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# NBER Reporter

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## Program Report

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### IN THIS ISSUE

Program Report	
Labor Economics	1
Research Summaries	
The Economics of Student Aid	5
... Private Long-Term Care Insurance	8
NBER Profiles	11
Conferences	12
NBER News	14
Program and Working Group Meetings	14
Bureau Books	40

## Labor Economics Redux

Richard B. Freeman\*

Labor economics has increased the number of tools it uses to analyze people's behavior in market settings by augmenting econometrics and models of rational behavior with increased analyses of field or laboratory experiments. This widening, and a greater focus on the ways economic institutions affect outcomes, as opposed to how hypothetical rational actors behave in ideal competitive settings, has helped the field to become an increasingly important and growing contributor to economic research. This growth is evidenced in the massive increase in the number of NBER Working Papers produced in the Labor Studies Program. In 1979, the Program published ten working papers over the entire year. In a single month in 2007 (February), the Program produced 18 working papers, making it the single largest producer of Working Papers among all NBER programs, as it was in 2006 when the program published 176 Working Papers. Once upon a time, I read all of the papers, but this has become a near impossibility. Moreover, labor specialists have spawned additional programs at the NBER — Education, Children, Aging — and smaller groups of labor researchers are working on particular topics, including personnel economics, shared capitalism, the science and engineering work force, immigration, and the economics of the welfare state in Sweden.

One reason for the growth in the NBER's Labor Studies Program has been the increased attention given to labor issues in economic debate. One of the great economic issues of our time relates to the differing economic performance of capitalist economies. In the 1980s many researchers sought to understand the great success of Japan. From the 1990s to the present, many analysts have sought to explain the difference between European

We are moving from a quarterly, seasonal system to a numbered system for the *NBER Reporter*, with the goal of eventually producing six issues per year. Therefore, this first issue of 2007 is Number 1.

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# NBER Reporter

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Union and U.S. economic performance in terms of the more market-oriented labor institutions and weaker welfare state in the United States. Seeking to explain why some firms or establishments do better than others, other analysts have looked at differences in incentives and work practices. In international trade, the most contentious issue relates to how trade affects workers, including the likelihood and costs of displacement, the role of off-shoring in reducing demand for skilled as well as unskilled labor, and the impact of trade on earnings inequality.

The concern over rising inequality has generated a huge labor literature in which NBER researchers have played a significant role as they seek to document the effect of institutions, technology, and/or trade in the growth of inequality in wages and hours worked in the United States. In addition, there is always interest in such perennial labor topics as the minimum wage, unions, female labor force participation, immigration, discrimination, and crime. Indicative of the standing of labor in economics is that, at this writing, the head of the President's Council of Economics Advisers, Ed Lazear, is a longstanding Research Associate in the Program (author of 10 percent of the 1979 crop of Working Papers). The field must be doing something right!

One of the things that the labor field is definitely doing right is widening the range of topics covered. When the leading Australian economist, Bob Gregory, visited NBER in the 1980s, he remarked that American labor economists were narrower in their research topics than Australian labor economists. Why? It was the economics of specialization in a large market. The United States had so many labor economists that we invariably ended up specializing to a greater extent than labor economists in Australia, where a small band had to cover the whole field and, in some cases, work on trade, monetary policy, and natural resource economics as well. Breadth over depth, as it were.

But over time the topics that have attracted NBER labor research have widened and widened. Consider, for example, some of the subjects of labor Working Papers in January and February 2007: happiness and well-being<sup>1</sup>; peer effects in juvenile corrections and attack assignments in terror organizations<sup>2</sup>; interpersonal styles and labor outcomes; the production of female artists<sup>3</sup>. This isn't your thesis advisor's or thesis advisor's advisor's set of labor topics. The idea that practitioners of the dismal science would have anything to contribute on happiness

seems almost an oxymoron, but in fact we do. And artists? Why, the next thing you know labor economists will be studying the economics of wine!<sup>4</sup>

Research on more traditional labor topics, such as unemployment benefits, job training, human capital investments, geographic mobility, and the like, also shows an expanding arc beyond what would have been treated a decade or so earlier. The youth training paper in February 2007 is about a program in the Dominican Republic; the human capital paper is about the effect of Indian Tariff reform on investment in skills; the mobility paper focuses on optimal migration in the world.<sup>5</sup> Five of the 13 working papers published in March 2007 were focused on evidence from other countries.<sup>6</sup> What had once been a field that devoted itself almost exclusively to U.S. evidence has become global, looking for natural experiments, variation in institutions and regulations across the world to draw inferences about economic behavior.<sup>7</sup>

Gregory may still be right that individual researchers in Labor Studies are more hedgehogs than foxes, per Isaiah Berlin's famous essay "The Hedgehog and the Fox" ("The fox knows many things, but the hedgehog knows one big thing.") but as a collective, NBER labor studies cover many things and many datasets and labor behavior and outcomes in many countries.

Another important development in labor and economics more broadly is that research has become increasingly collaborative, involving researchers across different countries. The trend for increased numbers of authors per working paper, noted in my 2002 review of the program, has continued. In January-February 2007, there were five single-authored papers, 18 double-authored papers, 10 triple-authored papers, and one paper with five authors. The authors cover people working in many different countries, as well. Some of this occurs because NBER research affiliates and fellows working on data from foreign countries collaborate with nationals of those countries; in other cases, it is U.S. data and topics that attract the interest of graduate students and researchers from other countries. The

open source policy that covers many U.S. datasets, some of which the NBER makes available on its web site, naturally inspires some research around the world.

Finally, as labor studies has grown in its coverage of issues, it has become less clear who is "labor" and who is not. There is a substantial overlap of Labor Studies Working Papers with those in public economics, and a growing pattern in which labor researchers collaborate with specialists in other fields to examine topics of interest.

## Tools and Findings

One of the important additions to the tool kit of economists has been experimental economics—the use of laboratory experiments that have traditionally been the meat and potatoes of psychology for testing diverse forms of economic behavior. Labor studies has become a home for experimental economics, both field experiments and laboratory experiments.<sup>8</sup> At virtually every Labor Studies program meeting or summer workshop, there are papers using experimental laboratory techniques to analyze behavior. This adds to the attention that labor has long given to field experiments, in which policymakers and/or researchers use random assignment and differential incentives or program designs to help assess behavior and to determine the most effective program interventions. While labor is empirical to its core, it has close ties to econometrics and has played a major role in using such techniques as difference-in-differences (comparing changes in one group subject to some new incentive to changes in a control group), instrumental variables analyses that seek to isolate the effect of the hopefully truly exogenous part of the variation in an explanatory variable on some behavior.

The pudding is the research findings. What do we now know that we didn't know five or so years ago when I last reviewed the status of labor studies? We know more about the complexities of supply responses to incentives in diverse areas. Yes, incentives matter, but studies have found that their impact can vary between groups, depend on peer effects

and on diverse behavioral issues that the simplest models of rational optimization miss. We know more about the determinants of inequality, though we also know more about how difficult it is to pin down the causes and effects of the rise in inequality in the United States. We know more about how institutions behave, though there clearly remains much more to be learned through the combination of cross-country analyses, case investigations, econometrics, and the whole panoply of tools that we have come to rely on to attack problems.

If the trends in research continue, I expect to see further use of laboratory experiments to help answer labor questions, the development of sufficient numbers of studies across countries to allow us to pin down the universals in economic behavior, and the specifics associated with particular incentives and structures. As globalization proceeds, the economic impact of female workers keeps growing, and innovation and productivity continue to play major roles in economic progress, I expect to see much greater understanding of the labor markets in developing countries, more about how gender affects economic behavior, and more about the impact of incentives and institutions on creativity and innovation, as well as on the more traditional employment and hours measures of labor.

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<sup>1</sup> D.G. Blanchflower and A. J. Oswald, "Is Well-being U-Shaped over the Life Cycle?" NBER Working Paper No. 12935, February 2007, and "Hypertension and Happiness across Nations," NBER Working Paper No. 12934, February 2007.

<sup>2</sup> P. Bayer, R. Hjalmarsson, and D. Pozen, "Building Criminal Capital behind Bars: Peer Effects in Juvenile Corrections," NBER Working Paper No. 12932, February 2007, and E. Benmelech and C. Berrebi, "Attack Assignments in Terror Organizations and the Productivity of Suicide Bombers," NBER Working Paper No. 12910, February 2007.

<sup>3</sup> D. W. Galenson, "Who Were the Greatest Women Artists of the Twentieth Century? A Quantitative Investigation," NBER Working Paper No. 12928,

February 2007.

<sup>4</sup> Indeed, one of the earliest members of the Labor Studies Program, Orley Ashenfelter, has specialized in the economics of the wine industry. See for example, O. Ashenfelter and K. Storchmann, "Using a Hedonic Model of Solar Radiation to Assess the Economic Effect of Climate Change: The Case of Mosel Valley Vineyards," NBER Working Paper No. 12380, July 2006.

<sup>5</sup> E. V. Edmonds, N. Pavcnik, and P. Topalova, "Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform," NBER Working Paper No. 12884, February 2007; D.A. Card, P. Ibarrraran, F. Regalia, D. Rosas, and Y. Soares, "The Labor Market Impacts of Youth Training in the Dominican Republic: Evidence from a Randomized Evaluation," NBER Working Paper No. 12883, February 2007; and J. Benhabib and B. Jovanovic, "Optimal Migration: A World Perspective," NBER Working Paper No. 12871, January 2007.

<sup>6</sup> A. Bjorklund, M. Jantti, and G. Solon, "Nature and Nurture in the Intergenerational Transmission of Socioeconomic Status: Evidence from Swedish Children and Their Biological and Rearing Parents," NBER Working Paper No. 12985, March 2007; M. Muendler, "Trade and Workforce Changeover in Brazil," NBER Working Paper No. 12980, March 2007; M. Diaye, N. Greenan, and M. Urdanivia,

"Subjective Evaluation of Performance Through Individual Evaluation Interview: Empirical Evidence from France," NBER Working Paper No. 12979, March 2007; T. Lallemand, R. Plasman, and F. Rycx, "Wage Structure and Firm Productivity in Belgium," NBER Working Paper No. 12978, March 2007; and A. Hunnes, J. Møoen, and K.G. Salvanes, "Wage Structure and Labor Mobility in Norway 1980–97," NBER Working Paper No. 12974, March 2007.

<sup>7</sup> R. B. Freeman "Learning from Other Economies: The Unique Institutional and Policy Experiments Down Under," NBER Working Paper No. 12116, March 2006.

<sup>8</sup> These include studies by specialists in experimental economics, who have joined the program: M. Niederle, "Competitive Wages in a Match with Ordered Contracts," NBER Working Paper No. 12334, June 2006; M. Niederle and L. Vesterlund, "Do Women Shy Away From Competition? Do Men Compete Too Much?" NBER Working Paper No. 11474, July 2005; C. N. McKinney, M. Niederle, and A. E. Roth, "The Collapse of a Medical Clearinghouse (and Why Such Failures Are Rare)," NBER Working Paper No. 9467, February 2003; and M. Niederle and A. E. Roth, "Unraveling Reduces the Scope of an Entry Level Labor Market: Gastroenterology With and Without a Centralized Match," NBER Working Paper No. 8616, December 2001.

But the experimental analysis has

come to be used by diverse labor specialists: J. R. Kling, "Methodological Frontiers of Public Finance Field Experiments," NBER Working Paper No. 12931, February 2007; J. Angrist, D. Lang, and P. Oreopoulos, "Lead Them to Water and Pay Them to Drink: An Experiment with Services and Incentives for College Achievement," NBER Working Paper No. 12790, December 2006; D.A. Card and D. R. Hyslop, "The Dynamic Effects of an Earnings Subsidy for Long-Term Welfare Recipients: Evidence from the SSP Applicant Experiment," NBER Working Paper No. 12774, December 2006; R. B. Freeman and A. M. Gelber, "Optimal Inequality/Optimal Incentives: Evidence from a Tournament," NBER Working Paper No. 12588, October 2006; E. Field, "Educational Debt Burden and Career Choice: Evidence from a Financial Aid Experiment at NYU Law School," NBER Working Paper No. 12282, June 2006; U. Gneezy and J. A. List, "Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments," NBER Working Paper No. 12063, March 2006; M. Bertrand, D. Karlin, S. Mullainathan, E. Shafir, and J. Zinman, "What's Psychology Worth? A Field Experiment in the Consumer Credit Market," NBER Working Paper No. 11892, December 2005; J. R. Kling, J. B. Liebman, and L. F. Katz, "Experimental Analysis of Neighborhood Effects," NBER Working Paper No. 11577, August 2005.

# The Economics of Student Aid

Susan M. Dynarski\*

My research focuses on the incentives and distributional effects created by government policy toward education. In a series of papers, I have examined the various methods that governments use to subsidize post-secondary education and how the choice of instrument mediates the final impact of the subsidy. I am particularly interested in how different instruments intensify or ameliorate racial, gender, and income inequality in educational and labor market outcomes. My goal is the establishment of a body of well-identified empirical research that informs us about these questions.

A wide array of policy instruments is now used to subsidize college attendance, including need-based grants, subsidized loans, merit scholarships, low public tuition, and tax incentives. Every state now has a tax-free college savings plan, or 529 savings plan. Many states also provide merit aid to a large proportion of their college students; these programs are distinct from the traditional merit scholarships (such as the National Merit Program or New York Regents Scholarships) in that they are aimed at students with moderate academic skills.

These innovations have outpaced our understanding of how different methods for subsidizing education affect schooling decisions, an evidentiary gap that my research agenda seeks to close. Theory and common sense suggest that different forms of subsidy will have different behav-

ioral and distributional effects.

For example, the paperwork requirements of the federal, need-based aid programs are quite high, comparable to those of a complicated income tax return.<sup>1</sup> If low-income families find such forms particularly difficult, then need-based aid—which requires gathering extensive information about income and expenses—may have a smaller effect on this population than less-targeted forms of subsidy with fewer application requirements and lower transaction costs.

## College Entry and Student Aid

In “Does Aid Matter? Measuring the Effect of Student Aid,”<sup>2</sup> I establish that a transparent grant program with low transaction costs had a substantial impact on college entry. Existing, well-identified studies had found no effect of grant aid on schooling behavior, so this paper made a substantial contribution to the field. From 1965 to 1982, the Social Security Administration paid for millions of students to go to college. Under this program, the 18- to 22-year-old children of deceased, disabled, or retired Social Security beneficiaries received monthly payments while enrolled full-time in college. The average annual payment in 1980 to the child of a deceased parent was \$6,700. At the program’s peak, 12 percent of full-time college students aged 18 to 21 were receiving Social Security student benefits.

In 1981, Congress voted to eliminate the program. Except for the introduction of the Pell Grant program in the early 1970s, and the various GI Bills, this is the largest and sharpest change in grant

aid for college that has ever occurred in the United States. The program’s demise provides an opportunity to measure the incentive effects of financial aid. Using difference-in-differences methodology, and with the death of a parent during an individual’s childhood as a proxy for benefit eligibility, I find that the elimination of the Social Security student benefit program reduced college attendance probabilities among this group by more than a third. These estimates suggest that an offer of \$1,000 in grant aid will increase the probability of attending college by about 3.6 percentage points.

I have also examined the effect of recent innovations in state post-secondary policy on schooling decisions. Since the early 1990s, more than a dozen states have established broad-based merit aid programs. The typical program waives tuition and fees at public colleges and universities in one’s home state. Unlike traditional, elite merit programs, such as the National Merit Scholarship, the new merit aid requires relatively modest academic credentials and annually funds hundreds of thousands of students. For example, Georgia’s merit scholarship requires a high school GPA of 3.0; renewal requires maintaining a 3.0 in college. In “Hope for Whom?”<sup>3</sup> I showed that Georgia’s HOPE Scholarship program had a substantial impact on college attendance. The effects were concentrated among whites, with little to no effect on the schooling of Blacks. The program thereby exacerbated the large racial gap in college attendance in Georgia.

I further explore racial heterogeneity in the effect of aid in “The New Merit Aid”<sup>4</sup>, in which I examine schol-

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arship programs in a dozen states. I estimate they have positive effects on college attendance, comparable in magnitude to those found in Georgia. All of the programs also shifted students from two-year colleges toward four-year colleges. However, the null effect of the Georgia program on Black attendance appears to be unique: other state's merit scholarship programs *reduce* racial gaps by disproportionately increasing college attendance among Blacks. I attribute the unusual effect of the Georgia program to a provision that reduced HOPE Scholarships for Pell Grant recipients, who are disproportionately Black.

## College Completion and Student Aid

The research just discussed established a link between college entry and college costs. A valid concern, however, is that students induced into college by grant aid may be unable to handle the academic rigors of college. Indeed, many young people enter college but drop out before completing a degree. In the 2000 Census, just 57 percent of those aged 22 to 34 with any college experience have completed an associate's or bachelor's degree. Thirteen percent have not completed even a year.

These facts were the motivation for my examination of the effect of student aid on college completion in "Building the Stock of College-Educated Labor"<sup>5</sup>. In this paper, I find a large and significant impact of college costs on degree receipt. Simple and generous scholarship programs introduced in Arkansas and Georgia in the early 1990s increase the share of young people with a college degree by three percentage points, from a base of 27 percent—a substantial effect. The results suggest that those induced into college by aid graduate at least at the same rate as other students.

A surprising finding is that almost all of the programs' effects are concentrated among women. More girls than boys meet the eligibility requirements for merit scholarships, with 49 percent of female college freshmen and only 36 percent of males having a high school GPA of

at least 3.0. Previous research has shown that in course grades and standardized tests, girls outperform boys in high school and are substantially more likely to go on to college<sup>6</sup>. I am now using multiple data sources to trace the development of these gender gaps in college and high school to their origins in elementary school and preschool.

## Tax Incentives for College Saving

Over the past decade, states and federal governments have established new tax-advantaged vehicles for college savings. The federal Coverdell accounts and state 529 accounts resemble Roth IRAs: aftertax dollars are deposited into special accounts where they can grow tax-free and, if used for qualified educational expenses, be withdrawn tax-free. In about half the states, deposits to 529 accounts are exempt from state taxation, further increasing the tax advantages.

In "Who Benefits from the Education Saving Incentives? Income, Educational Expectations, and the Value of the 529 and Coverdell"<sup>7</sup> I calculate the incentives created by these new savings vehicles. I find that the advantages of the 529 and Coverdell rise sharply with income. Those with the highest marginal tax rates benefit the most from sheltering income, gaining most in both absolute and relative terms. Further, the accounts are risky for families for whom the college attendance of children is uncertain, since account holders are penalized if the accounts are not used for schooling. I calculate the minimum probabilities of college attendance that are required for the 529 and Coverdell to have expected returns at least as high as alternative saving vehicles and find that for households with incomes below \$57,000 these breakeven probabilities are higher than the observed rates at which their children go to college.

A final reason that the education savings accounts disproportionately benefit high-income families is their poor coordination with the federal financial aid system. In "Tax Policy and Education Policy: Collision or Coordination? A Case Study of the 529 and Coverdell

Saving Incentives,"<sup>8</sup> I focus on the perverse incentives that can emerge when different policies to encourage human capital investments inadvertently collide. I find that the joint treatment by the income tax code and financial aid system of college savings creates tax rates that exceed 100 percent for those families on the margin of receiving additional financial aid. Since even families with incomes above \$100,000 receive need-based aid, the impact of these very high taxes is quite broad. My simulations showed that \$1,000 of pretax income placed in a Coverdell for a newborn and left to accumulate until college could face income and aid taxes that consume all principal, all earnings, and an additional several hundred dollars. Happily, this particular collision of aid and tax policy was corrected soon after the research was published.

## Complexity as a Barrier to the Effectiveness of Aid Policy

As evidence concerning the effect of subsidies on schooling choices has accumulated, it has become clear that not all aid programs are effective. In particular, the need-based programs that are the foundation of federal aid policy (including the Pell Grant and Stafford Loan) have not been shown to be effective in getting more people into college.<sup>9</sup>

A possible culprit is complexity and uncertainty in the federal aid programs. For the typical household, the aid application (the Free Application for Federal Student Aid, or FAFSA) is longer and more complicated than the federal tax return. The aid process is also highly uncertain, with definitive information about freshman-year aid not revealed until the spring of the senior year in high school. With Judith Scott-Clayton<sup>10</sup> I used the tools of optimal tax theory and behavioral economics to shed light on how complexity in a program can create unintended distributional and behavioral consequences.

Complexity in the need-based aid system arises from attempts to precisely measure ability to pay for college. As has been highlighted in the tax policy literature,<sup>11</sup> gathering detailed information

about income is costly to both the taxpayer and the government, although policymakers usually ignore these costs.

