares the changes in aggregate student outcomes, before and after adoption, for schools adopting the AP incentive program to the changes experienced over the same time period for carefully selected groups of comparison schools. Adoption of the AP incentive program is associated with a 30 percent increase in the number of students scoring above 1100 on the SAT or 24 on the ACT, and an 8 percent increase in the number of students who matriculate in college in Texas. The per-student costs of the program are very small relative to reasonable estimates of the implied lifetime benefits that accrue to affected students such that the AP program may ameliorate sub-optimal educational investments. Empirical evidence suggests that teachers and students were not simply aiming to maximize their rewards. Anecdotal evidence suggests that the increases in AP participation were due to better access to AP courses, changes in teacher and peer norms towards AP courses, and better

student information.

In recent years, policymakers and academics have become increasingly interested in applying financial incentives to individual decisionmaking in education. **Bettinger** presents evidence from a pay-for-performance program that took place in Coshocton, Ohio. Since 2004, the Coshocton City Schools has provided cash payments to students for successful completion of their standardized testing. Students in third, fourth, fifth, and sixth grade who passed district and state-mandated standardized exams are eligible for these rewards. Coshocton determined eligibility for the program using randomization. By exploiting the randomization of Coshocton's incentive program, Bettinger attempts to identify the effects of student incentive programs on students' academic behavior. Additionally, the structure of Coshocton's program creates some "kinks" in student incentives. These kinks reveal places where students who were eligible for the incentive program no longer had any incentive for subsequent "high stakes" work. The results present evidence that young children respond to incentives. Math scores improved about 0.15 standard deviations higher for elementary school students who were eligible for the program relative to the control group. There is little evidence that reading, social science, and science test scores changed in response to the incentive program. However, students' behavior at the specific discontinuities in the cash incentive program suggests that students respond to incentives even in ways which may not be desirable to educators.

## Program Meeting on Children

The NBER's Program on Children met in Cambridge on May 2. These papers were discussed:

**Anna Aizer**, Brown University and NBER, and **Pedro Dal Bó**, Brown University, "Love, Hate, and Murder: Commitment Devices in Violent Relationships" (NBER Working Paper No. 13492)

**Christopher Carpenter**, University of California, Irvine and NBER, and **Carlos Dobkin**, University of California, Santa Cruz and NBER, "The

Drinking Age, Alcohol Consumption, and Crime"

**Manuela Angelucci**, University of Arizona; **Giacomo De Giorgi**, Stanford University; **Marcos A. Rangel**, University of Chicago; and **Imran Rasul**, University College London, "Family Networks and School Enrollment: Evidence from a Randomized Social Experiment"

**Jorge M. Aguero** and **Mindy S. Marks**, University of California, Riverside, "Using Infertility Shocks to Estimate

the Effect of Family Size on Child Development"

**Dan Anderber**, **Arnaud Chevalier**, and **Jonathan Wadsworth**, Royal Holloway, University of London, "Anatomy of a Health Scare: Education, Income, and the MMR Controversy in the UK"

**J Peter Nilsson**, Uppsala University, "Does a Pint A Day Affect Your Child's Pay? The Effect of Prenatal Alcohol Exposure on Adult Outcomes"

Many violent relationships are characterized by a high degree of cyclical-ity: women who are the victims of domestic violence often leave and return multiple times. To explain this, **Aizer** and **Dal Bó** develop a model of time-inconsistent preferences in the context of domestic violence. This time inconsistency generates a demand for commitment. The authors present supporting evidence that women in violent relationships display time-inconsistent preferences by examining their demand for commitment devices. They find that "no-drop" policies—which compel the prosecutor to continue with prosecution even if the victim expresses a desire to drop the charges—result in an increase in reporting. No-drop policies also result in a decrease in the number of men murdered by intimates, suggesting that some women in violent relationships move away from an extreme type of commitment device when a less costly one is offered.

**Carpenter** and **Dobkin** use the exogenous variation in alcohol consumption induced by the Minimum Legal Drinking Age (MLDA) and data from California to determine how much an increase in drinking increases criminal behavior. They find that individuals just over age 21 are 32 percent more likely to report having consumed alcohol in the previous month and drink on 70 percent more days than

those just under age 21. This greater alcohol consumption results in a 6 percent increase in arrests, which is largely attributable to robberies, assaults, DUI, drunkenness, and disorderly conduct. These results imply an elasticity of about .08, which suggests that crime will increase significantly if proposals to reduce the legal drinking age are adopted.

**Angelucci** and her co-authors present evidence on whether and how a household's behavior is influenced by the presence and characteristics of its extended family. Using household panel data from the Progresa social assistance program in rural Mexico, they first exploit information on the paternal and maternal surnames of heads and spouses in conjunction with the patronymic naming convention in order to identify the inter- and intra-generational family links of each household to others in the same village. They then exploit the randomized research design of the Progresa evaluation data to identify whether the treatment effects of Progresa transfers on secondary school enrollment vary according to the presence and characteristics of extended family members. They find that Progresa only raises secondary enrollment among households that are embedded in an extended family network. Eligible but isolated households do not respond. The key mechanism through which the extended family

influences household schooling choices relates to the redistribution of resources within the family network towards those households on the margin of enrolling children into secondary school.

