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# NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

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2008 Number 1

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## NBER Selects James M. Poterba as Next President

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James M. Poterba,  
incoming President of the NBER

In February 2008, the NBER's Board of Directors selected James M. Poterba as the NBER's next President and Chief Executive Officer. He will succeed Martin Feldstein, who has led the NBER since 1977, and will assume the post on July 1, 2008. Poterba is currently the Director of the NBER's Program on Public Economics and the Mitsui Professor of Economics, and economics department head, at MIT.

Poterba began his association with the NBER in 1978, during his sophomore year at Harvard College. He was hired as a research assistant, working primarily with Martin Feldstein and Lawrence Summers on a range of projects involving capital income taxation. He also assisted NBER Research Associate Victor Zarnowitz in analyzing data collected as part of the American Statistical Association-NBER Survey of Economic Forecasters. Poterba went on to graduate studies at Nuffield College, Oxford, where he received a D.Phil. degree in Economics.

He was appointed an NBER Faculty Research Fellow in the Business Taxation and Finance Program in 1982, and promoted to NBER Research Associate in 1985. In 1989, he was selected to be the Associate Director of what by then had been renamed the Program on Taxation, working with inaugural Program Director David Bradford. In 1991, when Bradford was appointed to the President's Council of Economic Advisers, Poterba took over as Director of the newly renamed Program on Public Economics. He also assumed the editorship of the *Tax Policy and the Economy* series, a set of annual volumes containing the papers presented at an NBER conference in Washington that brings recent research in public economics to the attention of policymakers.

During his time as Program Director for the Public Economics Program, Poterba has led a number of taxation-related NBER projects on such topics as: the International Comparison of Tax-Based Saving Incentives; Residential Real Estate; the Tax-Exempt Bond Market; Behavioral Responses to Taxation; and the Economic Analysis of Tax Expenditures. His own research has ranged widely across issues involving tax policy, financial markets, and retirement saving. His early work applied rational expectations insights about asset markets to analyzing how house prices and housing construction would be affected by changes in the tax treatment of owner-occupied housing. Throughout his career, he also has been interested in taxation and housing markets. Currently, he and Todd Sinai are studying how estimates of the tax expenditures for deductions of mortgage interest and state and local property taxes depend on assumptions about behavioral responses to income tax incentives.

Poterba has also explored issues in financial economics and corporate

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finance. He and Lawrence Summers collaborated on an influential study suggesting that the prices of many financial assets, including common stocks and currencies, exhibit mean-reverting tendencies. They also studied corporate dividend policy and the influence of dividend taxation on investment decisions, joining a long-standing public finance debate about the economic effects of dividend taxation.

For more than a decade, Poterba has collaborated with NBER researchers Steven F. Venti and David A. Wise on a series of projects investigating how tax-deferred retirement saving accounts, such as 401(k) plans, affect household balance sheets and preparation for retirement. Initially, they studied the degree of substitution between saving in tax-favored accounts and other forms of saving, and concluded that on balance 401(k) plans had increased private and national saving. Their later work has examined how the growing importance of defined-contribution retirement programs, such as 401(k)s, and the coincident decline in traditional defined-benefit pension arrangements, has affected the riskiness of retirement income for U.S. households. In their latest work, Poterba, Venti, and Wise are examining the role of housing equity in contributing to financial preparation for retirement.

Aside from two sabbaticals at Stanford, one as a Fellow of the Center for Advanced Study in Behavioral Sciences and one as a Distinguished Visiting Fellow at the Hoover Institution, and a one-quarter visit to the University of Chicago Graduate School of Business, Poterba has spent his entire 25-year academic career at MIT. He was appointed Mitsui Professor of Economics in 1996, and served as Associate Department Head, with a one-year sabbatical hiatus, between 1994 and 2006. He has been Department Head since 2006.

In 2005, Poterba served as a member of the President's Advisory Panel on Federal Tax Reform, a group that proposed systematic changes to the federal income tax. He is a former Executive Committee member for the American Economic Association, a former member of the Board of Directors of the American Finance Association, and the current First Vice-President of the National Tax Association.