For aid applicants, the costs of complexity include the time and resources required to learn about the aid system and its rules, collect all of the required documents, and fill out the aid application. The time and effort required to complete these steps is likely higher for those low-income students who are the target of the federal aid programs. Many low-income families cannot benefit from learning-by-doing, since the parents are unlikely to have gone to college and applied for aid themselves. They have fewer guidance counselors to guide them through the process. They are less likely to have Internet access at home and more likely to speak English as a second language. Each of these barriers makes the aid process most daunting for its target population.

A valid rejoinder to this line of argument is that the financial returns to a college education dwarf any reasonable estimate of the costs of applying for aid. Thus, if people behave rationally, anyone who is deterred from going to college by compliance costs must have an unusually low expected return to college. By implication, not much is “left on the table” when such students are discouraged from entering college; the loss to social welfare is predicted to be minor if everyone is behaving rationally.

A key insight of behavioral economics is that people systematically do not behave rationally, even in matters where we might most expect calculating rationality. The behavioral literature demonstrates conclusively that even seemingly minor complexities can have profound impacts on behavior. In a series of influential papers,<sup>12</sup> Brigitte Madrian and co-authors have shown that the seemingly minor bureaucratic barriers to 401(k) enrollment have a substantial impact on

savings rates. If minor paperwork burdens discourage working adults from saving, they will plausibly discourage adolescents from investing in their own human capital.

By its nature, college is an investment: upfront sacrifices are required (tuition, forgone earnings, studying) in order to obtain back-loaded benefits (better job, higher earnings, higher social status). Applying for aid is part of the cost of college, requiring a current sacrifice in order to yield a future return. Given that adults are guilty of procrastination and avoidance in quite high-stakes investments, we should not expect any less (or any more) from adolescents making high-stakes decisions about their human capital.

We show that the aid system imposes these potentially large costs in order to measure very small differences in ability to pay. Nearly all of the variation in federal aid is generated by a fraction of 70 data items used in the aid formula. Adjusted gross income, marital status, and family size explain over three-quarters of the variation in Pell Grant awards. Since the IRS 1040EZ already collects most of the key pieces of data that determine aid eligibility, a reasonable option would be to eliminate the aid application completely and establish student aid eligibility based on tax return data.

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<sup>1</sup> S. Dynarski and J. Scott-Clayton, “The Cost of Complexity in Federal Student Aid: Lessons from Optimal Tax Theory and Behavioral Economics,” NBER Working Paper No. 12227, May 2006 and National Tax Journal, 59:2 (2006).

<sup>2</sup> S. Dynarski, “Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion,” NBER Working Paper No. 7422, November 1999, and American Economic Review, 93:1 (2003).

<sup>3</sup> S. Dynarski, “Hope for Whom?”

*Financial Aid for the Middle Class and Its Impact on College Attendance*,” NBER Working Paper No. 7756, June 2000, and National Tax Journal 53:3 (2004).

<sup>4</sup> S. Dynarski, “The New Merit Aid,” NBER Working Paper No. 9400, December 2002, and published in C. Hoxby, ed., *College Choices: The Economics of Where to Go, When to Go, and How To Pay for It* (2004).

<sup>5</sup> S. Dynarski, “Building the Stock of College-Educated Labor,” NBER Working Paper No. 11604, September 2005.

<sup>6</sup> C. Goldin, L. Katz, and I. Kuziemko, “The Homecoming of American College Women: The Reversal of the College Gender Gap,” NBER Working Paper No. 12139, April 2006 and Journal of Economic Perspectives 20:4 (2006).

<sup>7</sup> S. Dynarski, “Who Benefits from the Education Saving Incentives? Income, Educational Expectations, and the Value of the 529 and Coverdell,” NBER Working Paper No. 10470, May 2004 and National Tax Journal 57:2 (2004).

<sup>8</sup> S. Dynarski, “Tax Policy and Education Policy: Collision or Coordination? A Case Study of the 529 and Coverdell Saving Incentives,” NBER Working Paper No. 10357, March 2004, and Tax Policy and the Economy 18 (2004).

<sup>9</sup> T. Kane, “Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College,” NBER Working Paper No. 5164, July 1995.

<sup>10</sup> *Ibid.*

<sup>11</sup> L. Kaplow, “How Tax Complexity and Enforcement Affect the Equity and Efficiency of The Income Tax,” NBER Working Paper No. 5391, May 1996, and National Tax Journal, 49, (1996).

<sup>12</sup> J. Beshears, J. Choi, D. Laibson, and B. Madrian, “Simplification and Saving,” NBER Working Paper No. 12659, October 2006.



# The Market For Private Long-Term Care Insurance

Amy Finkelstein\*

## Long-Term Care Risk

Long-term care expenditures represent one of the largest uninsured financial risks facing the elderly in the United States. Expenditures on long-term care, such as home health care and nursing homes, accounted for 8.5 percent of all health care spending in the United States, and about 1.2 percent of GDP in 2004.<sup>1</sup> These long-term care expenditures are projected to triple in real terms over the next few decades, in large part because of the aging of the population.<sup>2</sup>

Long-term care expenditures are distributed unevenly among the elderly population. Therefore they represent a significant source of financial uncertainty for elderly households. Only about one third of current 65-year-olds will never enter a nursing home. However, of those who do, 12 percent of men and 22 percent of women will spend more than three years there; one in eight women who enter a nursing home will spend more than five years there.<sup>3</sup> These stays are costly: on average, a year in a nursing home cost \$50,000 in 2002 for a semi-private room, and even more for a private room.<sup>4</sup> Standard insurance theory suggests that the random and costly nature of long-term care makes it precisely the type of risk that would make insurance valuable for risk-averse individuals.

Yet most of the expenditure risk is uninsured. Only 4 percent of long-term care expenditures are paid for by private insurance, while one third are paid for out of pocket.<sup>5</sup> By contrast, in the health sec-

tor as a whole, private insurance pays for 35 percent of expenditures and only 17 percent are paid for out of pocket.<sup>6</sup>

The limited insurance coverage for long-term care expenditures has important implications for the welfare of the elderly, and potentially for their adult children as well. These implications will only become more pronounced as the baby-boomers age and as medical costs continue to rise.

The limited private insurance market also has implications for government expenditures. Because more than one third of Medicaid expenditures are already devoted to long-term care,<sup>7</sup> policymakers are increasingly concerned about the fiscal pressure that further growth in long-term care expenditures will place on federal and state budgets in the years to come. As a result, there is growing interest in stimulating the market for private long-term care insurance.

There are a host of potential theoretical explanations for the limited size of the private long-term care insurance market.<sup>8</sup> On the demand side, limited consumer rationality—such as difficulty understanding low-probability high-loss events<sup>9</sup> or misconceptions about the extent of public health insurance coverage for long-term care—may play a role. Demand also may be limited by the availability of imperfect but cheaper substitutes, such as the public insurance provided by the means-tested Medicaid program, financial transfers from children, or unpaid care provided directly by family members in lieu of formal paid care.<sup>10</sup> On the supply side, market function may be impaired by such problems as high transactions costs, imperfect competition, asymmetric information, or dynamic problems with long-term contracting.

This article briefly summarizes a rap-

idly growing body of empirical work dedicating to improving our understanding of the private long-term care insurance market in the United States, and why that market is currently so small.

## The Functioning Of Private Long-Term Care Insurance: High Prices, Limited Benefits

To understand the small size of the private long-term care insurance market, Jeff Brown and I start by examining what the available policies in this market are like.<sup>11</sup> We find that the typical policy that is purchased covers only about one third of the expected present discounted value of long-term care expenditures. Moreover, this policy is provided at premiums that are “marked up” substantially above expected benefits. We estimate that the typical policy purchased by an average 65-year-old in the population and held until death has a load of 0.18; in other words, the buyer on average will get back only 82 cents in expected-present-discounted-value benefits for every dollar paid in expected-present-discounted-value premiums. Most policies, however, are not held until death, and our estimate of the load rises substantially once we account for this. Individuals often stop paying premiums at some point after purchase, and therefore forfeit any right to future benefits. Because the premium profile of these policies is heavily front-loaded, especially relative to benefit payments, accounting for policy forfeiture raises our central estimate of the average load considerably, from 18 cents on the dollar to 51 cents on the dollar.

This 51-cent load for long-term care insurance is substantially higher than loads that have been estimated in other private insurance markets. For example,

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the estimated load on life annuities purchased by a typical 65-year-old in the population is about 15 to 25 cents on the dollar<sup>12</sup> and the estimated load for health insurance policies is about 6 to 10 cents on the dollar for group health insurance and 25 to 40 cents on the dollar for the (less commonly purchased) non-group acute health insurance.<sup>13</sup>

Complementing the evidence of high loads and limited benefits is growing evidence of specific market imperfections. Kathleen McGarry and I have found that individuals have private information about their long-term care utilization risk that insurance companies do not have and that individuals use this information in deciding whether to purchase long-term care insurance. Such asymmetric information makes it difficult for individuals to be able to buy private insurance at prices that are actuarially fair for them, given their (privately known) risk of long-term care use.<sup>14</sup>

There is also evidence of a number of “dynamic contracting” problems that arise because long-term care insurance involves locking in a premium payment schedule now for benefits that, if they arise, are likely to accrue about twenty years in the future.<sup>15</sup> This raises a host of issues such as the risk of bankruptcy before claims are made, the risk of dramatic growth in long-term care costs that insurance companies cannot diversify simply by pooling individual risks,<sup>16</sup> and the risk that individuals who learn over time that their health is better than expected will drop out of the insurance pool, thus raising the average risk of the pool and hence the average premium.<sup>17</sup>

## The Role Of Medicaid In Limiting Demand For Private Insurance

The evidence just reviewed suggests that the private long-term care insurance market does not appear to function efficiently. These market problems undoubtedly contribute to its small size. Yet at the same time, there is also evidence that “fixing” these supply side market failures would not by itself be sufficient to induce most elderly to buy long-term care

insurance. In other words, factors limiting demand for private insurance are also very important for understanding this market’s small size.

To investigate demand for private insurance, Jeff Brown and I have developed and calibrated a utility-based model of an elderly individual’s demand for private insurance.<sup>18</sup> We consider demand for private insurance given the current structure of policies discussed above, and the presence of the public Medicaid program. Medicaid functions as a payer-of-last resort, covering long-term care expenditures only after the individual has met stringent asset and income tests. It is thus a highly incomplete—but “free”—substitute for private long-term care insurance. Our model is able to replicate basic stylized facts concerning the portion of elderly that buy private insurance, and insurance rates by gender or wealth.

We examine how demand would change under various counterfactual assumptions. Our most striking finding is that, even if we were to “fix” whatever supply side problems may exist—and (contrary to fact) offer comprehensive private policies at actuarially fair prices—at least two-thirds of the wealth distribution still would not want to buy comprehensive insurance given the current structure of Medicaid.

Where does this large Medicaid crowd-out effect come from? It arises because a large portion of private insurance benefits are redundant, given the benefits that Medicaid would have provided in the absence of private insurance. We refer to this as the “implicit tax” that Medicaid imposes on private insurance. We estimate that for a male (female) at the median of the wealth distribution, 60 percent (75 percent) of the benefits from a private policy duplicate the benefits that Medicaid would otherwise have paid.

The Medicaid implicit tax stems from two features of Medicaid’s design, which results in private insurance reducing expected Medicaid expenditures. First, by protecting assets against negative expenditure shocks, private insurance reduces the likelihood that an individual will meet Medicaid’s asset-eligibility requirement. Second, Medicaid is a secondary payer

when the individual has private insurance. This secondary-payer status means that if an individual has private insurance, the private policy pays first, even if the individual’s asset and income levels make him otherwise eligible for Medicaid; Medicaid then covers any expenditures not reimbursed by the private policy.

The Medicaid implicit tax explains the large crowd-out effect of Medicaid. It is important to emphasize that this large crowd-out effect comes *despite* that fact that Medicaid provides an inadequate consumption-smoothing mechanism for all but the poorest of individuals. Medicaid’s income and asset spend-down requirements impose severe restrictions on an individual’s ability to engage in optimal consumption smoothing across states of care and over time. We estimate that, for most of the wealth distribution, the welfare loss associated with incomplete Medicare coverage relative to full insurance coverage is substantial.

We also find that reforms within the basic structure of the current Medicaid system are unlikely to have much of an effect on Medicaid’s implicit tax, and hence on its crowd-out effect. For example, even if Medicaid’s asset limits were eliminated for individuals who bought private insurance—so that these individuals were immediately eligible for Medicaid—Medicaid’s implicit tax would remain large because of its status as a secondary payer when individuals have private insurance.

Recent empirical work that I have done with Jeff Brown and Norma Coe is consistent with this simulation result.<sup>19</sup> We empirically examined the effect of variation in Medicaid’s asset protection rules on long-term care insurance coverage. These estimates imply that, if every state in the country moved from their current Medicaid asset eligibility requirements to the most stringent Medicaid asset eligibility requirements allowed by federal law—a change that would decrease average household assets that could be kept while qualifying for Medicaid by about \$25,000—demand for private long-term care insurance would rise by only 2.7 percentage points. While this represents about a 30 percent increase in insurance

coverage relative to current ownership rates, the vast majority of households would still find it unattractive to purchase private insurance. The combination of the simulation and empirical results suggests that, without substantial reductions in Medicaid's implicit tax, the market for private long-term care insurance is likely to remain quite small.

## Conclusions

Long-term care expenditures are a large and growing risk for elderly individuals. The private insurance market is miniscule, and the public payer of last resort provides very incomplete coverage for all but the poorest of individuals. The private market does not appear to function smoothly. Premiums are marked up substantially above expected benefits, and there is evidence of various market failures, including asymmetric information and dynamic contracting problems. Yet, the evidence suggests that even if all of these private market problems were "fixed" — so that actuarially fair comprehensive insurance were available — the private insurance market would still remain small because of the large crowd-out effect from the public Medicaid program.

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<sup>2</sup> Congressional Budget Office,

March 1999, "Projections on Expenditures for Long-Term Care Services for the Elderly", Government Printing Office: Washington, DC.

<sup>3</sup> J. R. Brown and A. Finkelstein, "The Interaction of Public and Private Insurance: Medicaid and the Long-Term Care Insurance Market," NBER Working Paper No. 10989, December 2004.

<sup>4</sup> MetLife Mature Market Institute, "MetLife Market Survey of Nursing Home and Home Care Costs 2002."

<sup>5</sup> Congressional Budget Office, 2004, *op. cit.*

<sup>6</sup> National Center for Health Statistics, Health, United States, 2002 With Chartbook on Trends in the Health of Americans, Hyattsville, Maryland, 2002.

<sup>7</sup> U. S. Congress, Committee on Ways and Means, "2004 Green Book" Washington DC: GPO, 2004.

<sup>8</sup> For a review of this literature, see E. Norton, "Long-term Care", in A.J. Culyer and J.P. Newhouse, eds., Handbook of Health Economics, Vol. 1, Ch. 17, Elsevier Science, 2000.

<sup>9</sup> H. Kunreuther, Disaster Insurance Protection: Public Policy Lessons, New York: Wiley, 1978.

<sup>10</sup> M. Pauly, "The Rational Non-purchase of Long-Term-Care Insurance", Journal of Political Economy, 98(1) 1990, pp.153–68.

<sup>11</sup> J.R. Brown and A. Finkelstein, "Supply or Demand: Why is the Market for Long-Term Care Insurance So Small?" NBER Working Paper No. 10782, September 2004.

<sup>12</sup> O.S. Mitchell, J. M. Poterba, M. Warshawsky, and J. R. Brown, "New Evidence on the Money's Worth of Individual Annuities," American Economic Review, 89 (December 1999), pp.1299–318.

<sup>13</sup> J. Newhouse, Pricing the Priceless: A Health Care Conundrum, MIT Press, Cambridge, MA, 2002.

<sup>14</sup> A. Finkelstein and K. McGarry, "Multiple dimensions of private information: evidence from the long-term care insurance market," American Economic Review, September 96(4): pp. 938–58, 2006.

<sup>15</sup> Brown and Finkelstein, *op. cit.*, Working Paper 10989.

<sup>16</sup> D. Cutler, "Why Don't Markets Insure Long-Term Risk?" unpublished working paper, 1996, [http://post.economics.harvard.edu/faculty/dcutler/papers/ltc\\_rev.pdf](http://post.economics.harvard.edu/faculty/dcutler/papers/ltc_rev.pdf)

<sup>17</sup> A. Finkelstein, K. McGarry, and A. Sufi, "Dynamic Inefficiencies in Insurance Markets: Evidence from Long-Term Care Insurance", American Economic Review Papers and Proceedings, 95: pp. 224–28, 2005.

<sup>18</sup> J.R. Brown and A. Finkelstein, *op. cit.*, Working Paper 10989.

<sup>19</sup> J.R. Brown, N. B. Coe, and A. Finkelstein, "Medicaid Crowd-Out of Private Long-Term Care Insurance: Evidence from the Health and Retirement Survey," NBER Working Paper No.12536, September 2006.

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## NBER Profile: *Susan M. Dynarski*

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Susan M. Dynarski has been a Faculty Research Fellow at the National Bureau of Economic Research since 1999. She is a member of the NBER's Programs of Research on Children, Education, and Public Economics. She is also an Associate Professor of Public Policy at Harvard University's Kennedy School of Government and has been a Visiting Fellow at Princeton University. She received her A.B. in Social Studies and her Master's in Public Policy from Harvard University and has a Ph.D. in economics from MIT.

Dynarski studies and teaches the economics of education and tax policy with a special interest in the interaction of inequality and education. She has ana-

lyzed the impact of grants and loans on college attendance, the effect of state policy on college completion rates, and the distributional aspects of college savings incentives. Her current research focuses on the role of academic preparation in college success, gender gaps in education outcomes, and simplification of the federal student aid system. She has testified on her research to the United States Senate and the President's Commission on Tax Reform.

Dynarski lives in Somerville, Massachusetts with her husband Bob. They enjoy exploring Boston and the world with their seven-year-old son and three-year-old daughter.



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## NBER Profile: *Amy Finkelstein*

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Amy Finkelstein is a Faculty Research Fellow in the NBER's Programs on Public Economics, Health Care, and the Economics of Aging, and an Assistant Professor in the Department of Economics at MIT. She received her AB in government from Harvard University in 1995, an M.Phil. in economics from Oxford University—where she was a Marshall Scholar—in 1997, and a Ph.D. in Economics from MIT in 2001.

Her research focuses on two main areas: market failures and government intervention in insurance markets; and the impact of public policy on the health care sector, particularly on the development and diffusion of medical technology.

Prior to joining the MIT faculty in 2005, Finkelstein was a Junior Fellow at the Harvard Society of Fellows (2002–5), and a Visiting Scholar in the Demography of Aging at the NBER (2000–2). From 1997 to 1998, she worked as a Staff Economist for the Council of Economic Advisers.

Finkelstein lives in Cambridge with her husband, and fellow economist, Ben Olken.

## Conferences

### Eighth Annual Conference in India

On January 20–23, 2007 the NBER and India's National Council for Applied Economic Research (NCAER) again brought together a group of NBER economists and about thirty economists from Indian universities, research institutions, and government departments for their eighth annual conference in India. **Mihir A. Desai** and **Martin S. Feldstein**, NBER and Harvard University, organized the conference jointly with **Suman Bery** of NCAER.

The U.S. participants were: Jagdish Bhagwati, Columbia University; Mihir A. Desai, Martin S. Feldstein, and Oliver D. Hart, NBER and Harvard University; Allan Drazen, NBER and University of Maryland; R. Glenn Hubbard, NBER and Columbia University; Kala Krishna, NBER and Pennsylvania State University; Anne O. Krueger, NBER; John Lipsky, IMF; Bruce D. Meyer, NBER and University of Chicago; Andrew K. Rose, NBER and University of California,

Berkeley; and Antoinette Schoar, NBER and MIT.

After introductory remarks about the U.S. and Indian economies by NBER President Feldstein and Bimal Jalan of NCAER, the participants discussed: globalization; trade; financial policies; growth; and governance.

Partial support for this project comes from the Institute for Financial Management and Research in India and from the Infosys Corporation.

### Twenty-second Annual Conference on Macroeconomics

The NBER's twenty-second Annual Conference on Macroeconomics, organized by NBER Research Associates Daron Acemoglu, MIT, Kenneth Rogoff, Harvard University, and Michael Woodford, Columbia University, took place in Cambridge on March 30 and 31. The program was:

**Charles Engel** and **Kenneth D. West**, University of Wisconsin and NBER, and **Nelson C. Mark**, University of Notre Dame and NBER, "Exchange Rate Models Are Not As Bad As You Think"

Discussants: Kenneth Rogoff, and Barbara Rossi, Duke University

**Kiminori Matsuyama**, Northwestern University, "Aggregate Implications of Credit Market Imperfections"

Discussants: Mark Gertler, New York University and NBER, and Nobuhiro Kiyotaki, Princeton University and NBER

**Philippe Aghion**, Harvard University and NBER, and **Ioana Marinescu**, University of Chicago, "Cyclical Budgetary Policy and Economic Growth: What Do We Learn from OECD Panel Data?"