**Aguero** and **Marks** introduce a novel instrument to test for the quantity/quality trade-off in child development. Specifically, they exploit exogenous changes in family size generated by infertility shocks after the first child is born. They show that an indicator variable for the infertility status of women is a plausible instrument for family size. They further show that infertility is not correlated with the child's or mother's background characteristics and has a robust impact on family size. Using data from Demographic and Health Surveys in Latin America, they evaluate the possible trade-off for different aspects of child development, including education and health. Their results indicate that, after instrumenting for the number of children using the mother's infertility status, there is a negative and significant relationship between the quantity and quality of children for health indicators (weight-for-age and breastfeeding status) but not for education.

The MMR controversy in the United Kingdom provides a case where, for a brief period of time, some highly publicized research suggested that a partic-

ular multi-component vaccine (MMR), freely provided to young children, could have potentially serious side-effects. As the controversy set in, uptake of the MMR vaccine by more educated parents decreased significantly faster than by less educated parents, turning a significant positive education gradient into a negative one. Somewhat puzzling, highly educated parents also reduced their uptake of other noncontroversial childhood vaccines. As an alternative to the

MMR, parents may purchase single vaccines privately; the MMR is the only vaccine for which **Anderber, Chevalier, and Wadsworth** observe a strong effect of income on uptake.

**Nilsson** uses a Swedish alcohol policy experiment conducted in the late 1960s to identify the impact of prenatal alcohol exposure on educational attainment and labor market outcomes. The experiment started in November 1967 and was prematurely discontinued in July 1968 because

of a sharp increase in alcohol consumption in the experimental regions, particularly among youth. Nilsson finds that the cohort in utero during the experiment has substantially reduced educational attainment, lower earnings, and higher welfare dependency rates at around age 30 than the surrounding cohorts. His results indicate that investments in early-life health may have far reaching effects on economic outcomes later in life.

## Higher Education

The NBER's Working Group on Higher Education met in Cambridge on May 2. Charles T. Clotfelter of NBER and Duke University organized the meeting. These papers were discussed:

**Kalena E. Cortes**, Syracuse University, and **Isaac McFarlin, Jr.**, University of Texas-Dallas, "College Quality and the Texas Top 10% Plan: Implications for Minority Students"

**Amanda D. Pallais**, MIT, "Why Not

Apply? The Effect of Application Costs on College Applications for Low-Income Students"

**Basit Zafar**, Northwestern University, "College Major Choice and the Gender Gap"

**Scott E. Carrell**, UC, Davis, and **James E. West**, United States Air Force Academy, "Does Professor Quality Matter? Evidence from Random Assignment of Students to Professors"

**Jason M. Fletcher**, Yale University, and **Marta Tienda**, Princeton University, "High School Peer Networks and College Success: Lessons from Texas"

**Stephen Desjardins** and **Brian McCall**, University of Michigan, "The Impact of the Gates Millennium Scholars Program on the College Enrollment, Borrowing, and Work Behavior of Low-Income Minority Students"

**Cortes** and **McFarlin** analyze the benefits of attending selective public colleges in the context of race-sensitive admissions: they estimate how college quality and the admissions-policy change, from affirmative action to the Top 10% Plan, affect college completion. Their results show that *all* students who attended selective colleges have higher college completion rates than their comparable counterparts who attended less selective colleges. Moreover, there is little evidence to support the minority "mismatch hypothesis." The effect of the admissions-policy change for non-top 10 percent students is negative and three times larger for minorities than for non-minorities.

**Pallais** argues that the value of applying to a given college is the probability that the student attends the college times

the student's expected utility from attending minus the application cost. Thus, students may be deterred from applying to selective schools because they believe they're unlikely to be admitted, even though their expected utility from attending would be high. A policy that induces students to apply to more colleges could encourage them to send applications with lower marginal benefits, including applications to more selective colleges. In fact, an exogenous decrease in the cost of sending ACT-score reports to colleges had exactly this effect. Students who took the ACT before the fall of 1997 were entitled to three free score reports and paid \$6 for each additional report; students who took the test afterwards were allowed four free score reports, with the same marginal cost for each additional report. This

change induced students of all income levels, but especially low-income students, to send more score reports and to raise the quality of the best colleges to which they sent their scores. Many of these extra score reports translated into applications. Using conservative assumptions, and Dale and Krueger's (2002) estimates on the return to attending a more selective college for low-income students, Pallais estimates that if the policy were limited to low-income students, the resulting wage benefits that would have accrued to those students would have been 223 times the implementation cost to the ACT. She argues that this small cost change had such large effects on application behavior either because it was a salient decrease in part of the application cost to "free" or because it provided a signal about

how many colleges students should apply to. These mechanisms potentially can be applied to other areas, such as job search and consumers' search for goods and services, to increase social welfare.

**Zafar** studies the question of how college majors are chosen with a focus on explaining the underlying gender gap. Since observed choices may be consistent with many combinations of expectations and preferences, he collects a unique dataset of Northwestern sophomores containing the students' subjective expectations about choice-specific outcomes. He estimates a model where college major choice is made under uncertainty (about personal tastes, individual abilities, and realizations of outcomes related to the choice of major). Enjoying coursework, enjoying work at potential jobs, and approval of parents are the most important determinants in the choice of college major. Males and females have similar preferences while in college, but differ in their preferences in the workplace: non-pecuniary outcomes at college are most important in the decision for females, while pecuniary outcomes at the workplace explain a substantial part of the choice for males. Zafar decomposes the gender gap into differences in beliefs and preferences. Gender differences in beliefs about academic ability and future earnings explain a small and insignificant part of the gap. Conversely, most of the gender gap is attributable to differences in beliefs about enjoying coursework, and preferences for various outcomes.