Poterba is married to Nancy L. Rose, an industrial organization economist on the MIT Economics faculty who is also an NBER Research Associate and Director of the NBER's Program on Industrial Organization. They have three children, aged 18, 16, and 13, and reside in Belmont, Massachusetts.

# The Declining American High School Graduation Rate: Evidence, Sources, and Consequences

James J. Heckman\* and Paul A. LaFontaine†

The high school graduation rate is a barometer of the health of American society and the skill level of its future workforce. Throughout the first half of the twentieth century, each new cohort of Americans was more likely to graduate from high school than the preceding one. This upward trend in secondary education increased worker productivity and fueled American economic growth.<sup>1</sup>

In the past 25 years, growing wage differentials between high school graduates and dropouts increased the economic incentives for high school graduation. The real wages of high school dropouts have declined since the early 1970s while those of more skilled workers have risen sharply.<sup>2</sup> Heckman, Lochner, and Todd<sup>3</sup> show that in recent decades, the internal rate of return to graduating from high school versus dropping out has increased dramatically and is now above 50 percent. Therefore, it is surprising and disturbing that, at a time when the premium for skills has increased and the return to high school graduation has risen, the high school dropout rate in

America is increasing. America is becoming a polarized society. Proportionately more American youth are going to college and graduating than ever before. At the same time, proportionately more are failing to complete high school.

One graduation measure issued by the National Center for Educational Statistics (NCES), the status completion rate<sup>4</sup>—widely regarded by the research community as the official rate—shows that U.S. students responded to the increasing demand for skill by completing high school at increasingly higher rates. By this measure, U.S. schools now graduate nearly 88 percent of students and black graduation rates have converged to those of non-Hispanic whites over the past four decades.

A number of recent studies have questioned the validity of the status completion rate and other graduation rate estimators. They have attempted to develop more accurate estimators of high school graduation rates.<sup>5</sup> Heated debates about the levels and trends in the true high school graduation rate have appeared in the popular press.<sup>6</sup> Depending on the data sources, definitions, and methods used, the U.S. graduation rate has been estimated to be anywhere from 66 to 88 percent in recent years—an astonishingly wide range for such a basic statistic. The range of estimated minority rates is even greater—from 50 to 85 percent.

In an NBER Working Paper published

in 2007<sup>7</sup>, we demonstrate why such different conclusions have been reached in previous studies. We use cleaner data, better methods, and a wide variety of data sources to estimate U.S. graduation rates. When comparable measures are used on comparable samples, a consensus can be reached across all data sources. After adjusting for multiple sources of bias and differences in sample construction, we establish that: 1) the U.S. high school graduation rate peaked at around 80 percent in the late 1960s and then declined by 4-5 percentage points; 2) the actual high school graduation rate is substantially lower than the 88 percent estimate; 3) about 65 percent of blacks and Hispanics leave school with a high school diploma, and minority graduation rates are still substantially below the rates for non-Hispanic whites. Contrary to estimates based on the status completion rate, we find no evidence of convergence in minority-majority graduation rates over the past 35 years. 4) Exclusion of incarcerated populations from some measures greatly biases the reported high school graduation rate for blacks.

These trends are for persons born in the United States and exclude immigrants. The recent growth in unskilled migration to the United States further increases the proportion of unskilled Americans in the workforce, apart from the growth attributable to a rising high school dropout rate.

As others have shown<sup>8</sup>, and we confirm, the most significant source of bias

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†Paul LaFontaine is affiliated with the American Bar Foundation.



in estimating graduation rates comes from including GED recipients as high school graduates. GEDs are high school dropouts who certify as the equivalents of ordinary graduates by passing an exam. Currently 15-20 percent of all new high school credentials issued each year are GEDs. In recent years, inclusion of GEDs as high school graduates has biased graduation rates by upwards of 7-8 percentage points. A substantial body of scholarship summarized in our 2008 book<sup>9</sup> shows that the GED program does not benefit most participants, and that GEDs perform at the level of dropouts in the U.S. labor market. The GED program conceals major problems in American society.