Discussants: Ricardo J. Caballero, MIT and NBER, and Anil K Kashyap, University of Chicago and NBER

**Roberto Perotti**, Università Bocconi and NBER, "In Search of the Transmission Mechanism of Fiscal Policy"

Discussants: Ricardo Reis, Princeton University and NBER, and Valerie Ramey, University of California, San

Diego and NBER

**Jesus Fernandez-Villaverde**, Duke University and NBER, and **Juan Rubio-Ramirez**, Duke University, "How Structural Are Structural Parameters?"

Discussants: Timothy Cogley, University of California, Davis, and Frank Schorfheide, University of Pennsylvania and NBER

**Florin Bilbiie**, University of Oxford; **Fabio Ghironi**, Boston College and NBER; and **Marc Melitz**, Princeton University and NBER, "Monetary Policy and Business Cycles with Endogenous Entry and Product Variety" Discussants: Virgiliu Midrigan, Federal Reserve Bank of Minneapolis, and Julio Rotemberg, Harvard University and NBER

Standard models of exchange rates, based on macroeconomic variables such as prices, interest rates, output, and the like, are thought by many researchers to have failed empirically. **Engel**, **West**, and **Mark** present evidence to the contrary. First, they emphasize the point that "beating a random walk" in forecasting

is too strong a criterion for accepting an exchange rate model. Typically, models should have low forecasting power of this type. They then propose a number of alternative ways to evaluate models. They examine in-sample fit, but emphasize the importance of the monetary policy rule, and its effects on expectations, in deter-

mining exchange rates. Next they present evidence that exchange rates incorporate news about future macroeconomic fundamentals, as the models imply. They demonstrate that the models might well be able to account for observed exchange-rate volatility. They discuss studies that examine the response of exchange rates to

announcements of economic data. Then they present estimates of exchange-rate models in which expected present values of fundamentals are calculated from survey forecasts. Finally, they show that out-of-sample forecasting power of models can be increased by focusing on panel estimation and long-horizon forecasts.

It is widely recognized that the market economy fails to allocate credit to the most productive investment projects when credit transactions are subject to some agency problems. In the presence of such imperfections, the borrower's net worth — also known as the balance sheet condition — plays a crucial role in the allocation of credit across entrepreneurs, firms, and industries. Using the same simple and tractable model of credit market imperfections throughout, **Matsuyama** develops a unified framework within which to demonstrate how a wide range of phenomena may arise as aggregate consequences of credit market imperfections. They include, among other things, investment-specific technological changes, persistent recessions and volatility, reverse international capital flows and the rise and fall of inequality across nations, and patterns of international trade. The same framework is used to investigate some equilibrium and distributional impacts of improving the efficiency of credit markets. One recurring finding is that the properties of equilibrium often respond non-monotonically to parameter changes, suggesting that the world with imperfect credit markets looks very different not only from the world with the perfect credit market but also from the world with no credit market.

**Aghion** and **Marinescu** use yearly panel data on OECD countries to analyze the relationship between growth and the cyclicity of government debt. They develop new time-varying estimates of the cyclicity of public debt. Their main findings can be summarized as follows: 1) public debt growth has become increasingly countercyclical in most OECD countries over the past twenty years, but

this trend has been less pronounced in the EMU; 2) more financially developed, less open economies and countries under an inflation targeting regime display more countercyclical public debt growth; 3) more countercyclical public debt growth can have significantly positive effects on productivity growth, in particular when financial development is lower.

Most economists would agree that a hike in the federal funds rate will cause some slowdown in growth and inflation, and that the bulk of the empirical evidence is consistent with this statement. But perfectly reasonable economists can and do disagree even on the basic effects of a shock to government spending on goods and services: neoclassical models predict that private consumption and the real wage will fall, some neo-Keynesian models predict the opposite. **Perotti** discusses alternative time-series methodologies to identify government spending shocks and to estimate their effects. Applying these methodologies to data from the United States and three other OECD countries provides little evidence in favor of the neoclassical predictions. Using the U.S. input-output tables, he then turns to industry-level evidence around two major military buildups to shed light on the effects of government spending shocks.

**Fernandez-Villaverde** and **Rubio-Ramirez** study the following problem: how stable over time are the so-called “structural parameters” of dynamic stochastic general equilibrium (DSGE) models? To answer this question, they estimate a medium-scale DSGE model with real and nominal rigidities using U.S. data. In their model, they allow for parameter drifting and rational expectations of the agents with respect to this drift. They document that there is strong evidence that parameters change within their sample. In particular, they illustrate variations in the parameters describing the monetary policy reaction function and in the parameters characterizing the

pricing behavior of firms and households. Moreover, they show how the movements in the parameters are correlated with the evolution of inflation and are consistent with alternative sources of information. These results cast doubt on some of the justifications for the empirical implementation of DSGE models, at least in their current form.

**Bilbiie**, **Ghironi**, and **Melitz** study the role of endogenous producer entry and product creation for monetary policy analysis and business cycle dynamics in a general equilibrium model with imperfect price adjustment. Optimal monetary policy stabilizes producer prices, but lets the consumer price index vary to accommodate changes in the number of available products. The free entry condition links the price of equity (the value of products) with marginal cost and markups, and hence with inflation dynamics. No-arbitrage between bonds and equity links the expected return on shares, and thus the financing of product creation, with the return on bonds, affected by monetary policy via interest rate setting. This new channel of monetary policy transmission through asset prices restores the Taylor Principle in the presence of capital accumulation (in the form of new production lines) and forward-looking interest rate setting, unlike in models with traditional physical capital. The researchers also study the implications of endogenous variety for the New Keynesian Phillips curve and business cycle dynamics more generally, and document the effects of technology, deregulation, and monetary policy shocks, as well as the second moment properties of their model, by means of numerical examples.

These papers will appear in an annual volume published by the MIT 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.

### Athey Receives John Bates Clark Medal

NBER Research Associate Susan Athey, a professor of economics at Harvard University, received the American Economics Association's John Bates Clark Medal for 2007. The award is given every two years to the economist under the age of 40 who has made the most substantial contribution to the field of economics. She received the medal for her important contributions to economic theory, empirical economics, and econometrics. Her citation notes that, "she has built a research program

strongly focused on using theory to understand substantive economic issues, especially in industrial organization." Athey is the first woman to receive this prestigious award, and one of the younger winners.

Athey received her B.A. from Duke University in 1991 and her Ph.D. from Stanford University's Graduate School of Business in 1995. She is a member of the NBER's Programs on Aging and Industrial Organization — she became an NBER Faculty Research Fellow in 1997 and was

promoted to NBER Research Associate in 2001. Previous Clark medalists among NBER Research Associates were: Zvi Griliches, Daniel L. McFadden, Martin S. Feldstein, Joseph E. Stiglitz, James J. Heckman, Jerry A. Hausman, Sanford J. Grossman, Paul R. Krugman, Lawrence H. Summers, David Card, Kevin M. Murphy, Andrei Shleifer, Steven D. Levitt, and Daron Acemoglu.

### Program and Working Group Meetings

#### Industrial Organization

NBER's Program on Industrial Organization, directed by Nancy Rose of MIT, met on February 2 and 3 at the NBER's California office. Catherine Wolfram and Florian Zettelmeyer, both of the University of California, Berkeley and NBER, organized the meeting. These papers were discussed:

**William Adams**, Citigroup, and **Liran Einav** and **Jonathan Levin**, Stanford University and NBER, "Liquidity Constraints and Their Causes: Evidence from Subprime Lending"  
Discussant: Raj Chetty, University of California, Berkeley and NBER

**Alessandro Gavazza**, Yale University, "Asset Liquidity, Boundaries of the Firm and Financial Contracts: Evidence from Aircraft Leases"

Discussant: Mara Lederman, University of Toronto

**Massimo Massa**, INSEAD; **Jonathan Reuter**, University of Oregon; and **Eric Zitzewitz**, Stanford University, "The Rise of Anonymous Teams in Fund Management"

Discussant: Chad Syverson, University of Chicago and NBER

**Stephen Ryan**, MIT and NBER, and **Catherine Tucker**, MIT, "Heterogeneity and the Dynamics of Technology Adoption"

Discussant: Marc Rysman, Boston University

**Joseph Farrell** and **Carl Shapiro**, University of California, Berkeley, "How Strong Are Weak Patents?"

Discussant: Robert Gertner, University of Chicago

**Matt Gentzkow** and **Jesse M. Shapiro**, University of Chicago and NBER, "What Drives Media Slant? Evidence from U.S. Daily Newspapers" (NBER Working Paper No. 12707)

Discussant: Joel Waldfogel, University of Pennsylvania and NBER

**Meghan R. Busse**, University of California, Berkeley; **Duncan Simester**, MIT; and **Florian Zettelmeyer**, "The Best Price You'll Ever Get: The 2005 Employee Discount Pricing Promotions in the U.S. Automobile Industry"

Discussant: Steve Berry, Yale University and NBER

**Adams**, **Einav**, and **Levin** present new evidence on consumer liquidity constraints and the credit market conditions

that might give rise to them. Their analysis is based on unique data from a large auto sales and financing company that serves the

subprime market. They first document the role of short-term liquidity in driving purchasing behavior, including sharp increases

in demand during tax rebate season and a high sensitivity to minimum down payment requirements. They then explore the informational problems facing subprime lenders. They find that default rates rise significantly with loan size, providing a rationale for lenders to impose loan caps because of moral hazard. They also find that borrowers at the highest risk of default demand the largest loans, but the degree of adverse selection is mitigated substantially by effective risk-based pricing.

**Gavazza** uses data on aircraft leasing contracts to examine how contracting costs simultaneously shape firms' boundaries and firms' financial structure. In particular, he studies how the liquidity of the market for different types of aircraft affects the lease/own decision, the optimal maturity of lease contracts, and the mark-ups of lease rates over prices. A lease contract integrates in a single agreement the primary issues of a vertical and a financing contract, but the literatures on vertical and financial contracting make different predictions on how the liquidity of the assets should affect lease contracts. For example, more liquid aircraft are more redeployable and should then have longer financing contracts (as in Shleifer and Vishny, 1992), but are also less specific and should then have shorter vertical contracts (as in Williamson, 1979). Gavazza finds that asset liquidity affects the existing types of lease contracts differently: operating leases adhere to the predictions of the vertical contracting literature, while capital leases follow the financial contracting predictions. This suggests that the growth of operating leases over time is an additional aspect of the vertical disintegration of production.

The fraction of actively managed mutual funds that report being anonymously "team managed" increased by a factor of 4–5 between 1993 and 2004. The family's decision to use an anonymous team, or to share credit for a fund's performance with a named manager, involves tradeoffs between marketing, incentives, and rent sharing. **Massa, Reuter, and Zitzewitz** find that named-manager funds are much more likely to receive positive media mentions, have greater inflows, and earn slightly higher returns. However, departures of named managers reduce inflows, especially for funds with strong past performance, sug-

gesting that named managers enjoy greater bargaining power. Consistent with hedge funds increasing outside opportunities for managers, the researchers find that the shift to anonymous team management is more pronounced in asset classes and geographies more affected by the hedge fund boom. A decline since 2000 in the media's preference for named managers likely also contributed to the rise of anonymous teams.

**Ryan and Tucker** analyze the role of heterogeneity and forward-looking expectations in the diffusion of network technologies. Using a detailed dataset on the adoption of a new videoconferencing technology within a firm, they estimate a structural model of technology adoption and communications choice. They allow for heterogeneity in network benefits and adoption costs across agents. They develop a new "simulated sequence estimator" to measure the extent to which agents seek diversity in their calling behavior, and characterize the patterns of communication as a function of geography, job function, and rank within the firm. They find that agents differ significantly in their adoption costs and network benefits. They find that agents have significant welfare gains from having access to a diverse network, and that a policy of strategically targeting the right subtype for initial adoption can lead to a faster-growing and larger network than a policy of uncoordinated or diffuse adoption.

**Farrell and Shapiro** analyze patent licensing by a patent holder to downstream technology users. They study how the structure and level of royalties depend on the patent's strength, that is, the probability it would be upheld in court. They examine the social value of determining patent validity before licensing, in terms of deadweight loss (*ex post*) and innovation incentives (*ex ante*). When downstream users do not compete against each other or the patent holder, license fees approximate the license fee for an ironclad patent times the patent strength, and reviewing validity before licensing would be unproductive (in expected value). But when downstream users compete, two-part tariffs for weak patents have high running royalty rates, combined with a negative fixed fee, and examining patent validity generates social benefits, both *ex post* and *ex ante*. Even without nega-

tive fixed fees, rival downstream firms will accept relatively high running royalties, so determining patent validity prior to licensing is socially beneficial.

**Gentzkow and Shapiro** construct a new index of media slant that measures whether a news outlet's language is more similar to a congressional Republican or Democrat. They use the measure to study the market forces that determine political content in the news. They estimate a model of newspaper demand that explicitly incorporates slant, estimate the slant that would be chosen if newspapers independently maximized their own profits, and compare these ideal points with firms' actual choices. The analysis confirms an economically significant demand for news slanted toward one's own political ideology. Firms respond strongly to consumer preferences, which account for roughly 20 percent of the variation in measured slant in this sample. By contrast, the identity of a newspaper's owner explains far less of the variation in slant, and the researchers find little evidence that media conglomerates homogenize news to minimize fixed costs in the production of content.

During the summer of 2005, the Big Three U.S. automobile manufacturers offered a customer promotion that allowed customers to buy new cars at the discounted price formerly offered only to employees. The initial months of the promotion were record-sales months for each of the Big Three firms, suggesting that customers thought that the prices offered during the promotions were particularly attractive. In fact, many customers paid higher prices following the introduction of the employee discount promotions than they would have in the weeks just before. **Busse, Simester, and Zettelmeyer** hypothesize that the complex nature of auto prices, the fact that prices are negotiated rather than posted, and the fact that buyers do not participate frequently in the market leads customers to rely on "price cues" in evaluating how good current prices are. The researchers argue that the employee discount pricing promotions were powerful price cues, and that customers responded to the promotions as a signal that prices were discounted.



## Economic Fluctuations and Growth

The NBER's Program on Economic Fluctuations and Growth met at the Federal Reserve Bank of San Francisco on February 9. NBER Research Associates Andrew Atkeson, University of California, Los Angeles, and Robert King, Boston University, organized the meeting. The following papers were discussed:

**David Card** and **Raj Chetty**, University of California, Berkeley and NBER, and **Andrea Weber**, Institute for Advanced Studies, "Cash-on-Hand and Competing Models of Intertemporal Behavior: New Evidence from the Labor Market"  
Discussant: Robert E. Hall, Stanford University and NBER

**Jonathan Heathcote**, Georgetown University; **Kjetil Storesletten**, University of Oslo; and **Giovanni**

**L. Violante**, New York University, "Consumption and Labor Supply with Partial Insurance: An Analytical Framework"  
Discussant: Luigi Pistaferri, Stanford University

**Steven J. Davis**, University of Chicago and NBER; **R. Jason Faberman**, U.S. Bureau of Labor Statistics; and **John C. Haltiwanger**, University of Maryland and NBER, "The Establishment-Level Behavior of Vacancies and Hiring"  
Discussant: Robert Shimer, University of Chicago and NBER

**Andreas Hornstein**, Federal Reserve Bank of Richmond; **Per Krusell**, Princeton University and NBER; and **Giovanni Violante**, New York University, "Frictional Wage Dispersion in Search Models: A Quantitative

Assessment"  
Discussant: Dale T. Mortensen, Northwestern University and NBER

**Ruediger Bachmann**, Yale University; **Ricardo J. Caballero**, MIT and NBER; and **Eduardo M.R.A. Engel**, Yale University and NBER, "Lumpy Investment in Dynamic General Equilibrium"  
Discussant: Julia Thomas, Federal Reserve Bank of Philadelphia

**Dirk Krueger**, University of Pennsylvania and NBER, and **Hanno Lustig**, University of California, Los Angeles and NBER, "The Irrelevance of Market Incompleteness for the Price of Aggregate Risk"  
Discussant: John C. Heaton, University of Chicago and NBER

**Card, Chetty, and Weber** present new tests of the permanent income hypothesis and other widely used models of household behavior using data from the labor market. They estimate the excess sensitivity of job search behavior to cash-on-hand using sharp discontinuities in eligibility for severance pay and extended unemployment insurance (UI) benefits in Austria. Analyzing data for more than half a million job losers, they obtain three empirical results: 1) a lump-sum severance payment equal to two months of earnings reduces the job-finding rate by 8–12 percent on average; 2) an extension of the potential duration of UI benefits from 20 weeks to 30 weeks similarly lowers job-finding rates in the first 20 weeks of search by 5–9 percent; and 3) increases in the duration of search induced by the two programs have little or no effect on subsequent job match quality. Using a search theoretic model, the researchers show that estimates of the relative effect of severance pay and extended benefits can be used to calibrate and test a wide set of intertemporal models. Their estimates of this ratio are inconsistent with the predictions of

a simple permanent income model, as well as naive rule-of-thumb behavior. The representative job searcher in this dataset is 70 percent of the way between the permanent income benchmark and credit-constrained behavior in terms of sensitivity to cash-on-hand.

**Heathcote, Storesletten, and Violante** develop an analytical framework to study consumption and labor supply in a rich class of heterogeneous-agent economies with incomplete markets. The environment allows for trade in non-contingent and state-contingent bonds, for permanent and transitory idiosyncratic productivity shocks, and for permanent preference heterogeneity and idiosyncratic preference shocks. Exact closed-form solutions are obtained for equilibrium allocations and for the first and second moments of the equilibrium joint distribution over wages, hours, and consumption. With these expressions in hand, the authors show that all the structural preference and risk parameters in the model can be identified, even when productivity risk varies over time, given panel data on wages and hours, and cross-sectional data on con-

sumption. They structurally estimate the model on data for the U.S. economy for the period 1967–96. They then use the estimated parameter values to decompose inequality in all variables of interest, both over the life-cycle and across time, into cross-sectional variation in preferences, uninsurable wage risk, insurable wage risk, and measurement error.

Search models are widely applied to the study of unemployment, worker turnover, wage dispersion, and other labor market phenomena. These models afford a central role to the concept of a job vacancy, but most of the evidence on vacancies is confined to aggregate outcomes. In contrast, **Davis, Faberman, and Haltiwanger** study vacancies, hires, and vacancy *yields* (success rates in generating hires) at the establishment level using the BLS Job Openings and Labor Turnover Survey, a large representative sample of U.S. employers. They show that the vacancy yield moves countercyclically but rises with employer growth in the cross section. They also develop a stock-flow accounting framework that identifies the average job-filling rate for vacant positions, the monthly flow of

new vacancies, and the frequency of hires without a reported vacancy. The job-filling rate is counter-cyclical, varies by a factor of three across major industry groups, declines steeply with employer size, and rises sharply with employer growth in the cross section. These results suggest that at least 36 percent of hires occur without a prior vacancy.

Standard search and matching models of equilibrium unemployment, once properly calibrated, can generate only a small amount of frictional wage dispersion, that is wage differentials, among ex-ante similar workers induced purely by search frictions. **Hornstein, Krusell, and Violante** derive this result for a specific measure of wage dispersion: the ratio between the average wage and the lowest (reservation) wage paid. They show that in a large class of search and matching models this statistic can be obtained in closed form as a function of observable variables (that is, interest rate, value of leisure, and statistics of labor market turnover). Looking at various independent data sources suggests that, empirically, residual wage dispersion (that is, inequality among observationally similar

workers) exceeds the model's prediction by a factor of 20. The authors discuss three extensions of the model (risk aversion, volatile wages during employment, and on-the-job search) and find that, in their simplest version, they can improve its performance, but only modestly. They conclude that either frictions account for a tiny fraction of residual wage dispersion, or the standard model needs to be augmented to confront the data.

**Bachmann, Caballero, and Engel** note that microeconomic lumpiness matters for macroeconomics. According to their model, it explains roughly 60 percent of the smoothing in the investment response to aggregate shocks. The remaining 40 percent is explained by general equilibrium forces. The central role played by micro frictions for aggregate dynamics results in important history dependence in business cycles. In particular, booms feed into themselves. The longer an expansion, the larger the response of investment to an additional positive shock. Conversely, a slowdown after a boom can lead to a long lasting investment slump, which is unresponsive to policy stimuli. Such dynamics

are consistent with U.S. investment patterns over the last decade. More broadly, over the 1960–2000 sample, the initial response of investment to a productivity shock with responses in the top quartile is 60 percent higher than the average response in the bottom quartile.