Using the random assignment of college students to professors in a large body

of required coursework, **Carrell** and **West** examine how professor quality affects student achievement. Introductory course professors significantly affect student achievement in the contemporaneous and follow-on related courses, but these effects vary greatly across subjects. The authors find that the academic rank, teaching experience, and terminal degree status of mathematics and science professors are negatively correlated with contemporaneous student achievement, but positively related to follow-on course achievement. Across all subjects, student evaluations of instructors are positive predictors of contemporaneous student achievement but are poor predictors of follow-on student achievement.

**Fletcher** and **Tienda** use administrative data from the University of Texas-Austin to examine whether high school peer networks upon college entry influence college achievement, as measured by grade point average (GPA) and persistence. For each freshman cohort from 1993 through 2003, the authors calculate the number and ethnic makeup of college freshmen from each Texas high school, which they then use as a proxy for freshmen "peer network." The empirical specifications include high school fixed effects to control for unobservable differences across schools that influence both college enrollment behavior and academic performance. Using an IV/fixed effects strategy that exploits the introduction and expansion of the Longhorn Scholars Program, which targeted low income schools with low college traditions, the authors also evaluate whether "marginal" increases in

peer networks influence college achievement. Their results show that students with larger peer networks upon entering college perform better than their counterparts with smaller networks at the beginning of their freshman year. The average effects of network size on college achievement are small, but a marginal increase in the size of same-race peer networks raises GPA by 0.1 point. The authors also find some suggestive evidence that minority students with large high school peer networks reap larger academic benefits than their white counterparts.

The Gates Millennium Scholars (GMS) program, funded by the Bill & Melinda Gates Foundation, was established in 1999 to improve access to and success in higher education for low-income and high-achieving minority students by providing them with full tuition scholarships and other types of support. The effects of programs such as the GMS are often difficult to assess, however, because of the non-random nature of selection into the program. **Desjardins** and **McCall** use regression discontinuity to ascertain the causal effect of the scholarship on a number of important educational outcomes. While they find some limited evidence that retention is higher for GMS recipients and that GMS recipients, loan debt and work hours during college and parental contributions towards college expenses are lower for GMS recipients than non-recipients, and GMS recipients are more likely than non-recipients to report educational aspirations to obtain a Ph.D. degree after completing their bachelor's degree.

## Behavioral Finance

The NBER's Working Group on Behavioral Finance met at Yale University on May 3. NBER Research Associates Nicholas Barberis and Robert J. Shiller, both of Yale, organized the meeting. These papers were discussed:

**Nicholas Barberis**, and **Wei Xiong**, Princeton University and NBER, "Realization Utility"  
Discussant: Simon Gervais, Duke University

**Ingolf Dittmann**, Erasmus University, and **Ernst Maug** and **Oliver Spalt**, University of Mannheim, "Sticks or Carrots? Optimal CEO Compensation when Managers are Loss Averse"

Discussant: Alex Edmans, University of Pennsylvania

**Enrichetta Ravina**, New York University "Love and Loans: The Effect of Beauty and Personal Characteristics in Credit Markets"  
Discussant: Tanya Rosenblat, Wesleyan University

**Markus K. Brunnermeier**, Princeton University and NBER; **Stefan Nagel**, Stanford University and NBER; and **Lasse H. Pedersen**, New York University and NBER, "Carry Trades and Currency Crashes"  
Discussant: Nikolai Roussanov, University of Pennsylvania

**Jialin Yu**, Columbia University, "Commonality in Disagreement and Asset Pricing"  
Discussant: Hongjun Yan, Yale University

**Joseph Chen**, University of Southern California; **Samuel Hanson**, Harvard University; **Harrison Hong**, Princeton University; and **Jeremy C. Stein**, Harvard University and NBER, "Do Hedge Funds Profit from Mutual Fund Distress?"  
Discussant: Owen Lamont, DKR Capital

**Barberis** and **Xiong** study the possibility that, aside from standard sources of utility, investors also derive utility from *realizing* gains and losses on individual investments that they own. The researchers propose a tractable model of this "realization utility," derive its predictions, and show that it can shed light on a number of puzzling facts. These include the poor trading performance of individual investors, the disposition effect, the greater turnover in rising markets, the negative premium to volatility in the cross-section, and the heavy trading of highly valued assets. Underlying some of these applications is one of their model's more novel predictions: that, even if the form of realization utility is linear or concave, investors can be risk-seeking.

**Dittmann** and his co-authors analyze optimal executive compensation contracts when managers are loss averse. They establish the general optimal contract analytically and calibrate the model to the observed contracts of 595 CEOs. They find that the Loss Aversion-model explains the observed structure of executive compensation contracts significantly better than the Risk Aversion-model. This holds especially for the mix of stock and options. The Loss Aversion-model pre-

dicts convex contracts with substantial option holdings that provide a stronger upside ("carrots"). By contrast, the optimal contract is concave for the standard Risk Aversion-model where it provides a significant downside ("sticks"). These results suggest that loss aversion is a better paradigm for analyzing design features of stock options and for developing preference-based valuation models than the conventional model used in the literature.