The decline in high school graduation is of interest in its own right as a measure of the performance of American schools. It has important implications for interpreting a wide variety of educational statistics. The slowdown in the high school graduation rate accounts for a substantial portion of the recent slowdown in the growth of college educated workers in the U.S. workforce.<sup>10</sup> This slowdown is not due to a decline in rates of college attendance among those who graduate high school.

Table I performs standard growth accounting, decomposing the change in college graduation into the change attributable to high school graduation, the change in college attendance given high school graduation, and the change in college grad-

uation given college attendance. It shows that the growth in college attendance and graduation for cohorts born before 1950 was fueled by growth in high school graduation. This contribution diminishes and turns negative for more recent cohorts of Americans.

The decline in high school graduation is greater for males than it is for females. Men now graduate from high school at significantly lower rates than women. For recent birth cohorts, the gap in college attendance between males and females is roughly 10 percent. However, the gap in college attendance given high school graduation is only 5 percent. Half of the growing gender gap in college going documented by Goldin, Katz, and Kuziemko<sup>11</sup> can be explained by declining rates of high school graduation.

Especially striking are the comparisons in graduation rates between minorities and whites. Our estimated black graduation rate is 15 percentage points higher than the 50 percent rate reported in some recent studies, but it is also 15 points lower than the NCES status completion rate. About 65 percent of blacks and Hispanics leave secondary schooling with a diploma. An additional 5 percent eventually receive a regular diploma through a variety of job training and adult education programs. According to the status completion rate, white and minority secondary completion rates have converged since the early 1970s.

However, these estimates exclude those who are in prison and count GED recipients as graduates. We show that when we count GED recipients as dropouts (incarcerated or not), there is little convergence in high school graduation rates between whites and minorities over the past 35 years. A significant portion of the racial convergence commonly reported in the literature is due to black males obtaining GED credentials in prison. Research by Tyler and Kling and Tyler and Lofstrom<sup>12</sup> shows that, when released, prison GEDs earn at the same rate as non-prison GEDs, and the GED does not reduce recidivism.

In the first half of the twentieth century, growth in high school graduation was the driving force behind increased college enrollments. The decline in high school graduation since 1970 (for cohorts born after 1950) has flattened college attendance and completion rates as well as growth in the skill level of the U.S. workforce. To increase the skill levels of its future workforce, America needs to confront a large and growing dropout problem.

The origins of this dropout problem have yet to be fully investigated. Evidence suggests a powerful role for the family in shaping educational and adult outcomes. A growing proportion of American children are being raised in disadvantaged families. This trend promises to reduce productivity and promote inequality in the America of tomorrow.

**Table I. Decomposition of the Sources of Change in College Graduation in the Cohorts Born Between 1900 and 1980 (Broken Down by Birth Cohorts 1900-1949 vs. Birth Cohorts 1950-1980)**

Totals Pre- and Post 1950 Cohort	Change in College Graduation Rate Due to Change in High School Graduation Rate	Change in College Graduation Rates Due to Change in College Attendance Given High School Graduation	Change in College Graduation Rate Due to Change in Finishing College Given Enrollment in College	Change Due to Interaction
	<b>Overall</b>			
Birth Years 1900-1949	8.99 %	3.17 %	0.81 %	0.92 %
% of Total Change	64.71%	22.86%	5.80%	6.63%
Birth Years 1950-1980	-1.47%	6.70%	5.20%	0.03%
% of Total Change	-14.05%	64.02%	49.75%	0.28%

(Table continued on next page)

Totals Pre- and Post 1950 Cohort	Change in College Graduation Rate Due to Change in High School Graduation Rate	Change in College Graduation Rates Due to Change in College Attendance Given High School Graduation	Change in College Graduation Rate Due to Change in Finishing College Given Enrollment in College	Change Due to Interaction
<b>Males</b>				
Birth Years 1900-1949	12.38%	3.81%	0.40%	0.35%
% of Total Change	73.10%	22.49%	2.36%	2.06%
Birth Years 1950-1980	-1.59%	2.90%	0.86%	0.08%
% of Total Change	-70.02%	128.26%	38.14%	3.63%
<b>Females</b>				
Birth Years 1900-1949	7.06%	3.69%	2.19%	0.78%
% of Total Change	51.44%	26.89%	15.98%	5.68%
Birth Years 1950-1980	-0.94%	9.50%	6.20%	0.65%
% of Total Change	-6.13%	61.70%	40.23%	4.20%

Source: Heckman and LaFontaine (2007), op cit.