**Krueger and Lustig** note that in models with a large number of agents who have constant relative risk aversion preferences, the absence of insurance markets for idiosyncratic labor income risk has no effect on the premium for aggregate risk if the distribution of idiosyncratic risk is independent of aggregate shocks. In spite of the missing markets, a representative agent who consumes aggregate income will correctly price the excess returns on stocks. This result holds regardless of the persistence of idiosyncratic shocks, as long as they are not permanent, even when households face binding, and potentially very tight borrowing constraints. Consequently, in this class of models there is no link between the extent of self-insurance against idiosyncratic income risk and aggregate risk premia.

## Working Group on National Security

The NBER's Working Group on National Security, directed by NBER President Martin Feldstein of Harvard University, met in Cambridge on February 22. These papers were discussed:

**Benjamin F. Jones**, Northwestern University and NBER, and **Benjamin A. Olken**, Harvard University and NBER, "Hit or Miss? The Effects of Assassinations on Institutions and War"

**Todd Sandler**, University of Texas, and **Walter Enders**, University of Alabama,

"Economic Consequences of Terrorism on Developed and Developing Countries: An Overview"

**Brent Neiman**, Harvard University, and **Phillip Swagel**, U.S. Treasury Department, "The Impact of Post 9/11 Visa Policies on Travel to the United States"

**Sandeep Baliga**, Northwestern University, and **Tomas Sjostrom**, Rutgers University, "Strategic Ambiguity and Arms Proliferation"

**Stephen I. Miran**, Harvard University, "Budget Rules and Defense: Evidence from the EU"

**Joseph Cullen**, University of Arizona, and **Price V. Fishback**, University of Arizona and NBER, "Did Big Governments Largesse Help the Locals? The Implications of WWII Spending for Local Economic Activity, 1939–1958" (NBER Working Paper No. 12801)

Assassinations are a persistent feature of the political landscape. Using a new dataset of attempts on the lives of all world leaders from 1875 to 2004, **Jones**

and **Olken** exploit the inherent randomness in the success or failure of those attempts to identify the effects of assassinations. They find that, on average, suc-

cessful assassinations of autocrats produce sustained moves toward democracy. They also find that assassinations affect the duration and intensity of small-scale con-

flicts. These results suggest that individual leaders play key roles in shaping institutions and conflict, and that small sources of randomness, such as perturbations in the path of a single bullet, can have a pronounced effect on history.

The paper by **Sandler** and **Enders** has four purposes. First and most importantly, it takes stock of the literature on the economic consequences of terrorism and evaluates the methodology used to date. The literature dates back to the early 1990s, with most of the contributions coming after 9/11. Second, it distinguishes the macroeconomic influences of terrorism from the microeconomic sector- or industry-specific effects. Third, it contrasts terrorism's effects in developed countries with those in developing countries. Fourth, it indicates how researchers can better account for terrorism's economic consequences in developing countries. A basic message of the research is that rich diversified economies are well-equipped to suffer terrorism attacks with little consequences attributable to transference of activities, security responses, and monetary and fiscal policies. Small developing economies are more prone to terrorism.

**Neiman** and **Swagel** examine the impact of post-9/11 changes in visa and security policy on business and leisure travel to the United States. American businesses, tourism industry representatives, and politicians pointed to changes in visa policies as leading to a sharp decline in short-term visitors following the September 11 attacks. Several foreign governments likewise complained that

visa requirements and other security measures were making it difficult for their citizens to travel to the United States. Using an empirical model that distinguishes the impact of visa policy from economic and country-specific factors, the researchers find that changes in visa policy are not associated with a decrease in travel to the United States. Rather, the reduction in entries was largest among travelers who were not required to obtain a visa.

**Baliga** and **Sjostrom** study the impact of strategic ambiguity on arms proliferation and the probability of conflict. Strategic ambiguity is a substitute for actually acquiring new weapons: ambiguity reduces the incentive for a small power to invest in a weapons program, which reduces the risk of arms proliferation. Therefore, strategic ambiguity tends to benefit a big power. On the other hand, strategic ambiguity may hurt the small power because it does not always protect it from an attack. Cheap-talk messages can be used to trigger inspections when they are most valuable to the big power. To preserve incentive compatibility, the "tough" messages that make inspections more likely must imply a greater risk of arms proliferation.

**Miran** investigates whether the debt limits imposed by the Stability & Growth Pact (SGP) affected defense spending, using three occasions on which changes in defense spending would be expected to occur: the 1999 adoption of the SGP, the 2001 War in Afghanistan, and the 2003 War in Iraq. He finds that deficit constraints have a negative and statistically significant association with defense

spending, on the magnitude of 0.2-0.4 percent of GDP. Use of the 1990 Gulf War as a placebo treatment when the SGP did not exist suggests that the same group of countries react to similar circumstances in a different way in the presence of the SGP than they do in its absence.

**Cullen** and **Fishback** examine whether local economies that were the centers of federal spending on military mobilization experienced more rapid growth in consumer economic activity than other areas. They rely on combined information from a wide variety of sources that allows them to estimate a reduced-form relationship between retail sales per capita growth (1939-48, 1939-54, 1939-58) and federal war spending per capita from 1940 through 1945. The results show that the World War II spending had virtually no effect on the growth rates in consumption that they examined. This contrasts with Fishback, Horrace, and Kantor's (2005) findings of about half a dollar increase in retail sales in 1939 associated with a dollar of New Deal public works and relief spending during the 1930s. Several factors contributed to this relative lack of impact. World War II spending often required a conversion of plants designed for civilian good production into military factories and back again over the nine-year period. Substantially higher federal tax rates paid by the majority of households imposed much stronger fiscal drags on the benefits of the spending. Finally, less of the military spending was earmarked for wages and use of locally produced inputs, which reduced the direct stimulus to the local economy.

## Law and Economics

The NBER's Program on Law and Economics met in Cambridge on March 2. Program Director Christine M. Jolls of Yale Law School organized the meeting. These papers were discussed:

**Louis Kaplow**, Harvard Law School and NBER, "Optimal Policy with Heterogeneous Preferences"  
Discussant: Chris Sanchirico, University of Pennsylvania School of Law

**Abraham Wickelgren**, Northwestern University School of Law, "The Economics of Constitutional Rights and Voting Rules"  
Discussant: Joshua Fischman, Tufts University

**Benjamin E. Hermalin**, University of California, Berkeley, and **Michael S. Weisbach**, University of Illinois and

NBER, "Transparency and Corporate Governance" (NBER Working Paper No. 12875)  
Discussant: Nicola Persico, New York University and NBER

**Steven Shavell**, Harvard Law School and NBER, "On Optimal Legal Change, Past Behavior, and Grandfathering"  
Discussant: Christopher Snyder, Dartmouth College

**Edward Morrison**, Columbia Law School, "Bargaining Around Bankruptcy: Small Business Distress and State Law"  
Discussant: Albert Choi, University of Virginia School of Law

**Christopher Avery** and **Alvin E. Roth**, Harvard University and NBER;

**Christine M. Jolls**; and **Richard A. Posner**, United States Court of Appeals, "The New Market for Federal Judicial Law Clerks"  
Discussant: Betsey Stevenson, Wharton School, University of Pennsylvania

**Jesse Rothstein**, Princeton University and NBER, and **Albert H. Yoon**, Northwestern University School of Law "Affirmative Action in Law School Admissions: What Do Racial Preferences Do?" and "Mismatch in Law School"  
Discussant: Justin Wolfers, Wharton School, University of Pennsylvania

**Suzanne Scotchmer**, University of California, Berkeley and NBER, "Risk Taking and Gender in Hierarchies"  
Discussant: Ian Ayres, Yale Law School and NBER

Optimal policy rules—including those regarding income taxation, commodity taxation, public goods, and externalities—are typically derived in models with preferences that are homogeneous. **Kaplow** reconsiders many central results for the case in which preferences for commodities, public goods, and externalities are heterogeneous. When preference differences are observable, standard second-best results in basic settings are unaffected, except those for the optimal income tax. Optimal marginal income tax rates may be higher or lower on types who derive more utility from various goods, depending on the nature of preference differences and the concavity of the social welfare function. When preference differences are unobservable, all policy rules may change. The determinants of even the direction of optimal rule adjustments are many and subtle.

Constitutions typically specify that some laws require greater levels of support to pass than others. Laws that overturn protected constitutional rights, for example, are much harder to pass than are most other laws. **Wickelgren** analyzes how the characteristics of a law influence how much sup-

port the law should have in order to pass. He shows that while the expected total benefit from a law should not affect the optimal vote share required for passage, the dispersion in gains and losses should. The fraction of winners from a law has a non-monotonic effect on the optimal vote share. These results can help one understand what "rights" deserve constitutional protection and what "rights" do not.

An objective of many proposed corporate governance reforms is increased transparency. This goal has been relatively uncontroversial, as most observers believe that increased transparency is unambiguously good. **Hermalin** and **Weisbach** argue that, from a corporate governance perspective, there are likely to be both costs and benefits to increased transparency, leading to an optimum level beyond which increasing transparency lowers profits. This result holds even when there is no direct cost of increasing transparency and no issue of revealing information to regulators or product-market rivals. The researchers show that reforms that seek to increase transparency can reduce firm profits, raise executive compensation, and inefficiently

increase the rate of CEO turnover. They further consider the possibility that executives will take actions to distort information. They show that executives could have incentives, because of career concerns, to increase transparency and that increases in penalties for distorting information can reduce profit.

When is it socially advantageous for legal rules to be changed in the light of altered circumstances? In answering this basic question, **Shavell** develops a simple point—that past compliance with legal rules tends to reduce the social advantages of legal change. The reasons are twofold: adjusting to a new legal rule often involves costs; and the social benefits of change are frequently only incremental, only in addition to those of past compliance. The general implications are that legal rules should be more stable than would be appropriate were the relevance of past behavior not recognized, and that a policy of grandfathering, namely, of permitting noncompliance, should sometimes be employed. The analysis of these points is general, applying across legal fields, often explaining what we observe but also indicating possibilities for

reform, such as in the regulation of air pollution. The analysis is related to the conventional reliance-based justification for the stability of the law and to the literature on legal transitions.

Discussions of small-business bankruptcy typically focus on the United States Bankruptcy Code. But few failing small businesses – around 20 percent – use federal law to reorganize or liquidate. Most use *state insolvency laws* for these purposes. State laws include foreclosures, bulk sales, and assignments for the benefit of creditors. Relative to federal law, these procedures are often faster, more private, and less costly to the debtor and its senior creditors. The procedures vary substantially by state in the protection offered to creditors. **Morrison** documents the interplay between state and federal bankruptcy law and how this dynamic varies by state. Drawing on two datasets—state-level data from public records and firm-level data from Dun & Bradstreet records—he shows that failing small business corporations and their senior creditors bargain around federal law. Because a debtor needs senior creditor consent to invoke many state procedures, a bankruptcy filing occurs only when the senior creditor distrusts the debtor and withholds consent. Morrison shows that a small business corporation is more likely to use bankruptcy law if it is encumbered by secured debt or tax liens and if it has defaulted or otherwise impaired its relationship with senior creditors. State procedures are more common in states with regulations that promote the transparency of the insolvency process and give senior lenders leverage to attack insider self-dealing. These findings suggest that any reform of federal bankruptcy law will have two effects: it will affect outcomes in federal courts (*intensive margin*) and the debtor's choice between state and federal procedures (*extensive margin*). Variation along the extensive margin can neutralize reforms in federal law, as when a reform designed to protect unsecured creditors induces businesses to use less protective state procedures instead. The findings in this paper also raise questions about the appropriate balance between state and federal law. The primary function of the Code is to serve as a backstop when bargaining fails, but state

law could better serve the same function. The optimal balance between state and federal law, then, may be one that gives states greater authority to regulate small business bankruptcy.

In the past, judges have often hired applicants for judicial clerkships as early as the beginning of the second year of law school, for positions commencing approximately two years down the road. In the new hiring regime for federal judicial law clerks, by contrast, judges are exhorted to follow a set of start dates for considering and hiring applicants during the fall of the third year of law school. Using the same general methodology as they employed in a study of the market for federal judicial law clerks conducted in 1998–2000, **Avery, Jolls, Posner, and Roth** have broadly surveyed both federal appellate judges and law students about their experiences of the new market for law clerks. This article analyzes their findings within the prevailing economic framework for studying markets with tendencies toward “early” hiring—a framework they both draw upon and modify in the course of their analysis. The data make clear that the movement of the clerkship market back to the third year of law school is highly valued by judges, but the authors also find that a strong majority of the judges responding to their surveys concluded that non-adherence to the specified start dates is very substantial—a conclusion the authors are able to corroborate with specific quantitative data from both judge and student surveys. The consistent experience of a wide range of other markets suggests that such non-adherence in the law clerk market will lead to either a reversion to very early hiring or the use of a centralized matching system such as that used for medical residencies. The authors suggest, however, potential avenues by which the clerkship market could stabilize at something like its present pattern of mixed adherence and non-adherence, thereby avoiding the complete abandonment of the current system.

**Rothstein and Yoon** examine the so-called “mismatch” hypothesis in the context of law school admissions. They discuss what sort of evidence might support or work against claims of mismatch effects. Using two data sources and their preferred approach, they find that claims of the mis-

match hypothesis are significantly overstated, particularly with respect to employment outcomes. Nevertheless, the data are consistent with some mismatch, concentrated among the students with the lowest entering credentials. To put these estimates in context, they simulate the elimination of affirmative action. This would lead to drastic reductions in the number of black law school matriculants, particularly at the most selective schools, without managing to eliminate mismatch between black and white students. This magnitude of the displacement dominates that of mismatch, so elimination of preferences would dramatically reduce the number of practicing black lawyers.

In their second paper, the same authors use two comparisons to identify so-called “mismatch” effects in law schools, with consistent results. There is no evidence of mismatch effects on graduation or bar passage rates of black students above the bottom quintile of the entering credentials distribution. The data are consistent with mismatch effects for bottom-quintile black students but do not demonstrate the importance of these effects, as sample selection bias is a potentially important confounding factor in this range. There is no evidence from any comparison of mismatch effects on employment outcomes.

If promotion in a hierarchy is based on a random signal of ability, then rates of promotion are affected by risk taking. Further, the statistical properties of the surviving populations of risk takers and non-risk takers will be different, and will be changing throughout the hierarchy. **Scotchmer** defines promotion hierarchies with and without memory, where memory means that promotion depends on the entire history of success. In both types of hierarchies, surviving risk takers have lower average ability than surviving non-risk takers at any stage where they have a higher probability of survival. However, that will not apply in the limit. With a common set of promotion standards, risk takers will survive with lower probability than non-risk takers, and will have higher average ability. Scotchmer gives several interpretations for how these theorems relate to affirmative action, in light of considerable evidence that males are more risk taking than females.

## Development of the American Economy

The NBER's Program on the Development of the American Economy met in Cambridge on March 3. Program Director Claudia Goldin of Harvard University organized the meeting. These papers were discussed:

**Richard C. Sutch**, University of California, Riverside, and NBER, "Henry Agard Wallace, the Iowa Corn Tests, and the Adoption of Hybrid Corn: American Corn Yields, 1866–2002"

**Martha J. Bailey**, University of Michigan and NBER, "Momma's Got the Pill"

**Richard H. Steckel**, Ohio State University and NBER, and **John J. Wallis**, University of Maryland and NBER, "Stones, Bones, and States: A New Approach to the Neolithic Revolution"

**Howard Bodenhorn**, Lafayette College and NBER, "Partnership, Entity

Shielding, and Credit Availability"

**William O. Brown, Jr.**, University of North Carolina, Greensboro; **J. Harold Mulherin**, University of Georgia; and **Marc D. Weidenmier**, Claremont McKenna College and NBER, "Competing with the NYSE"

**Frank Levy**, MIT, and **Peter Temin**, MIT and NBER, "Inequality and Institutions in Twentieth Century America"

**Sutch**, in his paper, makes the following claims: First, there was *not* an unambiguous yield advantage of hybrid corn over the open-pollinated varieties in 1935. Rather, the early adoption of hybrid corn can better be explained 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. The early adopters of hybrid seed were followed by later adopters because 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. The biological revolution in corn was not a unique phenomenon. Sutch finds remarkably similar "hockey stick graphs" for the yields per acre in cotton, wheat, tobacco, oats, potatoes, and barley. The synthesis of ammonia and the resulting increase in the use of commercial fertilizers are the more likely sources of the increase in yields of so many other crops during this period.

The 1960s ushered in a new era in U.S. demographic history, characterized by rising ages at first marriage and first birth and sharp reductions in family size. The importance of the birth control pill in this transition, released for the regulation of menses in 1957 and approved for use as a contraceptive in 1960, has found little support in the empirical literature.

**Bailey** develops a new empirical strategy to quantify the importance of oral contraception in married women's fertility decisions, using cross-state variation in the restrictiveness of anti-obscenity statutes. Her estimates suggest that laws restricting the sales of birth control during the 1960s decreased the use of oral contraception and increased birth rates among married women.

The rise of agriculture and the emergence of towns and cities transformed human activities and marked the beginning of modern society. Social scientists have constructed various explanations on thin reeds of evidence, which can be placed into exogenous and endogenous categories, such as climate change and over-hunting of a common property resource. **Steckel** and **Wallis** review these explanations and consider new evidence that shows that urban living was less healthy but also considerably less violent than that found among hunter-gatherers. Drawing upon the theory of the natural state, in which the political system manipulates economic privilege to create social order, their explanation is consistent with evidence that new methods of social organization accompanied, and may even have preceded the rise of agriculture. They argue that Neolithic societies preferred urban living built on farming, despite a lower physical standard of living, because new methods of organization created social order, enforced prop-

erty rights, and reduced violence.

Legal and economic historians have long placed corporate limited liability as the central innovation in organizational law. Without it, the modern industrial firm would not have appeared. An emergent "entity" literature, while not dismissing the importance of limited liability, focuses instead on a firm's ability to shield itself from the personal creditors of its owners. One implication of the entity approach is that firms that could shield their assets from claims of personal creditors should have received credit on better terms than firms not afforded the legal separation of business and personal assets. **Bodenhorn** shows that entity shielding was important. Partnerships and corporations accessed larger pools of credit on better terms than proprietorships. Entity shielding was as important an innovation as limited liability in the evolution of the modern firm.

The NYSE's recent merger with Archipelago and the proposed merger between the NYSE and Euronext raise many questions about the effects of competition between stock exchanges. **Brown**, **Mulherin**, and **Weidenmier** examine the largely forgotten, but unparalleled episode of competition between the New York Stock Exchange (NYSE) and the Consolidated Stock Exchange of New York (Consolidated) from 1885 to 1926. The ratio of Consolidated to NYSE volume averaged 40 percent and reached as

high as 60 percent from 1885 to 1895. The Consolidated averaged 23 percent of NYSE volume for approximately forty years by operating a second market for the most liquid securities that traded on the Big Board. These results suggest that NYSE bid-ask spreads fell by more than 10 percent when the Consolidated began to trade NYSE stocks and subsequently increased when the Consolidated ceased operations. The Consolidated brought innovations to Wall Street including the establishment of a clearinghouse to increase the transparency of financial transactions and odd-lot trading. The stock market rivalry also played an impor-

tant role in the development of the NY Curb Market (American Stock Exchange). This suggests that: 1) the NYSE has faced significant competition; 2) competition reduces bid-ask spreads; and 3) competition between exchanges may improve investor welfare by encouraging institutional innovations.

**Levy and Temin** provide a comprehensive view of the worsening income distribution in the United States, contrasting conditions since 1980 with those in earlier postwar years and arguing that income distribution in each period was strongly shaped by a set of economic institutions. The postwar years were

dominated by unions, the negotiating framework set in the *Treaty of Detroit*, progressive taxes, and other government regulations, including a high minimum wage that pushed toward income equality. More recent years have been characterized by reversals in all these dimensions, in an institutional pattern known as the *Washington Consensus*. Other explanations for income disparities including skill-biased technical change and international trade are seen as factors operating within this broader institutional story.