**Ravina** examines whether easily observable variables, such as the personal characteristics of a loan applicant and the way he presents himself, affect lenders' decisions, once hard financial information about credit scores, employment history, homeownership, and other financial information are taken into account. She studies an online lending market in which 7,321 borrowers posted 11,957 loan requests that included verifiable financial information, photos, an offered interest rate, and related context. Borrowers whose appearance was rated above average are 1.41 percentage points more likely to get a loan and, given a loan, pay 81 basis points less than an average-looking borrower with the same credentials. Black borrowers pay between 139 and 146 basis

points more than otherwise similar white borrowers. However, in this sample such personal characteristics are not, all else equal, significantly related to subsequent delinquency rates, with the exception of beauty, which is associated with substantially higher delinquency rates. These findings suggest that the mechanism through which personal characteristics affect loan supply is lenders' preferences and perception, rather than statistical discrimination, based on inferences from previous experience.

**Brunnermeier** and his co-authors document that carry traders are subject to crash risk: that is, exchange rate movements between high-interest-rate and low-interest-rate currencies are negatively skewed. The researchers argue that this negative skewness is attributable to sudden unwinding of carry trades, which tend to occur in periods in which investor risk appetite and funding liquidity decrease. Carry-trade losses reduce future crash risk, but increase the price of crash risk. The authors also document excess comovement among currencies with similar interest rate. Their findings are consistent with a model in which carry traders are subject to funding liquidity constraints.

**Yu** presents a dynamic model to dem-

onstrate that, when differences of opinion over individual securities have a common component, the valuation of the aggregate market can be higher than its fundamental, even if all investors agree on the market fundamental and the common disagreement drives discount rate news. Using analyst forecast dispersion to measure disagreement, Yu finds that: individual stock disagreements co-move and the common component mean-reverts; the common disagreement has substantial explanatory power for the time-series

variation of equity premium; and the common disagreement correlates with discount-rate news rather than cash-flow news and has explanatory power for the time-series variation of value premium.

**Chen** and his co-authors explore the question of whether hedge funds engage in front-running strategies that exploit the predictable trades of others. One potential opportunity for front-running arises when distressed mutual funds—those suffering large outflows of assets under management—are forced to sell stocks they

own. The authors document two pieces of evidence that are consistent with hedge funds taking advantage of this opportunity. First, in the time series, the average returns of long/short equity hedge funds are significantly higher in those months when a larger fraction of the mutual-fund sector is in distress. Second, at the individual-stock level, short interest rises in advance of sales by distressed mutual funds.

## Health Care

The NBER's Program on Health Care met in Cambridge on May 8. Kate Bundorf, NBER and Stanford University, and Mark Pauly, NBER and University of Pennsylvania, organized the meeting. These papers were discussed:

**Mark Duggan**, University of Maryland and NBER, and **Fiona Scott Morton**, Yale University and NBER, "The Effects of Medicare Part D on Pharmaceutical Prices and Utilization"

**Helen Levy**, University of Michigan and NBER, and **David Weir**, University

of Michigan, "The Impact of Medicare Part D on Drug Utilization and Out-of-Pocket Spending: Evidence from the Health and Retirement Study"

**Jay Bhattacharya**, Stanford University and NBER, and **Mikko Packalen**, University of Waterloo, "The Other Ex-Ante Moral Hazard in Health" (NBER Working Paper No. 13863)

**Liran Einav**, Stanford University; **Amy Finkelstein**, MIT and NBER, and **Mark R. Cullen**, Yale University,

"Using Price Variation to Estimate Welfare in Insurance Markets"

**Guy David**, University of Pennsylvania, and **Tanguy Brachet**, The Children's Hospital of Philadelphia, "Human Capital Accumulation and Forgetting in Emergency Medical Services"

**Tom Chang**, MIT, and **Mireille Jacobson**, University of California, Irvine, "Ownership Status and Response to Cost Shocks: Evidence from California's Seismic Retrofit Mandate"

The federal government began providing insurance coverage for Medicare recipients' prescription drug expenditures on January 1, 2006 through a program known as Medicare Part D. Rather than setting pharmaceutical prices itself, the government contracted with private insurance plans to provide this coverage. Enrollment in Part D was voluntary, with each Medicare recipient allowed to choose from one of the private insurers with a contract to offer coverage in her geographic region. **Duggan** and **Scott Morton** evaluate the effect of this program on the price and use of pharmaceutical treatments. Using data on product-

specific prices and quantities sold in the United States, the researchers find that Part D substantially lowered the average price and increased the total use of prescription drugs by Medicare recipients. The results further suggest that the magnitude of these average effects varies across drugs, as economic theory predicts.

**Levy** and **Weir** use data from the 2004 and 2006 waves of the Health and Retirement Study to estimate the extent of adverse selection into Part D—that is, whether beneficiaries with high existing demand for prescription drugs disproportionately choose to enroll in the program—and the impact of Part D on

medication use and out-of-pocket spending. They compare changes in use and spending for those who gained new Part D coverage to changes for those who were consistently covered by employer-sponsored insurance or Medicare HMOs, and for those who had no drug coverage in 2004 or 2006. Their results suggest that there was substantial selection into Part D: among Medicare beneficiaries with no drug coverage in 2004, those with high use and/or spending in 2004 were most likely to be enrolled in Part D in 2006. On average, the use of prescription drugs (number of prescriptions taken) did not change dramatically in response



to Part D. Monthly out-of-pocket drug spending for previously uninsured, newly enrolled beneficiaries decreased, though. The median decrease was \$30, compared to median baseline spending of \$100 per month. In contrast, median out-of-pocket spending for those consistently covered by employer-sponsored insurance, Medicaid, Medicare HMOs, or privately purchased prescription drug insurance did not change between 2004 and 2006. These results are consistent with respondents' subjective perception that Part D did not change their use of drugs but did reduce their out-of-pocket spending. Somewhat surprisingly, Medicare Part D does not seem to have reduced the extent of cost-related non-compliance among those who previously had no drug coverage.