<sup>1</sup> See J. B. DeLong, C. Goldin, and L. F. Katz, "Sustaining U.S. Economic Growth," in *Agenda for the Nation*, H. Aaron et al., eds., Washington, D.C.: The Brookings Institution, 2003, pp. 17–60.

<sup>2</sup> See D. H. Autor, L. F. Katz, and M. S. Kearney, "Rising Wage Inequality: The Role of Composition and Prices," NBER Working Paper No. 11627, September 2005.

<sup>3</sup> J. J. Heckman, L. J. Lochner, and P. E. Todd, "Earnings Functions and Rates of Return," forthcoming *Journal of Human Capital*.

<sup>4</sup> J. Laird, G. Kienzl, M. DeBell, and C. Chapman, "Dropout Rates in the United States: 2005," NCES 2007-059, Washington, DC: National Center for Education Statistics, Institute of Education Sciences, 2007.

<sup>5</sup> See J. P. Greene, "High School Graduation Rates in the United States," Civic Report No. 31, New York: Center for Civic Innovation at the Manhattan Institute with Black Alliance for Educational Options, 2001; C. B. Swanson, Who Graduates? Who Doesn't? A Statistical Portrait of Public High School Graduation, Class of 2001, Washington, DC: Urban Institute Education Policy Center, 2004; C. B. Swanson and D. Chaplin, "Counting High School Graduates when Graduates Count: Measuring Graduation Rates

under the High Stakes of NCLB," Washington, DC: Urban Institute Education Policy Center, 2003; J. Miao and W. Haney, "High School Graduation Rates: Alternative Methods and Implications," Education Policy Analysis Archives (12), 2004. pp. 1–68; and J. R. Warren, "State-Level High School Completion Rates: Concepts, Measures, and Trends," Education Policy Analysis Archives, 13, 2005. pp. 1–34.

<sup>6</sup> For a sample, see the heated debate in the popular press in May 2006 [www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201187.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201187.html); [www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201197.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201197.html); and [www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201189.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201189.html).

<sup>7</sup> J. J. Heckman and P. A. LaFontaine, "The American High School Graduation Rate: Trends and Levels," NBER Working Paper No. 13670, December 2007.

<sup>8</sup> See C. E. Finn, Jr., "The High School Dropout Puzzle," *Public Interest*, 87 (1987), pp. 3–22. Also see, M. Frase, "Dropout Rates in the United States: 1988," Washington, DC: NCES, 1988.

<sup>9</sup> J. J. Heckman and P. A. LaFontaine, "The GED and the Problem of Non-cognitive Skills in America," Chicago, IL:

University of Chicago Press, forthcoming.

<sup>10</sup> See D. Card and T. Lemieux, "Dropout and Enrollment Trends in the Post-War Period: What Went Wrong in the 1970s?" in *Risky Behavior among Youths: An Economic Analysis*, J. Gruber, ed., Chicago, IL: University of Chicago Press, 2001; and D. T. Ellwood, "The Sputtering Labor Force of the Twenty-First Century: Can Social Policy Help?" in *The Roaring Nineties: Can Full Employment be Sustained?* A. Krueger and R. Solow, eds., New York: Russell Sage Foundation, 2001, pp. 421–89.

<sup>11</sup> C. Goldin, L. F. Katz, and I. Kuziemko, "The Homecoming of American College Women: The Reversal of the College Gender Gap," *Journal of Economic Perspectives*, 20 (4), Fall 2006, pp. 133–56.

<sup>12</sup> J. H. Tyler and J. R. Kling, "Prison-Based Education and Re-entry into the Mainstream Labor Market," in *Barriers to Re-entry? The Labor Market for Released Prisoners in Post-Industrial America*, S. Bushway, M. Stoll, and D. Weiman, eds., New York: Russell Sage Foundation Press, 2007. J. H. Tyler and M. Lofstrom, "Modeling the Signaling Value of the GED with an Application in Texas," forthcoming, Review of Research in Labor Economics.