## Entrepreneurship

The NBER's Working Group on Entrepreneurship met in Cambridge on March 9. The Group's Director Josh Lerner of the Harvard Business School organized the meeting. These papers were discussed:

### *Revisionist Views of the Technology Bubble*

**Brent Goldfarb** and **David Kirsch**, University of Maryland; and **David A. Miller**, University of California, San Diego, "Was There Too Little Entry in the Dot Com Era?"  
Discussant: Shane Greenstein, Northwestern University and NBER

**Lubos Pastor** and **Pietro Veronesi**, University of Chicago and NBER, and **Lucian Taylor**, University of Chicago,

"Entrepreneurial Learning, the IPO Decision, and the Post-IPO Drop in Firm Profitability" (NBER Working Paper No. 12792)

Discussant: Ivo Welch, Brown University and NBER

### *Capital Constraints Revisited*

**Kaivin Munshi**, Brown University and NBER, "From Farming to International Business: The Social Auspices of Entrepreneurship in a Growing Economy"

Discussant: Asim Ijaz Khwaja, Harvard University

**Asli Demirgüç-Kunt** and **Leora Klapper**, The World Bank, and **Georgios Panos**, University of Aberdeen Business School, "The Origins

of Self-Employment"

Discussant: Simon Johnson, MIT and NBER

### *The Growth and Evolution of Entrepreneurship in Emerging Markets*

**William Kerr**, Harvard University, and **Ramana Nanda**, MIT, "Banking Deregulation, Financing Constraints and Entrepreneurship"

Discussant: Phil Strahan, Boston College and NBER

**Camilo Mondragon-Velez**, Georgetown University, "The Transition to Entrepreneurship: Human Capital, Wealth and the Role of Liquidity Constraints"

Discussant: Francisco Buerra, Northwestern University

**Goldfarb, Kirsch, and Miller** present four stylized facts about the Dot Com Era: 1) there was a widespread belief in a "Get Big Fast" business strategy; 2) the increase and decrease in public and private equity investment was most prominent in the internet and information technology sectors; 3) the survival rate of dot com firms is on a par with, or higher than, other emerging industries; and 4) firm survival is independent of

private equity funding. To connect these findings, the researchers offer a herding model that accommodates a divergence between the information and incentives of venture capitalists and their investors. The Get-Big-Fast belief may have led to overly focused investment in too few internet startups and, as a result, too little entry, they conclude.

**Pastor, Veronesi, and Taylor** develop a model in which an entrepreneur

learns about the average profitability of a private firm before deciding whether to take the firm public. In making this decision, the entrepreneur trades off the diversification benefits of going public against the benefits of private control. Their model predicts that firm profitability should decline after the IPO, on average, and that this decline should be larger for firms with more volatile profitability and firms with less

uncertain average profitability. A sample of 7,183 IPOs in the United States between 1975 and 2004 empirically support these predictions.

Traditionally, entrepreneurship has been concentrated in the hands of a few small communities in most developing economies. As these economies restructure, it is evident that they will be unable to satisfy the increased demand for new entrepreneurs. **Munshi** suggests that under some circumstances new business networks will compensate for the weak family background of first-generation entrepreneurs, supporting occupational mobility even in industries with significant barriers to entry. Using new firm-level data on the Indian diamond industry, he documents the important role played by an underlying community network in the expansion from agriculture to international business in one historically disadvantaged community over the course of a single generation.

**Demirgüç-Kunt, Klapper,** and **Panos** examine the factors affecting the transition to self-employment in Bosnia and Herzegovina, using a panel household survey for the years 2001-4. The study represents a unique case in that, in the early period of the panel (2000-1), the country changed its legal framework concerning labor regulation and the business environment. The primary aim of that change was to promote labor market flexibility and to encourage entre-

preneurial activity. The data allow the researchers to directly identify individuals who switched to self-employment during the sample period and to examine the viability of this transition, in terms of business survival for more than one year. Their results suggest an important role for financing constraints. Specifically, wealthier households are more likely to become entrepreneurs and to survive in self-employment. Also, having an existing bank relationship increases the chances of survival for the new entrepreneur. In contrast, overseas—and in some cases domestic—remittances significantly decrease the likelihood of becoming an entrepreneur. Interestingly, NGO- and government-supported programs that provide grants and transfers to promote entrepreneurship seem to have worked not only in promoting entrepreneurship but also to success, filling an important financing gap in the absence of more developed formal financial institutions. Finally, people working in the informal sector are more likely to become entrepreneurs and are significantly more likely to survive.

Using establishment-level data from the U.S. Census Bureau's Longitudinal Business Database, **Kerr** and **Nanda** study how U.S. branch banking deregulation affected the entry of new firms in the non-financial sector. The comprehensive microdata allow them to study how the entry rate and the distribu-

tion of entry size for new startups both responded to changes in banking competition. Moreover, they can distinguish the relative effect of the policy reforms on the entry of startups as compared to the opening of new establishments by existing firms. They find that interstate banking deregulation had a strong positive effect on the birth of new firms relative to the facility expansions of existing firms. There is limited evidence that the intrastate banking deregulations influenced entry. These results have implications for existing theories of financial constraints for entrepreneurs, as well as for research looking at the effect of banking competition on the efficient allocation of capital.

**Mondragon-Velez** estimates a life-cycle model of occupational choice that includes human capital heterogeneity; it generates a flat transition-probability profile with respect to wealth. However, he shows that the shape of this aggregate relationship cannot be interpreted as evidence of the lack of liquidity constraints in the economy; rather, it is a result of the optimal decisions of agents with different levels of human capital and assets within a cross-section. Moreover, quantitative analysis suggests that higher credit constraints better characterize the data for the U.S. economy. Altogether, the results in this paper imply that wealth is a key element of the occupational decision at the individual level.



## Productivity Program Meeting

The NBER's Productivity Program met in Cambridge on March 9. Program Director Ernst R. Berndt of MIT organized the meeting. The program was:

**Sinan Aral**, MIT; **Erik Brynjolfsson**, MIT and NBER; and **Marshall Van Alstyne**, Boston University, "Information Technology and Information Worker Productivity: Task Level Evidence"  
Discussant: Susan Helper, Case Western Reserve University and NBER

**Nick Bloom**, Stanford University and NBER, "The Impact of Uncertainty Shocks: A Firm-Level Estimation and a 9/11 Simulation"  
Discussant: Susanto Basu, Boston College and NBER

**Timothy Erickson**, Bureau of Labor Statistics, and **Ariel Pakes**, Harvard University and NBER, "An Experimental Component Index for the CPI: From Annual Computer Data to the Monthly Data on Other Goods"  
Discussant: Jack Triplett, Brookings Institution

**James Adams**, Rensselaer Polytechnic Institute and NBER: Announcement of the NBER-RPI Scientific Papers Database

"Recent US Productivity Growth: A One-Time Blip or Sustainable?" — a panel discussion moderated by Ernst R. Berndt — presentations by: **Kevin J. Stiroh**, Federal Reserve Bank of New York, and **Dale W. Jorgenson**, Harvard

University, "A Retrospective Look at the U.S. Productivity Growth Resurgence"; **Daniel Sichel**, Federal Reserve Board; **Robert J. Gordon**, Northwestern University and NBER, "Exploding Productivity Growth: Context, Causes, and Implication"; and **Barry Bosworth** and **Jack Triplett**, Brookings Institution, "The 21st Century Productivity Expansion Is STILL in Services"

**Liran Einav**, Stanford University and NBER, and **Aviv Nevo**, Northwestern University and NBER, "Errors in Self-Reported Data: A Cross-Validation of Homescan Data"  
Discussant: Alvin J. Silk, Harvard University

In an effort to reveal the fine-grained relationships between IT use, patterns of information flows, and individual information-worker productivity, **Aral**, **Brynjolfsson**, and **Alstyne** study task-level practices at a midsize executive recruiting firm. They analyze both project-level and individual-level performance using: 1) detailed accounting data on revenues, compensation, project completion rates, and team membership for over 1300 projects spanning five years; 2) direct observation of over 125,000 e-mail messages over a period of ten months by individual workers; and 3) data on a matched set of the same workers' self-reported IT skills, IT use, and information sharing. These detailed data allow the researchers to econometrically evaluate a multistage model of production and interaction activities at the firm, and to analyze the relationships among key technologies, work practices, and output. They find that: IT use is positively correlated with non-linear drivers of productivity. Further, the structure and size of workers' communication networks are highly correlated with performance. There is also an inverted-U shaped relationship between multitasking and productivity such that, beyond an optimum, more multitasking is

associated with declining project completion rates and revenue generation. Finally, asynchronous information seeking — such as email and database use — promotes multitasking, while synchronous information seeking over the phone is negatively correlated with multitasking. Overall, these data show statistically significant relationships among technology use, social networks, completed projects, and revenues for project-based information workers. The results are consistent with simple models of queuing and multitasking, and these methods can be replicated in other settings, suggesting new frontiers for IT value and social network research.

Uncertainty appears to vary strongly over time, temporarily rising by up to 200 percent around major shocks like the Cuban Missile crisis, the assassination of JFK, and 9/11. **Bloom** offers the first structural framework to analyze uncertainty shocks. He builds a model with a time-varying second moment, which he solves numerically and estimates using firm-level data. He then uses the parameterized model to simulate a macro *uncertainty* shock, which produces a rapid drop and rebound in employment, investment, and productivity growth, and a moderate loss in GDP. The

temporary impact of a second-moment shock is different from the typically persistent impact of a first-moment shock, highlighting for policymakers the importance of identifying the relative magnitudes in major shocks. Comparing the simulation of an uncertainty shock to the VAR estimations on monthly data and a 9/11 event-study, Bloom finds that both display a surprisingly good match.

The BLS staff recently increased the rate at which they incorporate techniques to correct for selection effects into their component indexes. However, their work — and the work of other researchers — shows very little difference between hedonic and matched-model indices for certain components of the CPI. **Erickson** and **Pakes** explore why. They look carefully at the component index for TVs and show that differences between the TV and computer markets, together with the fact that the BLS data are high frequency, make it necessary to use a more general hedonic correction procedure than has been used to date. The computer market is special in that it has both well defined cardinal measures of the major product characteristics and "exiting" goods which have relatively low values. In markets where such mea-

asures are absent and where turnover can be at the high-quality end, one needs to allow for selection on unmeasured, as well as measured, characteristics. Also, in high frequency data one needs to correct for differential “sticky price” rates among different goods. The researchers develop an hedonic selection correction that accounts for these phenomena; they show that, when applied to TVs, it yields much larger selection corrections. In particular, they find that matched-model techniques underestimate the rate of price decline by over 20 percent. When they apply the BLS’s correction algorithm to their data, they find that it does generate a substantial correction to the matched-model index, but one of only 7.8 percent. Moreover, the BLS staff’s recent successful push to modernize their data gathering procedures has made it possible to compute the researchers’ index within the BLS’s time constraints, making it a real-time alternative to current procedures.

It is now widely recognized that information technology (IT) was critical to the dramatic acceleration of U.S. labor productivity growth in the mid-1990s. The paper by **Jorgenson, Stiroh, and Mun S. Ho** traces the evolution of productivity estimates to document how and when this perception emerged. Early studies concluded that IT was relatively unimportant. It was only after the massive IT investment boom of the late 1990s that this investment and underlying productivity increases in the IT-producing sectors were identified as important sources of growth. Although IT has diminished in significance since the dot-com crash of 2000, these researchers project that private-sector productivity growth will average around 2.5 percent per year for the next decade, only moderately below the average of the post-1995 period.

**Sichel** presented some preliminary results based on aggregate data from a paper with Steve Oliner and Kevin Stiroh. That paper looks back at the past ten years of U.S. productivity performance in light of recent critiques of the standard growth accounting methodology that lies at the heart of many analyses of productivity. Specifically, the paper augments the standard framework to account for adjustment costs for capital investment, variable

factor utilization, and the role of intangible capital. Regarding intangibles, the paper extends the work of Basu, Fernald, Oulton, and Srinivasan (2003) to develop a new measure of intangible investment and capital related to information technology. Qualitatively, the new measures exhibit a pattern over time similar to that generated by other research (for example, see Corrado, Hulten, and Sichel, 2006). As for the role of information technology (IT), after augmenting the standard growth accounting framework to take these critiques on board, IT still was a key driver of the pickup in labor productivity growth over 1995–2000; since 2000, IT played a smaller, but still sizable, role. As for the continuing strength in the growth of labor and multifactor productivity since 2000, augmenting the standard framework alters the time profile of productivity growth since 1995. Specifically, taking on board the critiques—especially, the inclusion of intangibles—makes the gains over 1995–2000 larger and takes some of the luster off the performance since 2000. As for the outlook for productivity growth, Sichel discussed the crosscurrents affecting U.S. productivity performance, including cyclical dynamics, technical progress, and demand for new IT applications.

**Gordon** discusses his research which has three goals. The first is to forecast growth in U.S. potential real GDP, not for the full 75-year horizon of the Social Security trustees, but for the more modest but still daunting span of the next two decades. He brings together recent research, both about productivity and about the likely future behavior of the other four factors, especially population growth, that matter for potential output growth. The need to predict future population growth in turn requires an exploration of the determinants of trends in fertility and mortality rates, as well as the likely future trend of net immigration into the United States. The second goal of his paper, connected closely with the first, is to interpret the extraordinary productivity performance of the United States since 1995 and especially since mid-2000. Far from slowing in response to the 2001 recession and the collapse of investment in information and communications technol-

ogy (ICT) after mid-2000, growth in labor productivity actually accelerated from an average of 2.56 percent a year between 1995:4 and 2000:2 to 3.46 percent a year between 2000:2 and 2003:2. Should a forecast of future productivity growth use as its precedent the average behavior of actual productivity growth over the past two years, the past eight years, or some longer interval? The third goal of the paper, related to the first two, is to provide a new breakdown of past U.S. economic growth into its trend and cyclical components. In assessing long-term growth performance over some historical period, one would not want to include the portion of real GDP growth contributed by a sharp difference in cyclical conditions, for example between the 7.6 percent unemployment rate of mid-1992 and the 4 percent rate of early 2000. This paper bases its cyclical analysis on an identity that links real GDP to productivity, the employment rate, and several other variables. The analysis uncovers important changes in cyclical behavior between the earlier postwar downturns and the two recent jobless recessions and recoveries (1990–3 and 2001–3). One particularly important difference is the strength of productivity growth and the weakness of payroll employment growth in both of the most recent episodes and especially in the latest.

Labor productivity (LP) grew 2.5 percent per year during the 1995–2005 period, nearly double its growth rate over the previous two decades. But services sector LP and multifactor productivity (MFP) grew more rapidly and substantially exceeded productivity acceleration in the goods-producing sector. **Bosworth and Triplett** show that the services sector contributed three-quarters of U.S.-in-MFP growth after 1995, and that within services, the contribution of MFP to LP growth exceeded the vaunted contribution of IT investment. They also find that the services sector has become even more significant as the primary source of sustained productivity growth after 2000. In this study, they compute LP, MFP, and contributions to growth accounts for 57 industries within the goods and services-producing sectors, using the new NAICS-based dataset. They also show that resource real-

locations, which are a newly important factor in productivity analysis, have changed the relation between increases in industry productivity rates and aggregate and sector rates in surprising ways.

While economists have spent much time and energy thinking about sample selection issues, less effort has gone into the process of understanding what bias, if any, is caused by self reporting. Do consumers make mistakes when self-reporting data? How big are these mistakes? And, do these mistakes matter for the bottom line? **Einaiv** and **Nevo** contribute to the literature on cross-validation of data and examine these questions. They match self reported Homescan data, whereby consumers scan all of their purchases at home, with a very detailed and unique dataset of transactions recorded at the cashiers of a retailer. This allows them to construct a matched sample that they then use to

address the questions about self reporting. In particular, they match about 200 households and more than 10,000 transactions that appear in both the retailer data and the Homescan data and report the quality of the match. While on some dimensions (for example, purchased quantities) the datasets match remarkably well, there are differences in the shopping trips recorded, likely because of errant use of loyalty cards, and even more dramatic differences in the reported transaction prices, because of the way prices are imputed in the data. Moreover, the researchers find that these price differences are systematic—they do not cancel out with aggregation, and are more likely to be associated with certain demographic groups—and therefore may lead to false conclusions. They illustrate this latter point by showing that running a price regression on an identical set of transactions may lead to different conclusions,

depending on the data used to record these transactions. Besides shedding light on the general issue of self-reporting, these results are of interest for what they tell us about the quality of the Homescan data. With the declining cost of collecting and storing transaction-level data, the use of these data has been growing rapidly both in practice (for example, Nielsen has recently doubled the size of their panel) and in academic research. The data are very informative in several dimensions and have been used to study questions of marketing, competition, consumption, and nutrition. More generally, this exercise is a kind of case study demonstrating that selection bias may arise not only at the extensive margin, of whether certain individuals are in or out of the data, but also at the intensive margin, when certain individuals are more likely to be associated with recording errors.

## International Finance and Macroeconomics

The NBER's Program on International Finance and Macroeconomics met in Cambridge on March 23. Menzie D. Chinn, NBER and University of Wisconsin, and Lars E. O. Svensson, NBER and Princeton University, organized this program:

**Luis Catao**, IMF; **Ana Fostel**, George Washington University; and **Sandeep Kapur**, University of London, "Persistent Gaps and Default Traps"  
Discussant: Roberto Chang, Rutgers University and NBER

**Michael B. Devereux**, University of British Columbia, and **Alan Sutherland**, University of St. Andrews,

"Solving for Country Portfolios in Open Economy Macro Models"

**Cedric Tille**, Federal Reserve Bank of New York, and **Eric Van Wincoop**, University of Virginia and NBER, "International Capital Flows"  
Discussants for both papers: Pierpaolo Benigno, Luiss Guido Carli Rome and NBER; and Martin Bodenstein, Federal Reserve Board

**Gita Gopinath**, Harvard University and NBER; **Oleg Itskhoki**, Harvard University; and **Roberto Rigobon**, MIT and NBER, "Pass-through at the Dock: Pricing to Currency and to Market?"

Discussant: Linda S. Goldberg, Federal Reserve Bank of New York and NBER

**Akito Matsumoto**, IMF, "The Role of Nonseparable Utility and Nontradables in International Business Cycle and Portfolio Choice"  
Discussant: Fabio Ghironi, Boston College and NBER

**Francis X. Diebold**, University of Pennsylvania and NBER; **Canlin Li**, University of California, Riverside; and **Vivian Z. Yue**, New York University, "Global Yield Curve Dynamics and Interactions: A Generalized Nelson-Siegel Approach"  
Discussant: Alessandro Rebucci, IMF

**Catao**, **Fostel**, and **Kapur** show how virtuous and vicious cycles in countries' credit histories arise. In their model, output persistence is coupled with asymmetric information about the nature of output shocks between borrowers and lenders. In such an environment, a default creates a

pessimistic outlook about the borrowers' output path. This translates into higher debt-to-expected-output ratios, pushing up interest spreads and hence debt servicing costs. By raising the cost of future repayments, this creates default traps. The researchers provide empirical support for

the model by building a long and broad cross-country dataset spanning more than a century. These data are used to highlight the main stylized facts about defaults and to provide econometric evidence that the effects of persistence on sovereign creditworthiness are significant, after controlling

for other determinants of sovereign risk.

Open economy macroeconomics typically abstracts from portfolio structure. But the recent experience of financial globalization makes it important to understand the determinants and composition of gross country portfolios. **Devereux** and **Sutherland** present a simple approximation method for computing equilibrium financial portfolios in stochastic open economy macro models. The method is widely applicable, easy to implement, and delivers analytical solutions for optimal gross portfolio positions in any combination of types of asset. It can be used in models with any number of assets, whether markets are complete or incomplete, and can be applied to stochastic dynamic general equilibrium models of any dimension, so long as the model is amenable to a solution using standard approximation methods.

The sharp increase in both gross and net capital flows over the past two decades has led to a renewed interest in their determinants. Most existing theories of international capital flows are in the context of models with only one asset, which only have implications for net capital flows, not gross flows. Moreover, there is no role for capital flows as a result of changing expected returns and risk-characteristics of assets, as there is no portfolio choice. **Tille** and **Van Wincoop** develop a method for solving dynamic stochastic general equilibrium open-economy models with portfolio choice. They show why standard first- and second-order solution methods no longer work in the presence of portfolio choice, and extend them, giving special treatment to the optimality conditions for portfolio choice. They apply the solution method to a particular two-country, two-good,

two-asset model and show that it leads to a much richer understanding of both gross and net capital flows. The approach highlights time-varying portfolio shares, resulting from time-varying expected returns and risk characteristics of the assets, as a potential key source of international capital flows.

**Gopinath, Itskhoki, and Rigobon** investigate the role of currency and real rigidities in determining pass-through. They derive and estimate a pricing equation of a model with variable mark-ups and staggered price setting using detailed firm-level price data on goods imported into the United States over the period 1994–2004. They document that, even conditional on adjusting prices, there is a large difference in the pass-through of the average good priced in dollars versus the average good not priced in dollars. The pass-through into dollar-priced goods is close to zero in the short run and 0.18 in the long run. The pass-through into non-dollar-priced goods is one in the short run and 0.92 in the long run. Moreover, these pass-through rates, conditional on the currency of invoicing, are very similar across countries exporting to the United States. Consequently, countries with higher long-run pass-through have a greater share of goods that are not priced in dollars. The researchers find that non-dollar-priced goods are more likely to be in the differentiated-goods sectors where desired pass-through elasticity is high. Further, the difference in pass-through across currency of invoicing in non-differentiated goods is smaller. This suggests an important role for pricing-to-market effects. However, even within narrowly defined differentiated goods, the long-run differences across currency of invoicing persist.