It is well known that public or pooled insurance coverage can induce a form of ex-ante moral hazard: people will make inefficiently low investments in self-protective activities. However, **Bhattacharya** and **Packalen** point out another ex-ante moral hazard that arises through an induced innovation externality: this mechanism will cause people to devote an inefficiently high level of self-protection. As an example, they analyze the innovation induced by the obesity epidemic. Obesity is associated with an increase in the incidence of many diseases. The induced-innovation hypothesis says that an increase in the incidence of a disease will increase technological innovation specific to that disease. The empirical economics literature has produced substantial evidence in favor of this hypothesis. Bhattacharya and Packalen estimate the associations between obesity and disease incidence; they then show that if these associations are causal, and the pharmaceutical reward system is optimal, then the magnitude of the induced innovation externality of obesity roughly coincides with the Medicare-induced health insurance externality of obesity. The current Medicare subsidy for obesity thus appears to be approximately optimal. They also show that the pattern of diseases for obese and normal weight individuals are similar enough that the induced innovation

externality of obesity on normal weight individuals is positive as well.

**Einav** and his co-authors show how standard consumer and producer theory can be applied to estimating welfare in insurance markets with selection. Their key observation is that the same variation in prices needed to trace out the demand curve in any applied welfare analysis also can be used to trace out how costs vary as market participants endogenously respond to the price of insurance. With estimates of both the demand and cost curves, welfare analysis is straightforward. Moreover, because endogenous costs are the distinguishing feature of selection models, the analysis of the cost curve also provides a direct test for the existence of selection. The researchers discuss the data required to implement this approach and then apply it using individual-level data from a large private employer in the United States on the health insurance options, choices, and medical expenditures of its employees and their dependents. They detect adverse selection in this market and estimate that its efficiency cost, if these choices occurred in a free market setting, would be about 0.2 percent and 2 percent of the surplus that could be generated from efficient pricing. They estimate that the social cost of the subsidy needed to achieve the efficient outcome is about an order of magnitude higher than the social welfare gain from correcting the market failure.

**David** and **Brachet** examine the underlying channels through which organizational forgetting is achieved and their magnitude. They develop a framework for studying the relative contributions of labor turnover and skill decay to organizational forgetting. They then apply the framework to the performance of paramedics by using the universe of trauma-related ambulance runs in Mississippi between 1991 and 2005. Because paramedics are dispatched based on proximity and not on reputation, the relationship between experience and performance plausibly operates through learning-by-doing rather than through selection on unobservable quality. The authors con-

duct both individual and firm-level analyses to separate skill decay from labor turnover effects. They find that greater individual experience is robustly related to improved performance at the trauma scene. Their estimates suggest that about a third of human capital accumulated in a given quarter is eroded by skill decay. They find that turnover increases organizational forgetting by about 25 percent

**Chang** and **Jacobson** use a unified theoretical framework to model three popular theories of not-for-profit hospital behavior: 1) "for-profits in disguise"; 2) social welfare maximizers; and 3) perquisite maximizers. The authors develop testable implications of a hospital's response to a fixed-cost shock under each of these theories. They then examine the effect of a recent unfunded mandate in California that requires hospitals to retrofit or rebuild in order to comply with modern seismic safety standards. Because the majority of hospitals in the state were built between 1940 and 1970, well before a sophisticated understanding of seismic safety, a hospital's compliance cost is plausibly exogenously predetermined by its underlying geologic risk. The authors present evidence that within counties seismic risk is uncorrelated with a host of hospital characteristics, including ownership type. They show that hospitals with higher seismic risk experience larger increases in the category of spending that should be affected by retrofitting. Further, hospitals facing higher compliance costs are more likely to shut down, irrespective of ownership type. In contrast, private not-for-profits alone increase their mix of profitable services, such as neonatal intensive care days, obstetrics discharges, and MRI minutes. Government hospitals respond by decreasing the provision of charity care. As expected, for-profit hospitals do not change their service mix in response to this shock. These results are most consistent with the theory of not-for-profit hospitals as perquisite maximizers; it allows the authors to reject two of the leading theories of not-for-profit hospital behavior—"for-profits in disguise" and "pure altruism."

## Insurance Workshop

The NBER's Working Group on Insurance, directed by Kenneth A. Froot of the Harvard Business School and Howard C. Kunreuther of the Wharton School, University of Pennsylvania, met in Cambridge on May 8. These topics were discussed:

**John Major**, Guy Carpenter & Company, Inc., "On a Connection between Froot-Stein and the de Finetti Optimal Dividends Models"  
Discussant: Kenneth A. Froot

**Thomas Davidoff**, University of California, Berkeley, "Illiquid Housing as Self-Insurance: the Case of Long Term Care"  
Discussant: David Moss, Harvard University

**Dwight Jaffe**, University of California, Berkeley; **Howard Kunreuther**; and **Erwann Michel Kerjan**, University of Pennsylvania, "The Development of Long Term Insurance (LTI) To Address Catastrophe Insurance Market Failure"  
Discussant: Robert J. Shiller, Yale University and NBER

**Neil A. Doherty** and **Anastasia Kartasheva**, University of Pennsylvania, and **Richard D. Phillips**, Georgia State University, "Competition among Rating Agencies and Information Disclosure"  
Discussant: Christopher Lewis, The Hartford Financial Services Group