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## NBER Profile: *James J. Heckman*

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James J. Heckman, who shared the 2000 Nobel Memorial Prize in Economic Sciences, is a Research Associate in the NBER's Program on Labor Studies. He is also the Henry Schultz Distinguished Service Professor of Economics at the University of Chicago, where he has served since 1973, and where he directs the Economics Research Center and the Center for Social Program Evaluation at the Harris School. In addition, he is the Professor of Science and Society in University College Dublin and a Senior Research Fellow at the American Bar Foundation.

Heckman received his B.A. in mathematics from Colorado College in 1965 and his Ph.D. in economics from Princeton University in 1971. His work has been devoted to the development of a scientific basis for economic policy evaluation, with special emphasis on models of individuals and disaggregated groups, and to the problems and possibilities created by heterogeneity, diversity, and unobserved counterfactual states. He has developed a body of new econometric tools that address these problems and possibilities. He established a strong causal effect of the 1964 Civil Rights Act on promoting African-American economic progress. He established that GEDs are not the equivalent of high school graduates and perform

only slightly better than high school dropouts who do not exam certify. GEDs are as smart as high school graduates but lack noncognitive skills. He has built on this work to develop the economics of personality and motivation.

His recent research focuses on human development and lifecycle skill formation, with a special emphasis on the economics of early childhood. He is currently conducting new social experiments on early childhood interventions and reanalyzing old experiments. His research has given policymakers important new insights into areas such as education, job-training, the importance of accounting for general equilibrium in the analysis of labor markets, anti-discrimination law, and civil rights.

Heckman has published over 250 articles and several books. His most recent books include: *Inequality in America: What Role for Human Capital Policy?* (with Alan Krueger) and *Evaluating Human Capital Policy, and Law and Employment: Lessons From Latin America and the Caribbean* (with C. Pages).

Heckman has received numerous awards for his work, including the John Bates Clark Award of the American Economic Association in 1983, the 2005 and 2007 Dennis Aigner Award for Applied Econometrics from the *Journal*



*of Econometrics*, the 2007 Theodore W. Schultz Award from the American Agricultural Economics Association, the 2005 Jacob Mincer Award for Lifetime Achievement in Labor Economics, and the 2005 Ulysses Medal from the University College Dublin. He is currently Associate Editor of the *Journal of Labor Economics* and the *Journal of Applied Econometrics*. He is also a member of the National Academy of Sciences, and a fellow of the American Academy of Arts and Sciences, the Econometric Society, the Society of Labor Economics, and the American Statistical Association.

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## Conferences

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### Ninth Annual Conference in India

On January 13–15, 2008 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 ninth 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: Alan J. Auerbach, University of California, Berkeley; Katherine Baicker, Mihir A. Desai, Martin S. Feldstein, and Elhanan Helpman, NBER and Harvard University; Michael P. Dooley, University of California, Santa Cruz; Brian G. Knight, Brown University; Gary D. Libecap, University of California, Santa Barbara; and Raghuram Rajan, NBER

and University of Chicago. Takatoshi Ito, NBER and University of Tokyo, also participated in the discussions.

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.



## International Differences in Entrepreneurship

Joshua Lerner, NBER and Harvard Business School, and Antoinette Schoar, NBER and MIT, organized a conference on “International Differences in Entrepreneurship” that took place on February 1 and 2. These papers were discussed:

**Camilo Mondragon Velez**, International Finance Corporation, and **Ximena Pena**, Universidad de los Andes, “Business Ownership and Self-Employment in Developing Economies — the Colombian Case”  
Discussant: Ramana Nanda, Harvard University

**Claire Lelarge**, French Ministry of Industry; **David Sraer**, INSEE; and **David Thesmar**, HEC Paris, “Entrepreneurship and Credit Constraints: Evidence from a French Loan Guarantee Program”  
Discussant: Shawn Cole, Harvard University

**Rajkamal Iyer**, University of Amsterdam, and **Antoinette Schoar**, “Are there Cultural Determinants of Entrepreneurship?”  
Discussant: Morten Sorensen, University of Chicago and NBER