**Matsumoto** analyzes the role of non-separable utility and nontradables in business cycle and portfolio choice using a two-country two-sector production economy model with a fairly general utility function. He finds that nonseparability in utility can change the optimal portfolio choice significantly. Unlike the results of Stockman and Dellas (1989) or Baxter, Jermann, and King (1998), the optimal portfolio of traded-good-sector equities is no longer a well-diversified portfolio under nonseparability. The optimal portfolios of both traded and nontraded good sector equities become sensitive to the elasticity of substitution between traded and nontraded goods and the coefficient of relative risk aversion. As a result, the model can generate extreme home bias and anti-home bias portfolios, implying that some frictions in asset markets, which prevent agents from holding these extreme portfolios, can explain the lack of international risk sharing.

The popular Nelson-Siegel yield curve model is routinely fit to intracountry bond yields, facilitating extraction of latent yield factors. In this paper, **Diebold, Li, and Yue** move to a global context, modelling a potentially large set of country yield curves via a generalized Nelson-Siegel model that allows for both global and country-specific yield factors. They extract the global and country-specific factors from term structures of government bond yields for the United States, Germany, Japan, and the United Kingdom. The results indicate that global yield factors do indeed exist and are economically important, generally explaining significant fractions of country yield curve dynamics, with interesting differences across countries.

## Asset Pricing

The NBER's Program on Asset Pricing met at the University of Chicago on March 30. Program Director John H. Cochrane, NBER and University of Chicago, and Nicolae B. Garleanu, NBER and the Wharton School, organized this program:

**Ravi Bansal**, Duke University; **Dana Kiku**, University of Pennsylvania; and **Amir Yaron**, University of Pennsylvania and NBER, "Risks for the Long Run: Estimation and Inference"  
Discussant: George M. Constantinides, University of Chicago and NBER

**Wei Yang**, University of Rochester, "Time-Varying Exposure to Long-Run Consumption Risk"

Discussant: Lars P. Hansen, University of Chicago and NBER

**Dimitri Vayanos**, London School of Economics and NBER, and **Jean-Luc Vila**, Merrill Lynch, "A Preferred-Habitat Model of the Term Structure of Interest Rates"  
Discussant: Pierre Collin-Dufresne, University of California, Berkeley and NBER

**Lorenzo Garlappi**, University of Texas, and **Hong Yan**, University of South Carolina, "Financial Distress and the Cross-Section of Equity Returns"  
Discussant: Joao Gomes, University of Pennsylvania

**Xavier Gabaix**, MIT and NBER, "Linearity-Generating Processes: A Modeling Tool Yielding Closed Forms for Asset Prices"  
Discussant: Pietro Veronesi, University of Chicago and NBER

**Lubos Pastor** and **Pietro Veronesi**, University of Chicago and NBER, and **Lucian Taylor**, University of Chicago, "Entrepreneurial Learning, The IPO Decision and the Post-IPO Drop in Firm Profitability" (NBER Working Paper No. 12792)  
Discussant: Markus K. Brunnermeier, Princeton University and NBER

Recent work by Bansal and Yaron (2004) on long-run risks suggests that they can account for key features of asset market data. In this paper, **Bansal**, **Kiku**, and **Yaron** develop methods for estimating their equilibrium model by exploiting the asset pricing Euler equations. Using an empirical estimate for the long-run risk component, they demonstrate that the Long-Run Risk Model can indeed capture a rich array of asset returns. The model, at plausible preference estimates, can account for the market as well as the "value" and "size" premium. The researchers show that time averaging effects, that is a mismatch in the sampling and the agent's decision interval, lead to significant biases in the estimates for risk aversion and the elasticity of intertemporal substitution. Their evidence suggests that accounting for these biases is important for interpreting the magnitudes of the preference parameters and the economic implications of the model for asset prices.

**Yang** develops a model of time-varying expected returns and shows that, when investors care about the long-run consumption risk, they also care about the persistence of an asset's exposure to this risk, and demand substantially higher compensation for more persistent exposure. The model also implies a negative sensitivity of price-dividend ratios to expected excess

returns, and the magnitude of the sensitivity is substantially larger for more persistent exposure. In an application of the model, he specifies individual stocks' dividend growth as containing two time-varying components of exposure to the long-run consumption risk—a fast mean-reverting component whose shocks are positively correlated with the independent dividend growth shocks, and a slow mean-reverting component whose shocks are negatively correlated with the independent dividend growth shocks. Firm-level simulations from this model produce short-run momentum and long-run reversal quantitatively comparable to empirically documented patterns in the cross section as well as along the time dimension. The simulations also show that the value premium across price-dividend ratio sorted portfolios is driven by a spread in the slow mean-reverting risk exposure. Together, these results propose potential interpretations of the value and momentum factors as representing time-varying loadings of different persistence on the long-run consumption risk factor.

**Vayanos** and **Vila** develop a term-structure model in which investors with preferences for specific maturities trade with risk-averse arbitrageurs. Arbitrageurs integrate the markets for different maturities, incorporating information about expected

short rates into bond prices. The researchers show that bond risk premia are related negatively to short rates and positively to term-structure slope. Moreover, forward rates under-react to expected short rates, especially for long maturities, while investor demand mainly affects long maturities. Thus, the short end of the term structure is driven mainly by short-rate expectations, while the long end is driven by demand. Despite the presence of two distinct economic factors, the first principal component explains about 90 percent of movement. These results are consistent with empirical evidence and generate novel testable implications.

**Garlappi** and **Yan** propose a new perspective for understanding cross-sectional properties of equity returns. They explicitly introduce financial leverage in a simple equity valuation model and consider the likelihood of a firm defaulting on its debt obligations as well as potential deviations from the absolute priority rule (APR) upon the resolution of financial distress. They show that financial leverage amplifies the magnitude of the book-to-market effect and hence provides an explanation for the empirical evidence that value premia are larger among firms with higher likelihood of financial distress. By further allowing for APR violations, this model

generates two novel predictions about the cross section of equity returns: 1) the value premium (computed as the difference between expected returns on mature and growth firms), is hump-shaped with respect to default probability, and 2) firms with a higher likelihood of deviation from the APR upon financial distress generate stronger momentum profits. Both predictions are confirmed in empirical tests. These results emphasize the unique role of financial distress and the ensuing nonlinear relationship between expected return and risk in understanding cross-sectional properties of equity returns.

**Gabaix** proposes a new class of stochastic processes with appealing properties

for theoretical or empirical work in finance and macroeconomics, the “linearity-generating” class. Its key property is that it yields simple exact closed-form expressions for stocks and bonds, with an arbitrary number of factors. It operates in discrete and continuous time. It has a number of economic modeling applications. These include macroeconomic situations with changing trend growth rates, or stochastic probability of disaster, asset pricing with stochastic risk premia or stochastic dividend growth rates, and yield curve analysis that allows flexibility and transparency. Many research questions may be addressed more simply and in closed form by using the linearity-generating class.

**Pastor, Veronesi, and Taylor** develop a model in which an entrepreneur learns about the average profitability of a private firm before deciding whether to take the firm public. In this decision, the entrepreneur trades off diversification benefits of going public against benefits of private control. The model predicts that firm profitability should decline after the IPO, on average, and that this decline should be larger for firms with more volatile profitability and firms with less uncertain average profitability. These predictions are supported empirically in a sample of 7,183 IPOs in the United States between 1975 and 2004.

## Corporate Finance

The NBER's Program on Corporate Finance met at the University of Chicago on March 30. Program Director Raghuram G. Rajan, NBER and University of Chicago, organized the meeting and chose these papers for discussion:

**Morten Bennedsen**, University of Copenhagen and CEPR; **Francisco Perez-Gonzalez**, Columbia University; and **Daniel Wolfenzon**, New York University and NBER, “Do CEOs Matter?”  
Discussant: Antoinette Schoar, MIT and NBER

**Greg Nini**, Board of Governors; **David C. Smith**, University of Virginia; and **Amir Sufi**, University of Chicago, “Creditor Control Rights and Firm Investment Policy”  
Discussant: Matias Braun, University of

California, Los Angeles

**Yael V. Hochberg**, Northwestern University, and **Paola Sapienza** and **Annette Vissing-Jorgensen**, Northwestern University and NBER, “A Lobbying Approach to Evaluating the Sarbanes-Oxley Act of 2002”  
Discussant: Morten Sorensen, University of Chicago

**Andrew Hertzberg** and **Jose Maria Liberti**, Northwestern University, and **Daniel Paravisini**, Columbia University, “Information and Incentives Inside the Firm: Evidence from Loan Officer Rotation”  
Discussant: Ulrike Malmendier, University of California, Berkeley and NBER

**Efraim Benmelech**, Harvard University and NBER, and **Nittai K. Bergman**,

MIT, “Liquidation Values and the Credibility of Financial Contract Renegotiation: Evidence from U.S. Airlines”

Discussant: Bilge Yilmaz, University of Pennsylvania

**Bo Becker** and **Zoran Ivkovich**, University of Illinois, and **Scott Weisbender**, University of Illinois and NBER, “Local Dividend Clientele”  
Discussant: Christian Leuz, University of Chicago

**Asim Ijaz Khwaja**, Harvard University; **Atif Mian**, University of Chicago and NBER; and **Abid Qamar**, State Bank of Pakistan, “The Value of Business Networks”  
Discussant: Krishnamurthy Subramanian, Emory University

Estimating the value of top managerial talent is a central topic of research that has attracted widespread attention from academics and practitioners. Yet, testing for the importance of chief executive officers (CEOs) on firm outcomes is challenging. **Bennedsen, Perez-Gonzalez, and Wolfenzon** test for the impact of CEOs

on performance by assessing the effect of CEO deaths and the deaths of CEOs' immediate family members (spouse, parents, children, and so on), which arguably affect CEOs' focus. Using a unique dataset from Denmark, they find that CEOs' (but not board members') own and family members' deaths are strongly corre-

lated with declines in firm operating profitability, investment, and sales growth. This CEO shock-outcome analysis allows the authors to identify the shocks that are the most (least) meaningful for CEOs: the death of children and spouses (mothers-in-law). They show that individual CEO, firm, and industry characteristics seem

to affect the impact of these shocks. In particular, CEO effects are larger (lower) for longer-tenured (older) CEOs and for those managers with large investment fixed effects. CEO shocks are relevant across the size distribution of firms but are concentrated on those firms that invested heavily in the past. Finally, the researchers find that CEO shocks tend to be larger in rapid growth, high investment, and R-and-D-intensive industries. Overall, these findings demonstrate that managers are a key determinant of firm performance.

**Nini, Smith, and Sufi** provide novel empirical evidence of a direct contracting channel through which firm financial policy affects firm investment policy. They examine a large sample of private credit agreements between banks and public firms and find that 32 percent of the agreements contain an explicit restriction on the firm's capital expenditures. Creditors are more likely to impose a restriction following negative borrower performance. Moreover, the effect of credit downgrades and financial covenant violations on the incidence of capital expenditure restrictions in new contracts is larger than the effect on interest spreads. The researchers also find that restrictions cause a reduction in firm investment and that firms obtaining contracts with a new restriction experience subsequent increases in market valuation and operating performance. The evidence suggests that capital expenditure restrictions reduce inefficient excess investment by managers.

**Hochberg, Sapienza, and Vissing-Jorgensen** evaluate the net benefits of the Sarbanes-Oxley Act (SOX) for shareholders by studying the lobbying behavior of investors and corporate insiders designed to affect the final implemented rules under the Act. Investors lobbied overwhelmingly in favor of strict implementation of SOX, while corporate insiders and business groups lobbied against strict implementation. The authors identify the firms most affected by the law as those whose insiders lobbied against strict implementation, and compare their returns to the returns of less affected firms. Cumulative returns during the four and a half months leading up to passage of SOX were approximately 10 percent higher

for corporations whose insiders lobbied against one or more of the SOX disclosure-related provisions than for similar non-lobbying firms. Analysis of returns in the post-passage implementation period indicates that investors' positive expectations with regards to the effects of the law were warranted for the enhanced disclosure provisions of SOX.

**Hertzberg, Liberti, and Paravisini** show that a bank policy that routinely reassigns loan officers to different borrowers acts as an incentive device. The researchers argue that the new loan officer assigned to the task has no reputation incentive to hide bad information. Therefore, the threat of rotation induces the incumbent to reveal bad news in order to avoid being uncovered by her successor. Using a proprietary monthly panel of internal risk rating data, the researchers show that a three-year rotation rule induces incumbent loan officers to reveal negative information about the creditworthiness of the firms they manage. Consistent with this theory, loan officers systematically downgrade firms leading up to the three-year rule, and these downgrades are informative about the future probability of default. In line with their reputation concerns argument, the authors document that loan officers who fail to report bad news and are subsequently exposed by a successor later go on to manage smaller lending portfolios. Finally, the authors show that loan officer rotation affects the capital allocation decisions of the bank.

**Benmelech and Bergman** examine how liquidation values and firm cash flows affect the credibility of financial contract renegotiation and its outcome. They develop an incomplete-contracting model of financial contract renegotiation and estimate it using data on the airline industry in the United States. They find that airlines successfully renegotiate their lease obligations down when their financial position is sufficiently poor, and when the liquidation value of their fleet is low. These results show that strategic renegotiation is common in the airline industry. Moreover, the results emphasize the importance of the incomplete contracting perspective to real world financial contract renegotiation.

**Becker, Ivkovich, and Weisbenner**

exploit variation in demographics to identify the effect of dividend demand on firm payout policy. Retail investors tend to hold local stocks and older investors prefer dividend-paying stocks. These tendencies generate geographically varying demand for dividends. Using a sample of U.S. listed firms, the researchers show that, at locations where seniors constitute a large fraction of the population, firms are more likely to pay and to initiate dividends, and have higher dividend yield. The fraction of seniors is not correlated with repurchases, profitability, or investment, however, suggesting that the geographic variation in dividend payout is not driven by some unmeasured firm characteristic affecting the ability or willingness to pay. The effect of seniors is stronger for firms and in locations where local investors are more important as owners. Finally, ex-dividend day price drops are larger for firms in locations with many seniors, consistent with dividend demand being higher for those firms. Then authors conclude that the preferences of a firm's investors help explain payout policy.

Developing countries are marked by the prevalence of informal business networks. Many believe that these networks facilitate information sharing, trade, and contractual enforcement in weak institutional environments. However, estimating network benefits remains difficult because of data limitations and identification concerns. **Khwaja, Mian, and Qamar** use ownership data on all (but the very small) private firms in Pakistan to construct business networks involving 100,000 firms. They link two firms together if they have a director in common, and document the presence of a super-network in the economy. It comprises 5 percent of all firms, is over 100 times larger than the next largest network, and obtains more than half of all bank credit. They then investigate the economic value that membership to the super-network brings by exploiting entry (exit) of firms over time into the network. They identify the causal effect of network membership through a number of tests, including instrumenting network membership with "incidental" entry/exit of firms. Network membership increases total external financing by 16.5 percent,

reduces propensity to enter financial distress by 9.7 percent, and better insures firms against industry and location shocks. When forming new banking relationships,

entering firms are also more likely to select banks that already have existing relationships with adjoining firms. The authors also find that, consistent with theories of

strategic network development, the benefits of memberships are stronger when firms connect through more powerful network nodes.

## Behavioral Economics

The NBER's Working Group on Behavioral Economics met at the University of Chicago on March 31. The group's directors, NBER Research Associates Robert Shiller of Yale University and Richard H. Thaler of the University of Chicago, organized this program:

**George A. Akerlof**, University of California, Berkeley, "The Missing Motivation in Macroeconomics"  
Discussant: Steven N. Kaplan, University of Chicago and NBER

**Roni Michaely** and **William C. Weld**, Cornell University; **Shlomo Benartzi**, University of California, Los Angeles; and **Richard H. Thaler**, "A Nominal

Stock Price Puzzle"  
Discussant: Markus K. Brunnermeier, Princeton University and NBER

**Henrik Cronqvist** and **Angie Low**, Ohio State University, and **Mattias Nillson**, Worcester Polytechnic Institute, "Does Corporate Culture Matter for Firm Policies?"  
Discussant: Malcolm Baker, Harvard University and NBER

**Sumit Agarwal**, Federal Reserve Bank of Chicago; **John C. Driscoll**, Federal Reserve Board; **Xavier Gabaix**, NBER and Princeton University; and **David Laibson**, NBER and Harvard University, "The Age of Reason: Financial Decisions Over the Lifecycle"

Discussant: Ulrike Malmendier, University of California, Berkeley and NBER

**Valentin Dimitrov**, Rutgers University; **Prem C. Jain**, Georgetown University; and **Sheri Tice**, Tulane University, "Sell on the News: Differences of Opinion and Returns around Earnings Announcements"  
Discussant: Charles M.C. Lee, Barclay Global Investors

**Robert S. Chirinko**, Emory University, and **Huntley Schaller**, Carleton University, "Fundamentals, Misvaluation, and Investment: The Real Story"  
Discussant: Joshua Rauh, University of Chicago and NBER

The discovery of five neutralities surprised the economics profession and forced the re-thinking of macroeconomic theory. Those neutralities are: the independence of consumption and current income (given wealth); the independence of investment and finance decisions (the Modigliani-Miller theorem); inflation stability only at the natural rate of unemployment; the ineffectiveness of macro stabilization policy with rational expectations; and Ricardian equivalence. However, each of these surprise results occurs because of missing motivation. The neutralities no longer occur if decisionmakers have natural norms for how they *should* behave. **Akerlof** suggests a new agenda for macroeconomics with inclusion of those norms.

Nominal prices of common stocks have remained constant at around \$30 per share since the Great Depression as a result of firms splitting their stocks. It is surprising that firms actively maintained constant nominal price for their shares while general prices in the economy went up more

than ten fold. This is especially puzzling given that commissions paid by investors on trading ten \$30 shares are about ten times those paid on a single \$300 share. **Michaely, Weld, Benartzi, and Thaler** estimate, for example, that had share prices of General Electric kept up with inflation, investors in that stock would have saved \$100 million in commissions in 2005. They review potential explanations, including signaling and optimal trading range, and find that none of the existing theories are able to explain the observed constant nominal prices. They suggest that the evidence is consistent with the idea that Norms (for example, Akerlof, 2006) can explain the nominal price puzzle.

Economic theories suggest that a firm's corporate culture matters for its policy choices. **Cronqvist, Low, and Nillson** construct a parent-spinoff-firm panel dataset that allows them to identify culture effects in firm policies from behavior that is inherited by a spinoff firm from its parent after the firms split up. They find positive

and significant relations between spinoff firms' and their parents' choices of investment, financial, and operational policies. Consistent with predictions from economic theories of corporate culture, they find that the culture effects are long-term and stronger for internally grown business units and older firms. Their evidence also suggests that firms preserve their cultures by selecting managers who fit into their cultures. Finally, they find a strong relation between spinoff firms' and their parents' profitability, suggesting that corporate culture ultimately also affects economic performance. These results are robust to a series of robustness checks, and cannot be explained by alternatives such as governance or product market links. The contribution of this paper is to introduce the notion of corporate culture in a formal empirical analysis of firm policies and performance.

The sophistication of financial decisions varies with age: middle-aged adults borrow at lower interest rates and pay



fewer fees than both younger and older adults. **Agarwal, Driscoll, Gabaix, and Laibson** document this pattern in ten financial markets. The measured effects cannot be explained by observed risk characteristics. The sophistication of financial choices peaks at about age 53 in this cross-sectional data. The results are consistent with the hypothesis that financial sophistication rises and then falls with age, although the patterns observed represent a mix of age effects and cohort effects.

**Dimitrov, Jain, and Tice** present strong evidence that high differences-of-opinion stocks earn lower returns around earnings announcements. The evidence is similar across six different proxies for differences of opinion (earnings volatility, return volatility, dispersion of analysts'

earnings forecasts, number of analysts, firm age, and share turnover). The three-day hedge returns (returns on low minus high differences-of-opinion stocks) around earnings announcements are equivalent to annualized returns of 14 percent to 60 percent depending upon the proxy used. The results are even stronger for firms that are more difficult to short. These findings are consistent with Miller's (1977) hypothesis that stock prices contain an optimistic bias and that resolution of uncertainty results in downward price corrections. The conclusions are not affected when the researchers control for size, book-to-market, post-earnings-announcement drift, leverage, price momentum, and price reversals. Their conclusions also are not affected when they control for the return premium around

earnings announcements.