**Martin F. Grace** and **Robert W. Klein**, Georgia State University, "The Perfect Storm: Hurricanes, Insurance and Regulation"

Discussant: Richard Thomas, American International Group

**Paul A. Raschky**, University of Innsbruck, "Natural Hazards, Growth, and Risk Transfer: An Empirical Comparison between Risk-Transfer Mechanisms in Europe and USA"  
Discussant: Jeffrey R. Brown, University of Illinois at Urbana-Champaign and NBER

**Christian Laux**, Goethe University Frankfurt, and **Alex Muermann**, Vienna University of Economics and Business Administration, "Financing Risk Transfer under Governance Problems: Mutual versus Stock Insurers"  
Discussant: Keith Crocker, Pennsylvania State University

Costly external capital is one of the frictions that violates the premises of the Modigliani and Miller irrelevance theorems. Froot et. al. developed a three-stage model to explain how costly external capital, along with other frictions, provides an opportunity for risk management to create value. **Major** extends their model to analyze risk management (in particular, reinsurance) in the context of a going concern. He relates the extended Froot model to a 50-year-old stochastic dividend optimization problem, introduced by Bruno de Finetti, which has received growing interest in the recent decade.

Long-term care is one of the few observable triggers for home sale among the elderly, **Davidoff** notes. Combined with a thin reverse mortgage market, this helps to rationalize the weak demand for long-term care insurance (LTCI). Home equity tapped in the event of long-term care reduces the gain to insurance transfers during healthy periods, in which home equity typically goes unspent. The Health and Retirement Study provides empirical

evidence supporting this. Households exposed to large increases in home equity in the recent housing boom were relatively unlikely to add LTCI coverage and relatively likely to drop coverage.

**Jaffe** and his co-authors propose long-term insurance (LTI) as an alternative to the standard annual policies for homeowners' coverage. They underscore the need for such a contractual arrangement by focusing on the challenges facing homeowners who live in high-risk areas and insurers today, having experienced the significant increase and variability in losses from natural disasters in recent years. Lessons from the mortgage market provide a benchmark for the development of LTI. More specifically, the authors here propose fixed and adjustable rate insurance contracts that have features similar to those in the mortgage market with penalties for canceling a long-term (LT) contract before it expires. For insurers to want to offer LTI, premiums have to reflect the risk including the cost of capital. Consumers are likely to prefer LTI to annual policies if there is considerable

uncertainty as to whether their insurance will be cancelled unexpectedly, or if premiums are increased significantly following the next disasters. A two-period model illustrates when an LT contract would be attractive to both insurers and consumers under competitive market conditions. The authors show that insurers will be willing to offer such a policy if they can charge a high enough penalty for cancellation.

**Doherty** and his co-authors analyze why a rating agency pools different credit risks in one credit grade and how information disclosure depends on the value of information to the market. The authors build a model to analyze the optimal disclosure policy of a monopoly rating agency depending on the value of information to investors; they then describe the potential market and the strategy of the entrant. They find that entry of symmetric rating agencies results in asymmetric rating scales. This justifies why some companies obtain multiple ratings and suggests that similar ratings from different agencies may mean different credit risks. The

researchers then empirically test the qualitative predictions of their model. They use Standard and Poor's entry into the insurance market that was previously covered by a monopoly agency, A.M. Best, as a natural experiment to study the impact of competition on the information content of ratings.

The risk and cost of natural disasters, their effects on insurance markets, and associated government policies yield an interesting and important story about the interplay of economics and politics. The intense hurricane seasons of 2004 and 2005 caused considerable instability in property insurance markets in coastal states with the greatest pressure in Florida and the Southeast. Insurers have raised their rates substantially and decreased their exposures. While no severe hurricanes have struck the United States since 2005, market pressures remain strong given the high risk still facing coastal states. These developments have generated considerable concern and some controversy among various groups of stakeholders. Government responses have varied. In Florida, political pressures have prompted a wave of legislation and regulations to expand government underwriting and subsidization of hurricane risk and to constrain insurers' rates and

market adjustments. In this context, it is important to understand how property insurance markets have been changing and governments have been responding to increased catastrophe risk. **Grace and Klein** examine important market developments and evaluate associated government policies. They find interesting similarities and contrasts between Florida and other coastal states. They comment on how government policies are affecting the equilibration of insurance markets and offer opinions on actions that are helpful and those that are likely to have a negative impact on the supply of insurance and to undermine the efficient management of catastrophe risk.

An analysis of the effects of natural hazards on society does not depend solely on a region's topographic or climatic exposure, but rather on the region's institutional resilience to natural processes that ultimately determine whether they will result in a natural hazard or not. **Raschky** provides an institutional comparison between different societal risk-transfer mechanisms against floods in Europe and the United States. In the short run, a major flood event in a European region reduces the regional GDP by 0.4-0.6 percentage points; an average flood event in the

United States reduces personal income by 0.3-0.4 percentage points. In addition, the results for the U.S. sample suggest that counties participating in the NFIP follow a less volatile growth path in subsequent years. Appropriate ex-ante risk-transfer policies can largely mitigate these effects, while ex-post governmental disaster relief tends to even enlarge the negative impact of natural hazards on income. These results provide useful implications for adaptation strategies against the adverse effects of climate change.

**Laux and Muermann** note that mutual insurance companies and stock insurance companies are different forms of organized risk sharing: policyholders and owners are two distinct groups in a stock insurer, while they are one and the same in a mutual. This distinction is relevant to raising capital and to selling policies under governance problems. In the presence of an owner-manager conflict, capital is costly. Free-rider and commitment problems limit the degree of capitalization that a stock insurer can obtain. The mutual form, by tying sales of policies to the provision of capital, can overcome these problems at the cost of less diversified owners.