Is real investment fully determined by fundamentals or is it sometimes affected by stock market misvaluation? **Chirinko and Schaller** introduce three new tests that: measure the reaction of investment to sales shocks for firms that may be overvalued; use Fama-MacBeth regressions to determine whether "overinvestment" affects subsequent returns; and analyze the time path of the marginal product of capital in reaction to fundamental and misvaluation shocks. Besides these qualitative tests, they introduce a measure of misvaluation into standard investment equations to estimate the quantitative effect of misvaluation on investment. Overall, the evidence suggests that both fundamental and misvaluation shocks affect investment.

## Public Economics

The NBER's Program on Public Economics met in Cambridge on April 5–6. NBER Faculty Research Fellows Mark Duggan, University of Maryland, and Amy Finkelstein, MIT, organized the meeting. These papers were discussed:

**Raj Chetty**, University of California, Berkeley and NBER; **Kory Kroft**, University of California, Berkeley, and **Adam Looney**, Federal Reserve Board, "Salience and Taxation"  
Discussant: Erzo F. P. Luttmer, Harvard University and NBER

**Amy Finkelstein**, "E-Z Tax: Tax Salience and Tax Rates"  
Discussant: Austan Goolsbee, University

of Chicago and NBER

**Emmanuel Saez**, University of California, Berkeley and NBER; and **Henrik J. Kleven** and **Claus T. Kreiner**, University of Copenhagen, "The Optimal Income Taxation of Couples" (NBER Working Paper No. 12685)  
Discussant: Nada Eissa, Georgetown University and NBER

**Mariacristina De Nardi**, Federal Reserve Bank of Chicago and NBER; **John Bailey Jones**, State University of New York, Albany; and **Eric French**, Federal Reserve Bank of Chicago, "Differential Mortality, Uncertain

Medical Expenses, and the Saving of Elderly Singles"

Discussant: John Karl Scholz, University of Wisconsin, Madison and NBER

**Dan Silverman**, University of Michigan and NBER, and **John Laitner**, University of Michigan, "Consumption, Retirement, and Social Security: Evaluating the Efficiency of Reform that Encourages Longer Careers"  
Discussant: Jeffrey B. Liebman, Harvard University and NBER

**Ivan Werning**, MIT and NBER, "Pareto Efficient Income Taxation"  
Discussant: Wojciech Kopczuk, Columbia University and NBER

A central assumption in public finance is that individuals optimize fully with respect to the incentives created by tax policies. In this paper, Chetty, Kroft, and Looney test this assumption using two empirical strategies. First, they conducted an experiment at a grocery store where they posted tax-inclusive prices for 750 products subject to sales tax for a

three-week period. They find that posting tax-inclusive prices reduced demand by roughly 7 percent among the treated products relative to control products and nearby control stores. Second, they find that state-level increases in excise taxes (which are included in posted prices) reduce alcohol consumption significantly more than increases in sales taxes (which

are added at the register and hence are less salient). Both sets of results indicate that tax salience affects behavioral responses. The researchers propose a simple bounded rationality model to explain why salience matters, and show that it matches their evidence as well as several additional stylized facts. In the model, agents incur second-order (small) utility losses from

ignoring some taxes, even though these taxes have first-order (large) effects on social welfare and revenue. Using this framework, they derive formulas for the efficiency cost and incidence of commodity taxes when agents do not optimize fully.

**Finkelstein** tests the hypothesis that the salience of a tax system affects equilibrium tax rates. To do this, she analyzes how toll rates change after toll facilities adopt electronic toll collection. Unlike manual toll collection, in which the driver must hand over cash at the toll collection plaza, electronic toll collection automatically debits the toll amount as the car drives through the toll plaza, thereby plausibly decreasing the salience of the toll. She finds robust evidence that toll rates increase following the adoption of electronic toll collection. Her estimates suggest that, in steady state, toll rates are 20 to 40 percent higher than they would have been without electronic toll collection. Consistent with the hypothesis that decreased tax salience is responsible for the increase in toll rates, she also finds that the short-run elasticity of driving with respect to the actual toll declines (in absolute value) following the adoption of electronic toll collection. She considers a variety of alternative explanations for these results and concludes that these are unlikely to be able to explain the findings.

**Saez, Kleven, and Kreiner** analyze the optimal income tax treatment of couples. Each couple is modelled as a single rational economic agent supplying labor along two dimensions: primary and secondary earnings. The researchers consider fully general joint income tax systems. Separate taxation is never optimal if social welfare depends on total couple incomes. In a model where secondary earners make only a binary work decision (work or not work), the authors demonstrate that the marginal tax rate of the primary earner is

lower when the spouse works. As a result, the tax distortion on the secondary earner decreases with the earnings of the primary earner and actually vanishes to zero asymptotically. Such negative jointness is optimal because redistribution from two-earner toward one-earner couples is more valuable when primary earner income is lower. They also consider a model where both spouses display intensive labor supply responses. In that context, they show that, starting from the optimal separable tax schedules, introducing some negative jointness is always desirable. Numerical simulations suggest that, in that model, it is also optimal for the marginal tax rate on one earner to decrease with the earnings of his/her spouse. The authors argue that many actual redistribution systems, featuring family-based transfers combined with individually-based taxes, generate schedules with negative jointness.

People have heterogeneous life expectancies: women live longer than men, rich people live longer than poor people, and healthy people live longer than sick people. People are also subject to heterogeneous out-of-pocket medical expense risk. Using AHEAD data and the method of simulated moments, **De Nardi, Jones, and French** estimate a rich structural model of saving for retired single households that accounts for this heterogeneity. They find that the risk of living long and facing high medical expenses goes a long way toward explaining the elderly's saving decisions. Specifically, medical expenses that rise quickly with both age and permanent income can explain why elderly singles, and especially the richest ones, run down their assets so slowly. The authors also find that social insurance has a big impact on the elderly's savings.

**Silverman and Laitner** analyze the effect on individuals' retirement and consumption choices of a potential reform to the U.S. Social Security system. They first estimate the parameters of a life-

cycle model. They assume intratemporally nonseparable preference orderings and the possibility of disability. The specification predicts a change in consumption at retirement. They use the empirical magnitude of the change, together with the model's predicted retirement age, to identify key parameters, including the curvature of the utility function. They then qualitatively and quantitatively study the possible long-run effect of a Social Security reform in which individuals no longer face the old-age and survivors' insurance payroll tax after some specified age, and their subsequent earnings have no bearing on their Social Security benefits. Simulations indicate that retirement ages could rise by as much as one year, equivalent variations could average \$6000 (1984 dollars) per household or more, and the reform could generate as much as \$3000 of additional income tax revenue per household.

**Werning** revisits the seminal Mirrlees' optimal tax model but adopts a different normative criterion. Instead of solving the optimum for a particular welfare function, such as a Utilitarian criterion, he studies the set of all Pareto-efficient tax schedules. He provides a simple test for the efficiency of a given tax schedule and finds that the set of efficient and inefficient tax schedules turns out to be large. The efficiency condition generalizes the well-known zero-tax-at-the-top result. Taxes should be low in regions where the density of income falls rapidly. Pareto improvements require a lowering of taxes that produces a local, average, Laffer effect. Werning uses the framework to explore the optimality of a flat tax, to bound the top tax rate of a nonlinear schedule, and to evaluate the efficiency of a tax system that does not condition on observable traits. Preliminary calculations, based on U.S. data, are used to illustrate the test and to evaluate the efficiency condition.

## Environmental Economics

The NBER's Working Group on Environmental Economics met in Cambridge on April 6 and 7. Working Group Director Don Fullerton of the University of Texas, Austin organized the meeting. These papers were discussed:

**Michael Greenstone**, MIT and NBER, and **Olivier Deschenes**, University of California, Santa Barbara, "Climate Change, Mortality, and Adaptation: Evidence from Annual Fluctuations in Weather in the U.S."

Discussant: Robert Mendelsohn, Yale University

**Gilbert E. Metcalf**, Tufts University and NBER, "Energy Conservation in

the United States: Understanding its Role in Climate Policy"

Discussant: Catherine Wolfram, University of California, Berkeley and NBER

**Charles Kolstad** and **Nicholas Burger**, University of California, Santa Barbara, "Voluntary Public Goods Provision, Coalition Formation, and Uncertainty" Discussant: Talbot Page, Brown University

**Nathaniel O. Keohane** and **Andrey Voynov**, Yale University, and **Erin T. Mansur**, Yale University and NBER; "Averting Enforcement: Strategic Response to the Threat of

Environmental Regulation"

Discussant: Louis Kaplow, Harvard University and NBER

**Matthew J. Kotchen**, University of California, Santa Barbara, "Voluntary Provision of Public Goods for Bads: A Theory of Environmental Offsets" Discussant: Geoffrey Heal, Columbia University and NBER

**William D. Nordhaus**, Yale University and NBER, "The Economics of Hurricanes in the United States" (NBER Working Paper No. 12813) Discussant: Wolfram Schlenker, Columbia University

**Deschenes** and **Greenstone** measure the welfare loss associated with the direct risks to health posed by climate change in the United States: they develop estimates of the impact of temperature on human mortality and energy consumption (perhaps the primary form of self-protection against high temperatures). Using predictions from the Hadley 3 Model and AIFI scenario from 2070–99, which indicate an increase in the daily mean temperature of 6° F on average in the United States, their preferred mortality estimates indicate that climate change will lead to roughly 35,000 more deaths per year by the end of the century. That is roughly a 1.3 percent increase in the annual fatality rate. However, these estimated overall impacts are statistically indistinguishable from zero—and the 95 percent confidence interval ranges from a decline of 23,000 fatalities to an increase of 93,000 per year. The estimates for some subgroups are more precise, as statistically significant increases in mortality rates are predicted for infants and some older age groups. The energy results suggest that, by the end of the century, climate change will cause total U.S. residential energy consumption to increase by 25–35 percent of average annual consumption in the 1970–2003 period. This estimated increase implies that there will be an addi-

tional \$30–\$45 billion (2006\$) per year of U.S. energy consumption. The analysis suggests that a substantial portion of the adjustment to climate change will occur through adaptation or changes in consumption patterns, rather than increased mortality. Finally, the paper's identification strategy exploits the presumably random variation within U.S. counties and states across years. Individuals will have a greater set of adaptations (for example, migration to the North) available to respond to permanent climate change. For this reason, this paper's results are likely an upper bound estimate of the increase in mortality and energy consumption in response to permanent climate change.

Efforts to reduce carbon emissions significantly will require considerable improvement in energy intensity, the ratio of energy consumption to economic activity. Improvements in energy intensity over the past 30 years suggest great possibilities for energy conservation: current annual energy consumption avoided because of declines in energy intensity since 1970 substantially exceed current annual domestic energy supply. **Metcalf** analyzes a dataset on energy intensity in the United States at the state level between 1970 and 2001 to disentangle the key elements of energy efficiency and economic activity that drive

changes in energy intensity. Rising per capita income plays an important role in lowering energy intensity. Higher energy prices also are important. Price and income predominantly influence intensity through changes in energy efficiency rather than through changes in economic activity.

There is an extensive empirical and theoretical literature on voluntary provision of public goods, including recent theoretical work on the formation of voluntary coalitions to provide public goods. However, there is some ambiguity in this theoretical literature regarding the factors that influence coalition size and contribution rates. **Kolstad** and **Burger** present some of the first experimental evidence in this vein. They test how uncertainty in public goods provision affects contribution levels and coalition size. They find that contributions decrease when payoffs from the public good are uncertain but increase when individuals are allowed to form a coalition to provide the good. Contrary to theory, they find that coalition size increases when the public good benefits are higher. Uncertainty has no effect on coalition size.

**Keohane**, **Voynov**, and **Mansur** use data from the U.S. electric power industry to explore the strategic responses of regulated firms to government enforcement.

They focus on the enforcement of New Source Review, a provision of the Clean Air Act that imposes stringent emissions limitations on substantially modified older power plants. Starting in late 1999, the EPA sued the owners of 46 power plants for NSR violations. This paper explores how electric utilities responded to both the perceived threat of future action, and the action itself. The researchers find that the threat of action did have a significant effect on emissions: plants that were likely to be named in the lawsuits (as determined by a discrete choice model of the lawsuit decision) reduced their emissions by about 17 percent on the eve of the lawsuits. After the lawsuits, there are no significant differences found between the plants that were sued and other relatively dirty coal-fired power plants.

**Kotchen** examines an alternative explanation for voluntary provision of public goods: to compensate for other activities that diminish the level of a public good. Markets for environmental offsets, such as those that promote carbon

neutrality in order to minimize the impact of climate change, provide an increasingly salient example. An important result, related to one shown earlier, is that mean donations to the public good do not converge to zero as the economy grows large. The other results are new and are comparable to those from the standard model of a privately provided public good. Kotchen solves the Nash equilibrium explicitly to show how individual direct donations and net contributions depend on wealth and heterogenous preferences. His comparative static analysis demonstrates how both the level of the public good and social welfare depend on the technology, individual wealth, and an initial level of the public good. Applying the model in an environmental context establishes a starting point for understanding and making predictions about markets, such as those for carbon offsets.

The year 2005 brought record numbers of hurricanes and storm damage to the United States. Was this a foretaste of increasingly destructive hurricanes in an

era of global warming? **Nordhaus** examines the economic impacts of U.S. hurricanes. His major conclusions are: First, there appears to be an increase in the frequency and intensity of tropical cyclones in the North Atlantic. Second, there are substantial vulnerabilities to intense hurricanes in the Atlantic coastal United States. Damages appear to rise with the eighth power of maximum wind speed. Third, greenhouse warming is likely to lead to stronger hurricanes, but the evidence on hurricane frequency is unclear. He estimates that the average annual U.S. hurricane damages will increase by \$8 billion at 2005 incomes (0.06 percent of GDP) because of global warming. However, this number may be underestimated by current storm models. Fourth, 2005 appears to have been a quadruple outlier, involving a record number of North Atlantic tropical cyclones, a large fraction of intense storms, a large fraction of the intense storms making landfall in the United States, and an intense storm hitting the most vulnerable high-value region in the country.

## Labor Studies

NBER's Labor Studies Program met in Cambridge on April 6. Program Director Richard B. Freeman and NBER Research Associate Lawrence F. Katz organized the meeting. These papers were discussed:

**Alberto Abadie**, Harvard University and NBER; and **Alexis Diamond** and **Jen Hainmueller**, Harvard University, "Synthetic Control Methods for Comparative Case Studies: Estimating the Effects of California's Tobacco Control Program" (NBER Working Paper No. 12831)

**Timothy G. Conley**, University of Chicago, and **Christopher R.**

**Taber**, Northwestern University and NBER, "Inference with 'Differences in Differences' with a Small Number of Policy Changes"

**Muriel Niederle**, Stanford University and NBER; **Carmit Segal**, Harvard University; and **Lise Vesterlund**, University of Pittsburgh, "How Costly is Diversity? Affirmative Action in Competitive Environments"

**Stefano DellaVigna**, University of California, Berkeley and NBER, and **Eliana La Ferrara**, Università Bocconi and IGER, "Detecting Illegal Arms Trade"

**Bruce D. Meyer**, University of Chicago and NBER, and **Wallace K.C. Mok**, Northwestern University of Notre Dame, "Quasi-Experimental Evidence on the Effects of Unemployment Insurance from New York State" (NBER Working Paper No. 12865)

**Michael W. Elsby** and **Gary Solon**, University of Michigan and NBER, and **Ryan Michaels**, University of Michigan, "The Ins and Outs of Cyclical Unemployment"

Building on an idea in Abadie and Gardeazabal (2003), **Abadie**, **Diamond**, and **Hainmueller** investigate the application of synthetic control methods to

comparative case studies. They discuss the advantages of these methods and apply them to a study of Proposition 99, a large-scale tobacco control program that

California implemented in 1988. They demonstrate that following Proposition 99, tobacco consumption fell markedly in California relative to a comparable

synthetic control region. They estimate that by the year 2000, annual per-capita cigarette sales in California were about 26 packs lower than what they would have been in the absence of Proposition 99. Given that many policy interventions and events of interest in social sciences take place at an aggregate level (countries, regions, cities, and so on) and affect a small number of aggregate units, the potential applicability of synthetic control methods to comparative case studies is very large, especially in situations where traditional regression methods are not appropriate. The methods proposed in this article produce informative inference regardless of the number of available comparison units, the number of available time periods, and whether the data are individual (micro) or aggregate (macro). Software to compute the estimators proposed in this article is available at the authors' web-pages.

Difference-in-differences methods have become very popular in applied work. **Conley** and **Taber** provide a new method for inference in these models when there are a small number of policy changes. This situation occurs in many implementations of these estimators. Identification of the key parameter typically arises when a group "changes" some particular policy. The asymptotic approximations that are typically used assume that the number of cross-sectional groups,  $N$ , times the number of time periods,  $T$ , is large. However, even when  $N$  or  $T$  is large, the number of actual policy changes observed in the data is often very small. In this case, the authors argue that point estimators of treatment effects should not be thought of as being consistent and that the standard methods that researchers use to perform inference in these models are not appropriate. They develop an alternative approach to inference under the assumption that there are a finite number of policy changes in the data, using asymptotic approximations as the number of non-changing groups gets large. In this situation, they cannot obtain a consistent point estimator for the key treatment effect parameter. However, they can consistently estimate the finite-sample distribution of the treat-

ment effect estimator, up to the unknown parameter itself. This allows them to perform hypothesis tests and construct confidence intervals. For expositional and motivational purposes, they focus on the difference-in-differences case, but their approach should be appropriate more generally in treatment effect models that use a large number of controls, but a small number of treatments. They demonstrate the use of the approach by analyzing the effect of college merit aid programs on college attendance. They show that in some cases the standard approach can give misleading results.

Recent research documents that while men are eager to compete, women often shy away from competitive environments. As a natural consequence, few women succeed in and win competitions. Using experimental methods, **Niederle**, **Segal**, and **Vesterlund** show that affirmative action may entice women to compete. When there is a preference for getting female winners, more women and fewer men will enter competitions, and this response exceeds what is warranted by changes in the probability of winning. One explanation for this change in behavior is that, under affirmative action, the probability of winning depends not only on one's rank relative to other group members but also on one's rank within gender. The changes in competitive entry have important implications when assessing the costs associated with securing a more diverse group of winners. Specifically, they imply that the minimum performance threshold for winners need not be lowered to the extent predicted based on ex-ante entry decisions. Interestingly, it need not be costly to achieve a more diverse set of winners.

Illegal arms are responsible for thousands of deaths in civil wars every year. Yet, their trade is very hard to detect. **DellaVigna** and **Ferrara** propose a method for statistically detecting illegal arms trade based on the investor knowledge embedded in financial markets. They focus on eight countries under UN arms embargo in the period 1990-2005. They consider events during the embargo that suddenly increase or decrease conflict intensity, and examine the contem-

poraneous stock returns of weapon-making companies. If the companies are not trading or are trading legally, then an event worsening the hostilities should not affect stock prices or affect them adversely, because it delays the removal of the embargo. Conversely, if the companies are trading illegally, then the event may increase stock prices, because it increases the demand for illegal weapons. The authors detect a large and significant positive reaction for companies trading in markets where the legal and reputation costs of illegal trades are likely to be lower. The results hold using measures of corruption and transparency in arms trade, or membership in OECD. The researchers also suggest a method for detecting potential embargo violations based on systematic stock reactions by individual companies. They identify 29 company-country pairs that display a pattern of reactions consistent with embargo violation. The authors' analysis suggests that investors believe that some companies are selling arms that will ultimately reach countries under embargo.

**Meyer** and **Mok** examine unemployment duration and the incidence of claims following a 36 percent increase in the maximum weekly benefit in New York State. This change sharply increased benefits for a large group of claimants but left benefits unchanged for a large share of claimants, thus providing a natural comparison group. In addition, the New York benefit increase has the special features that it was unexpected and applied to in-progress spells. These features allow the effects on duration to be separated convincingly from the effects on incidence. The results show a sharp fall in the hazard of leaving unemployment insurance (UI) that coincides with the increase in benefits. Also, the benefit level appears to have had a substantial effect on the incidence of claims, and this change in incidence biases the duration estimates. Further, at least in this case, the evidence suggests that standard methods that identify duration effects through nonlinearities in the benefit schedule are not badly biased.

One of the strongest trends in recent macroeconomic modeling of labor mar-

ket fluctuations is to treat unemployment inflows as acyclical. This trend stems in large part from an influential paper by Shimer on "Reassessing the Ins and Outs of Unemployment," that is, the extent to which increased unemployment during a recession arises from an increase in the number of unemployment spells versus an increase in their duration. After broadly reviewing the previous litera-

ture, **Elsby, Michaels, and Solon** replicate and extend Shimer's main analysis. Like Shimer, they find an important role for increased duration. But contrary to Shimer's conclusions, they find that even his own methods and data, when viewed in an appropriate metric, reveal an important role for increased inflows to unemployment as well. This finding is further strengthened by their refinements

of Shimer's methods of correcting for data problems and by their detailed examination of particular components of the inflow to unemployment. They conclude that a complete understanding of cyclical unemployment requires an explanation of countercyclical inflow rates as well as procyclical outflow rates.

## Health Economics

The NBER's Program on Health Economics met in Cambridge on April 13. Program Director Michael Grossman organized the meeting. These papers were discussed

**Javier A. Birchenall**, University of California, Santa Barbara, and **Rodrigo R. Soares**, University of Maryland and NBER, "Altruism, Fertility, and the Value of Children: Health Policy Evaluation and Intergenerational Welfare"

**Donald Kenkel**, Cornell University and NBER, "The Evolution of the Schooling-Smoking Gradient"

**Charles L. Baum II**, Middle Tennessee State University, and **Christopher J. Ruhm**, University of North Carolina and NBER, "Age, Socioeconomic Status, and Obesity Growth"

**Emily Oster**, University of Chicago and NBER, "HIV and Sexual Behavior Change: Why not Africa?" (NBER

Working Paper No. 13049)

**Elizabeth Oltmans Ananat**, Duke University, and **Daniel M. Hungerman**, University of Notre Dame and NBER, "The Power of the Pill for the Next Generation"

**Tinna Laufey Asgeirsdottir**, University of Iceland, "Health and Income: The Case of Iceland"

**Birchenall** and **Soares** account for the value of children and future generations in the evaluation of health policies by incorporating altruism and fertility into a "value of life" type of framework. They are able to express adults' willingness to pay for changes in child mortality and to incorporate the welfare of future generations into the evaluation of current policies. Their model clarifies a series of puzzles from the literature on the "value of life" and on intergenerational welfare comparisons. They show that, by incorporating altruism and fertility into the analysis, the estimated welfare gain from recent reductions in mortality in the United States easily doubles.

**Kenkel** explores how the schooling-smoking gradient has evolved over time. Using data from 11 Gallup Surveys conducted between 1954 and 1999, he finds that the schooling-smoking gradient first emerged in tandem with a

schooling-health knowledge gradient. As early as 1957, 62 percent of college graduates agreed that smoking was a cause of lung cancer, compared to only 46 percent of those with less than a college degree. After the mid-1970s, the schooling-knowledge gradient began to flatten, but the schooling-smoking gradient did not. To further explore patterns of smoking behavior, Kenkel econometrically analyzes data on individual life-course smoking histories from retrospective information available in six cycles of the Tobacco Use Supplements to the Current Population Survey (TUS-CPS). With these data, he estimates discrete-time hazard models of smoking cessation as functions of schooling, measures of the health information environment, and other control variables.

The rapid growth in obesity represents a major public concern. Although body weight tends to increase with age,

the evolution of obesity over the life-cycle is not well understood. **Baum** and **Ruhm** use longitudinal data from the National Longitudinal Survey of Youth to examine how body weight changes with age for a cohort moving into and through early adulthood. They further investigate how the age-obesity gradient differs with socioeconomic status (SES) and begin to examine channels for these SES disparities. Their analysis yields three main findings. First, weight rises with age but is inversely related to SES at given ages. Second, the SES-obesity gradient widens over the lifecycle, which is consistent with research on other health outcomes, such as overall health status or specific medical conditions. Third, a substantial portion of the SES "effect" is transmitted through race/ethnicity and the translation of advantaged family backgrounds during childhood to higher levels of subsequent education. Conversely, little of

the SES difference appears to be propagated through family income, marital status, number of children, or a limited set of health behaviors that are accounted for. However, approximately half of the SES-weight correlation persists after the inclusion of controls, illustrating the need for further study of the mechanisms for the gradient.

The response of sexual behavior to HIV in Africa is an important input for predicting the path of the epidemic and focusing prevention efforts. Existing estimates suggest limited behavioral response, but generally fail to take into account possible differences across individuals. A simple model of sexual behavior choice among forward-looking individuals implies that behavioral response should be larger for those with lower non-HIV mortality risks and those who are richer. **Oster** estimates behavioral response using a new instrumental variables strategy, instrumenting for HIV prevalence with distance to the origin of the virus. She finds low response on average, consistent with the existing literature, but larger responses for those who are richer or face lower non-HIV mortality. She also suggests, based on a very simple calibration, that the magnitude of behavioral response in Africa is similar to that among gay men in the United States once differences in

income and life expectancy are taken into account.

**Ananat** and **Hungerman** ask how the diffusion of oral contraception to young unmarried women affected the number and parental characteristics of children born to these women. Using census data, they document that access to the pill led to falling short-term fertility rates for young women. They further document the success of the pill in reducing unwanted pregnancies by providing evidence that increased availability of the pill led to fewer abortions among young women. They also find significant effects of pill access at a young age on completed lifetime fertility at both the intensive and extensive margins. Finally, they examine how the pill affected average maternal characteristics. Their results indicate that the pill's effects on the average mother were sometimes very different from the pill's effects on the average woman. Further, they find that early pill access led to an increase in the share of children whose mothers were married, were college-educated, had professional occupations, and who were able to "have it all": marriage, children, and a professional career.

Health-care costs are rising in Iceland, as in the rest of the Western World. Furthermore, the Icelandic gov-

ernment takes financial responsibility for the medical-care demands of its citizens, to the point where non-governmental funding of such consumption has been negligible for several decades. This centralization of the medical system is motivated by equalitarian views and makes the case of Iceland both important and interesting. It is largely unknown whether income-related inequalities in health have been effectively restrained. Is the effect of income largely alleviated, or does it remain a significant influence in the production of good health? **Asgeirsdottir** considers the effect of household income in the production of health, using data that became available as a product of a postal survey, conducted in 2002, by Gallup-Iceland. With one of the most expensive centralized medical systems in the world, the scale of the matter has reached a point where comparative Icelandic studies are essential. The results show that income influences an Icelander's health under the current political and social structure. Results reveal a statistically significant relationship between health and income in Iceland, smaller than that reported for other countries. Furthermore, unexpected adverse effects of income on health are revealed at high-income levels.

## Monetary Economics

NBER's Program on Monetary Economics met at the Federal Reserve Bank of New York on April 13. NBER researchers Marc P. Giannoni of Columbia Business School and Kenneth D. West of the University of Wisconsin organized this program:

**Anil K Kashyap**, University of Chicago and NBER, and **Francois Gourio**, Boston University, "Investment Spikes: New Facts and a General Equilibrium Exploration"  
Discussant: Nobuhiro Kiyotaki, Princeton University and NBER

**Christina D. Romer** and **David H. Romer**, University of California, Berkeley and NBER, "The

Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks"  
Discussant: Francesco Giavazzi, MIT and NBER

**Ariel Burstein**, University of California, Los Angeles and NBER, and **Christian Hellwig**, University of California, Los Angeles, "Prices and Market Shares in a Menu Cost Model"  
Discussant: Mikhail Golosov, MIT and NBER

**James D. Hamilton**, University of California, San Diego and NBER, "Daily Monetary Policy Shocks and the Delayed Response of New Home Sales"  
Discussant: John H. Cochrane,

University of Chicago and NBER

**Glenn D. Rudebusch** and **John C. Williams**, Federal Reserve Bank of San Francisco, "Revealing the Secrets of the Temple: The Value of Publishing Central Bank Interest Rate Projections"  
Discussant: William English, Federal Reserve Board

**Stefano Eusepi**, Federal Reserve Bank of New York, and **Bruce Preston**, Columbia University, "Central Bank Communication and Expectations Stabilization"  
Discussant: Christopher A. Sims, Princeton University and NBER

Using plant-level data from Chile and the United States, **Kashyap** and **Gourio** show that investment spikes are highly pro-cyclical, so much so that changes in the number of establishments undergoing investment spikes (the "extensive margin") account for the bulk of variation in aggregate investment. The number of establishments undergoing investment spikes also has independent predictive power for aggregate investment, even controlling for past investment and sales. The authors re-calibrate the Thomas (2002) model (that includes fixed costs of investing) so that it assigns a prominent role to extensive adjustment. The recalibrated model has different properties than the standard RBC model for some shocks.

**Romer** and **Romer** investigate the impact of changes in the level of taxation on economic activity. They use the narrative record — presidential speeches, executive-branch documents, and Congressional reports — to identify the size, timing, and principal motivation for all major postwar tax policy actions. This narrative analysis allows them to separate revenue changes resulting from legislation from changes occurring for other reasons. It also allows them to

further separate legislated changes into those taken for reasons related to prospective economic conditions, such as countercyclical actions and tax changes tied to changes in government spending, and those taken for more exogenous reasons, such as to reduce an inherited budget deficit or to promote long-run growth. They then examine the behavior of output following these more exogenous legislated changes. The resulting estimates indicate that tax increases are highly contractionary. The effects are strongly significant, highly robust, and much larger than those obtained using broader measures of tax changes. The large effect stems in considerable part from a powerful negative effect of tax increases on investment. They also find that legislated tax increases designed to reduce a persistent budget deficit appear to have much smaller output costs than other tax increases.

**Burstein** and **Hellwig** propose a procedure to infer the quantitative significance of firm-level pricing complementarities in the context of a menu cost model of price adjustment, using product-level data on prices and market shares. They then apply this procedure by calibrating their model (in which pricing

complementarities are based on decreasing returns to scale at the product level) to one particular dataset of supermarket scanner data, to explore the quantitative importance of pricing complementarities for the propagation of nominal disturbances at business cycle frequencies. Although the data support moderately strong levels of pricing complementarities, they appear to be too weak to generate much larger aggregate real effects from nominal shocks than a model without pricing complementarities.

**Hamilton** argues that a change in the fed funds target begins to affect the economy as soon as it becomes anticipated by markets, with innovations in mortgage rates driven in part by innovations in the level and slope of the term structure of expected near-horizon fed funds rates. Despite this instantaneous anticipatory response of mortgage rates, the consequences for housing of a change in monetary policy are drawn out over a long period of time because of heterogeneity across households in time required to purchase a home. This framework facilitates detailed measurement and interpretation of the time lags relating monetary policy to the housing market, and motivates a daily index that can



be used to summarize the current and future economic implications of recent Fed policy changes.

The modern view of monetary policy stresses its role in shaping the entire yield curve of interest rates in order to achieve various macroeconomic objectives. A crucial element of this process involves guiding financial market expectations of future central bank actions. Recently, a few central banks have started to explicitly signal their future policy intentions to the public, and two of these banks have even begun publishing their internal interest rate projections. **Rudebusch** and **Williams** examine the macroeconomic effects of direct revelation of a central bank's expectations about the future path of the policy rate. They show that, in an economy where private agents have imperfect information about the

determination of monetary policy, central bank communication of interest rate projections can help shape financial market expectations and may improve macroeconomic performance.

**Eusepi** and **Preston** analyze the value of communication in the implementation of monetary policy. The central bank is uncertain about the current state of the economy. Households and firms do not have a complete economic model of the determination of aggregate variables, including nominal interest rates, and must learn about their dynamics using historical data. Given these uncertainties, when the central bank implements optimal policy, the Taylor principle is not sufficient for macroeconomic stability: for all reasonable parameterizations, self-fulfilling expectations are possible. To mitigate this instability,

three communication strategies are contemplated: 1) communicating the precise details of the monetary policy — that is, the variables and coefficients; 2) communicating just the variables on which monetary policy decisions are conditioned; and 3) communicating the inflation target. The first two strategies restore the Taylor principle as a sufficient condition for stabilizing expectations. In contrast, in economies with persistent shocks, communicating the inflation target fails to protect against expectations driven fluctuations. These results underscore the importance of communicating the systematic component of current and future monetary policy decisions: announcing an inflation target is not enough to stabilize expectations — one must also announce how this target will be achieved.

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## Bureau Books

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## NBER International Seminar on Macroeconomics 2005

This annual conference volume, which was edited by Jeffrey A. Frankel and Christopher A. Pissarides, is available from The MIT Press. The paperback price is \$30.00; the price of the clothbound volume is \$60.00.

The NBER's International Seminar on Macroeconomics brings together leading U.S. and European economists to discuss a broad range of issues in global

macroeconomics. An international companion to the more U.S.-focused *NBER Macroeconomics Annual*, this 2005 volume first explores issues of interest to all advanced economies and then analyzes topical questions concerning the eastward expansion of the European Monetary Union.

Frankel is a Research Associate in the NBER's Programs on International

Finance and Macroeconomics and International Trade and Investment. He is also the James W. Harpel Professor of Capital Formation and Economic Growth at Harvard University's Kennedy School of Government. Pissarides is a Professor of Economics at the London School of Economics.

## NBER Macroeconomics Annual 2006

*NBER Macroeconomics Annual 2006*—edited by Daron Acemoglu, Kenneth Rogoff, and Michael Woodford—will be available from the MIT Press this spring. The paperback price is \$35.00 and the clothbound price is \$70.00.

This 21st edition of the *NBER Macroeconomics Annual* treats questions that are at the cutting edge of macroeco-

nomics and are central to current policy debates. The first four papers and discussions focus on such issues as how to identify sources of business cycle fluctuations and the evolution of U.S. macroeconomic policies. The last two papers analyze theoretical developments in optimal taxation policy and equilibrium yield curves.

All three editors are Research

Associates in the NBER's Program on Economic Fluctuations and Growth. Acemoglu is the Charles P. Kindleberger Professor of Applied Economics at MIT. Rogoff is the Thomas D. Cabot Professor of Public Policy and Professor of Economics at Harvard University. Woodford is the John Bates Clark Professor of Political Economy at Columbia University.

## Tax Policy and the Economy, Volume 21

*Tax Policy and the Economy, Volume 21*, edited by James M. Poterba, will be available from the MIT Press this spring. The paperback price is \$25.00; the clothbound price is \$58.00.

This NBER series presents current academic research findings in the areas of taxation and government spending. The papers included provide important background information for policy analysts in

government and the private sector without making specific policy recommendations. This twenty-first installment in the series reports on recent research concerning both taxation and social insurance policy. The papers discuss Medicaid's implicit tax on the benefits of private long-term care insurance, an alternative to current unemployment insurance systems, the tax treatment of health insur-

ance expenditures, the effective marginal tax rates on labor supply and saving, and the rationale for and effect of energy-related tax policies.

Poterba has been Director of the NBER Public Economics Research Program since 1991 and has edited volumes 6–20 of *Tax Policy and the Economy*. He is also Mitsui Professor in the Department of Economics at MIT.

The following volumes may be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628-2215; 1-800-621-2736. Academic discounts of 10 percent for individual volumes and 20 percent for standing orders for *all* NBER books published by the University of Chicago Press are available to university faculty; orders must be sent on university stationery.

## Hard-to-Measure Goods and Services: Essays in Honor of Zvi Griliches

*Hard-to-Measure Goods and Services: Essays in Honor of Zvi Griliches*, edited by Ernst R. Berndt and Charles R. Hulten, will be available from the University of Chicago Press this spring. This volume is number 67 in the series, NBER Studies in Income and Wealth. The price of the book is \$99.00.

Celebrated economist Zvi Griliches's entire career can be viewed as an attempt to advance the cause of accuracy in economic measurement. His interest in the causes and consequences of technical progress led to his pathbreaking work on price hedonics, now the principal analytical

technique available to account for changes in product quality. *Hard-to-Measure Goods and Services*, a collection of papers from an NBER conference held in Griliches's honor, is a tribute to his many contributions to current economic thought. Here, leading scholars of economic measurement address issues in the areas of productivity, price hedonics, capital measurement, diffusion of new technologies, and output and price measurement in "hard-to-measure" sectors of the economy. Furthering Griliches's vital work, which changed the way that economists think about the U.S. National Income and Product Accounts,

this volume is essential for all those interested in the labor market, economic growth, production, and real output.

Berndt directs the NBER's Program on Productivity and is the Louis B. Seley Professor of Applied Economics at MIT's Sloan School of Management. Hulten is an NBER Research Associate in the Productivity Program and the Chairman of the Executive Committee of the Conference on Research in Income and Wealth. He is also a professor of economics at the University of Maryland.

## Mexican Immigration to the United States

*Mexican Immigration to the United States*, edited by George J. Borjas, is available from the University of Chicago Press this spring. This NBER Conference Report costs \$60.00.

From debates on Capitol Hill to the popular media, Mexican immigrants stir widespread controversy. By 2003, they accounted for 28.3 percent of all foreign-born inhabitants of the United States. *Mexican Immigration to the United States* analyzes the astonishing economic impact of this historically unprecedented exodus.

Why do Mexican immigrants gain citizenship and employment at a slower rate than non-Mexicans? Does their migration adversely affect the working conditions of lower-skilled workers who already reside here? And, how rapid is the intergenerational mobility among Mexican immigrant families? This authoritative volume provides a historical context for Mexican immigration to the United States and reports new findings on an immigrant influx whose size and character will force us to rethink economic policy for decades

to come. *Mexican Immigration to the United States* will be necessary reading for anyone concerned about social conditions and economic opportunities in both countries.

Borjas is a Research Associate in the NBER's Program on Labor Studies and the Robert W. Scrivner Professor of Economics and Social Policy at Harvard University's Kennedy School of Government.

## G7 Current Account Imbalances: Sustainability and Adjustment

*G7 Current Account Imbalances: Sustainability and Adjustment*, edited by Richard H. Clarida, is available from the University of Chicago Press this spring. The price of this NBER Conference Report is \$99.00.

The current account deficit of the United States is more than 6 percent of its gross domestic product—an all-time high. The rest of the world, including other G7 countries such as Japan and Germany, collectively must run current account surpluses to finance this deficit. How long can such unevenness between imports and exports be sustained, and what form

might their eventual reconciliation take? Putting forth scenarios ranging from a gradual correction to a crash landing for the dollar, *G7 Current Account Imbalances* brings together economists from around the globe to consider the origins, status, and future of those disparities.

An esteemed group of collaborators examines the role of the bursting of the dot-com bubble, the history of previous episodes of current account adjustments, and the possibility of the Euro surpassing the dollar as the leading international reserve currency. Although there are areas of broad agreement—that the imbalances

will ultimately decline and that currency revaluations will be part of the solution—many areas of contention remain regarding both the dangers of imbalances and the possible forms of adjustment. This volume will be of tremendous value to economists, politicians, and business leaders alike as they look to the future of the G7 economies.

Clarida is a Research Associate in the NBER's Programs on International Finance and Macroeconomics and International Trade and Investment. He is also the C. Lowell Harriss Professor of Economics at Columbia University.

## Capital Controls and Capital Flows in Emerging Economies

*Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences*, edited by Sebastian Edwards, is available from the University of Chicago Press this spring. The price of this NBER Conference Report is \$99.00.

Some scholars argue that the free movement of capital across borders enhances welfare; others claim that it represents a clear peril, especially for emerging nations. In *Capital Controls and Capital Flows in Emerging Economies*, a distinguished group of contributors exam-

ines both the advantages and the pitfalls of restricting capital mobility in these emerging nations. In the aftermath of the East Asian currency crises of 1997, the authors consider mechanisms that eight countries have used to control capital inflows and evaluate their effectiveness in altering the maturity of the resulting external debt and reducing macroeconomic vulnerability. This conference volume is essential reading for all those interested in emerging nations and the costs and benefits of restricting international

capital flows.

Edwards is a Research Associate in the NBER's Programs in International Finance and Macroeconomics and International Trade and Investment. He is also the Henry Ford II Professor of International Business Economics at the Anderson Graduate School of Management at the University of California, Los Angeles (UCLA).

## The Decline of Latin American Economies: Growth, Institutions, and Crises

*The Decline of Latin American Economies: Growth, Institutions, and Crises*, edited by Sebastian Edwards, Gerardo Esquivel, and Graciela Márquez, is available from the University of Chicago Press this spring. This NBER Conference Report is priced at \$85.00.

Latin America's economic performance is mediocre at best, despite abundant natural resources and flourishing neighbors to the north. The perplexing question of how some of the wealthiest nations in the world during the nineteenth century are now the most crisis-prone has long puzzled economists and

historians. *The Decline of Latin American Economies* examines the reality behind the struggling economies of Argentina, Chile, and Mexico. A distinguished panel of experts argues that slow growth, rampant protectionism, and rising inflation plagued Latin America for years, where corrupt institutions and political unrest undermined the financial outlook of already besieged economies. Tracing Latin America's growth and decline through two centuries, this volume illustrates how a once-prosperous continent now lags behind. Of interest to scholars and policymakers alike, it offers new insight into

the relationship between political systems and economic development.

Edwards is a Research Associate in the NBER's Programs in International Finance and Macroeconomics and International Trade and Investment. He is also the Henry Ford II Professor of International Business Economics at the Anderson Graduate School of Management at the University of California, Los Angeles (UCLA). Esquivel and Márquez are affiliated with El Colegio de México.

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