## Market Microstructure

The NBER's Working Group on Market Microstructure met in Cambridge on May 9. Working Group Director Bruce Lehmann of University of California, San Diego; Eugene Kandel, of Hebrew University, Jerusalem; and Avanidhar Subrahmanyam, of University of California, Los Angeles, jointly organized the meeting. These papers were discussed:

**Steven L. Heston**, University of Maryland; **Robert A. Korajczyk**, Northwestern University; and **Ronnie Sadka**, University of Washington, "Intraday Patterns in the Cross-Section of Stock Returns" Discussant: Julie Wu, Texas A&M University

**Shmuel Baruch**, University of Utah, "Random Limit-Orders" Discussant: Ioanid Rosu, University of Chicago

**Stefan Frey**, University of Tubingen, and **Patrik Sandas**, University of Virginia, "The Impact of Hidden Liquidity in Limit Order Books" Discussant: Uday Rajan, University of Michigan

**Andrew Ellul**, Indiana University, and **Marios Panayides**, University of Utah, "Do Financial Analysts Restrain Insiders' Informational Advantage?" Discussant: Paul Irvine, University of Georgia

**Amy K. Edwards** and **Kathleen Weiss Hanley**, U.S. Securities and Exchange Commission, "Short Selling in Initial Public Offerings" Discussant: Rajdeep Singh, University of Minnesota

**Alessandro Beber**, University of Lausanne; **Michael W. Brandt**, Duke University and NBER; and **Kenneth A. Kavajecz**, University of Wisconsin, "What Can Equity Orderflow Tell Us about the Economy?" Discussant: Shane Underwood, Rice University

Microstructure effects, such as bid/ask bounce, induce short-run negative autocorrelation patterns in asset returns while longer horizons exhibit momentum effects. **Heston** and his co-authors study the term structure of microstructure effects using half-hour observation intervals in the post-decimalization period. The microstructure induced reversal is pronounced within 24 hours. Notably, they find significant continuation of returns at intervals that are multiples of a day and this effect lasts for over twenty trading days. Trading volume exhibits similar patterns, but does not explain the return patterns. Additionally, bid/ask spreads and order imbalances do not explain the return pattern. The return continuation at daily frequencies is more pronounced for the first and last half-hour periods. These effects are not driven by firm size, systematic risk premiums, or inclusion in the S&P 500 index. The pattern is also not driven by particular months of the year, days of the week, or turn-of-the-month effects. This suggests that traders may wish to time portfolio rebalancing to account for

these persistent intraday patterns.

**Baruch** studies a pure limit-order market in which strategic risk-neutral traders can post bids and offers at various prices, although they run the risk of being picked off by informed traders. He shows that, in equilibrium, limit-order traders post offers at random prices and for random quantities. In equilibrium, a trader can increase his/her chance of making the market by submitting price-aggressive offers. The payoff associated with an aggressive offer is skewed to the left (that is, there are small chances of large losses to informed traders) while the payoff associated with a non-aggressive offer is skewed to the right (that is, there are small chances of large gains from uninformed traders). However, in equilibrium, expected payoffs are the same, so it is optimal to choose the offering price randomly. **Baruch** also shows that a trader who exposes his/her offer expects to lose, even though rational traders don't "penny jump" exposed offers.

**Frey** and **Sandas** report that the presence of hidden liquidity is asso-

ciated with greater liquidity in the order books, greater trading volume, and smaller price impact. Limit and market order submission behavior changes when hidden liquidity is present, consistent with at least some traders being able to detect hidden liquidity. The researchers estimate a model of liquidity provision that allows them to measure variations in the marginal and total payoffs from liquidity provision in states with and without hidden liquidity. They measure the expected surplus to providers of visible and hidden liquidity and show that often the surplus for both types is positive. They approximate the difference in the surplus of liquidity demanders in order books with visible and hidden liquidity. Their results suggest that, collectively, the liquidity providers and demanders may obtain a higher expected surplus when there is hidden liquidity in the order books. The magnitude of the estimated gain is between 25 and 35 percent of the quoted bid-ask spreads per trade. The authors interpret their results as evidence that a less than fully transparent limit order book

may enhance the welfare of market participants.

**Ellul** and **Panayides** investigate the competitive relationship between financial analysts and firm insiders for price-sensitive information and its influence on liquidity and price discovery. Without the presence of analysts, insiders have complete monopoly over information, influencing market equilibrium and liquidity. If analysts really compete for information (as in Fishman and Hagerty, 1992) they can reduce insiders' informational advantage with a consequent improvement of traders' welfare (as in Holden and Subrahmanyam, 1992). The authors empirically investigate this hitherto ignored role of analysts by using a sample of stocks that lost all analyst coverage, thus giving insiders complete monopoly over price-sensitive information. The departure of analysts leads to important changes in liquidity and market equilibrium. Using a matching-firm methodology to address possible endogeneity, the authors find that liquidity decreases significantly, price efficiency deteriorates rapidly, information asymmetries increase, and institutional shareholders and liquidity-motivated traders leave the stock. The impact of insiders' trading on adverse selection costs and price efficiency

becomes larger and their trades become more profitable. They also find that an important role of analysts is their ability to make price-sensitive information available to the market, suggesting that analysts make a significant contribution to market quality by competing with insiders for information.

A number of academic papers have used short-sale constraints in the immediate aftermarket of IPOs to explain short-term pricing anomalies that are subsequently reversed in the long term. Using newly available data, **Edwards** and **Hanley** document that short selling is prevalent early in the aftermarket trading of IPOs. Greater short selling is observed in IPOs with positive changes in offer price, high initial returns, and large trading volume. Although large levels of underpricing may be indicative of overvaluation, the authors find that short selling does not appear to limit *observed* underpricing. This is inconsistent with theoretical models that predict high initial returns, in part, by assuming constraints on short sales. Using data on failures to deliver, they also test whether short sellers appear to avoid the perceived restrictions of the equity lending market by "naked" short selling. However, the level of failures to deliver are uncorrelated with the amount of short selling and are

more likely to occur in IPOs that are hypothesized to be price supported. Thus, they conclude that short selling in IPOs is neither as constrained as suggested by the literature nor the result of "naked" short sales.

Investors rebalance their portfolios as their views about expected returns and risk change. **Beber** and his co-authors use empirical measures of portfolio rebalancing to back out investors' views, specifically about the state of the economy. They show that aggregate portfolio rebalancing across equity sectors is consistent with sector rotation, an investment strategy that exploits perceived differences in the relative performance of sectors at different stages of the business cycle. This empirical foot-print of sector rotation has strong predictive power for the evolution of the economy, future stock returns, and future bond returns, even after controlling for relative sector returns. Contrary to many theories of price formation, trading activity thus contains information that is not entirely captured by resulting relative price changes. Moreover, the authors find that a portfolio that mimics the observed aggregate rebalancing across equity sectors dominates the market portfolio, particularly during economic downturns.

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## Bureau Books

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### International Financial Issues in the Pacific Rim: Global Imbalances, Financial Liberalization, and Exchange Rate Policy

*International Financial Issues in the Pacific Rim: Global Imbalances, Financial Liberalization, and Exchange Rate Policy*, which is Volume 17 in NBER's East Asia Seminar on Economics series, is now available from the University of Chicago Press. The price of the clothbound volume is \$99.00

The imbalanced, yet mutually beneficial, trading relationship between the United States and Asia has long been one of international finance's most perplexing mysteries. This volume considers why

the United States enjoys a seemingly symbiotic relationship with its trading partners despite stark inequalities in the trade balance, especially with Asia. This timely and well-informed study also debunks the assumed link between economic openness and low inflation in the region, identifies the serious gap between academic and private-sector researchers' understanding of exchange rate volatility, and analyzes the liberalization of Asian capital accounts. As a result, the book will have broad implications for global trade and eco-

nommic policy issues in Asia and beyond.

Conference organizers and volume editors Takatoshi Ito and Andrew K. Rose are NBER Research Associates in the Program on International Finance and Macroeconomics. Ito is also a Professor at the Graduate School of Economics, University of Tokyo. Rose is the B.T. Rocca Professor of Economic Analysis and Policy at the Haas School of Business, University of California, Berkeley.

The following three volumes may be ordered from the University of Chicago Press Journals Division, P.O. Box 37005, Chicago, IL 60637. Via email, write to: [subscriptions@press.uchicago.edu](mailto:subscriptions@press.uchicago.edu)

### Two Volumes from NBER's International Seminar on Macroeconomics Available this Summer

The NBER's International Seminar on Macroeconomics (ISoM) has met annually in Europe for the past thirty years. The proceedings of the 2006 conference are now available, and the 2007 proceedings will appear later this summer. This series of annual volumes is now published by the University of Chicago Press Journals Division. The books are priced at \$90.00 for clothbound editions.

The papers included in *ISoM 2006* discuss: the relationship between prices

and productivity in the OECD; monetary policy's impact on inflation and output; implications of rising government debt; the relationship between consumption and labor market tightness; variation in real wages over the business-cycle; production sharing and business cycle synchronization in the accession countries; and pension systems and the allocation of macroeconomic risk.

The editors of the 2006 volume, who also organized the conference that year,

are Lucrezia Reichlin, director of general research at the European Central Bank and a full professor of economics at Université Libre de Bruxelles, and Kenneth West, the Ragnar Frisch Professor of Economics at the University of Wisconsin, Madison, and an NBER Research Associate in the Programs on Monetary Economics and Asset Pricing.

The topics included in *ISoM 2007* are: interest setting and central bank transparency; expectations, monetary policy, and

traded goods prices; public investment and the golden rule; the role of institutions, confidence, and trust in financial integration within EU countries; international portfolios with supply, demand, and redistributive shocks; transmission and stabilization in closed and open econ-

omies; capital flows and asset prices; and welfare implications of financial globalization without financial development.

The editors of that volume, who also organized last year's conference, are NBER Research Associates Richard H. Clarida, the C. Lowell Harriss Professor

of Economics and professor of international affairs at Columbia University, and Francesco Giavazzi, professor of economics at Bocconi University and a regular visiting professor at MIT. Both are members of the NBER's Program on International Finance and Macroeconomics.

## Tax Policy and the Economy

*Tax Policy and the Economy*, Volume 22, is now available from the University of Chicago Press Journals Division for \$60.00 (clothbound). This annual series presents current academic research findings on taxation and government spending that have both immediate bearing on policy debates and longer-term interest.

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James M. Poterba, the conference organizer and editor of this volume, is a professor of economics and head of the Economics Department at MIT, the Director of NBER's Public Economics Research Program, and President of the NBER.

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