**Leora Klapper**, The World Bank,

and **Raffi Amit** and **Mauro F. Guillen**, University of Pennsylvania, “Entrepreneurship and Firm Formation across Countries”  
Discussant: Laura Alfaro, Harvard University and NBER

**Robert W. Fairlie**, University of California, Santa Cruz; **Julie Zissimopoulos**, RAND Corporation; and **Harry Krashinsky**, University of Toronto, “The International Asian Business Success Story? A Comparison of Chinese, Indian, and Other Asian Businesses in the United States, Canada, and United Kingdom”  
Discussant: William Kerr, Harvard University

**Suresh De Mel**, University of Peradeniya; **David McKenzie**, The World Bank; and **Christopher Woodruff**, University of California, San Diego, “Who are the Microenterprise Owners? Evidence from Sri Lanka on Tokman v. de Soto”  
Discussant: Tavneet Suri, MIT and NBER

**Yi Qian**, Northwestern University, and **Yasheng Huang**, MIT, “Is Entrepreneurship Missing in Shanghai?”  
Discussant: Randall Morck, University of Alberta and NBER

**Silvia Ardagna**, Harvard University, and **Annamaria Lusardi**, Dartmouth College and NBER, “Explaining International Differences in Entrepreneurship: The Role of Individual Characteristics and Regulatory Constraints”  
Discussant: Boyan Jovanovic, New York University and NBER

**Sendhil Mullainathan**, MIT and NBER, and **Philipp Schnabl**, Harvard University, “Business Simplification in Peru”  
Discussant: Asim Ijaz Khwaja, Harvard University

**James A. Brander**, **Edward J. Egan**, and **Thomas F. Hellmann**, University of British Columbia, “Government Sponsored Venture Capital in Canada: Effects on Value Creation, Competition, and Innovation”  
Discussant: Scott Stern, Northwestern University and NBER

**Simeon Djankov**, The World Bank; **Yingyi Qian** and **Gerard Roland**, University of California, Berkeley; and **Ekaterina Zhuravskaya**, CEFIR, “What Makes an Entrepreneur?”  
Discussant: Paola Sapienza, Northwestern University and NBER

**Velez** and his co-author characterize entrepreneurship in developing economies through a case study for Colombia. They document self-employment and business ownership since the 1980s; the relative size of these groups within the labor force is stable across time, but they differ significantly in important observable dimensions, such as education and business sector. Next the authors study the motivations for becoming an entrepreneur. They analyze the transition into and out of potential forms of entrepreneurship by measuring the flows across

occupations, and study the determinants of entry and exit into and out of self-employment and business ownership. They find surprisingly little transition between self-employment and business ownership. Second, they focus on the financial motivations by measuring the differences in earnings from self-employment and business ownership relative to salaried work, at the mean and along the distribution. There is a substantial earnings premium to becoming a business owner, but it is not financially attractive to become self-employed. The results of

this paper suggest that while business ownership is what the literature associates with entrepreneurship, self-employment is basically a subsistence activity.

**Lelarge** and her co-authors use information on a French loan guarantee program to assess the consequences of credit constraints for new ventures. Loan Guarantee Programs, as implemented in France, are an effective instrument for helping young firms grow faster, in terms of both employment and capital. These effects are quite persistent, because they are still significant four years after obtain-



ing the guarantee. Loan guarantees also allow firms to pay cheaper interest rates, but a potential drawback of this policy is that guaranteed ventures adopt riskier strategies, and thus filing for bankruptcy occurs more often. Finally, the authors find no effect, at the industry level, on creation rates.

**Iyer** and **Schoar** explore the importance of culture in determining contractual outcomes across different communities. They set up an audit study and send buyers (from different communities) to contract with wholesalers (who also belong to different communities) in the pen industry in India. They find that wholesalers from the most entrepreneurial community in India (Marwari) offer lower prices. Furthermore, wholesalers from Andhra offer higher prices than dealers from other communities. Iyer and Schoar also find that when the buyer and seller from the same community contract, the terms of the contract are more favorable. These results suggest that culture has an important effect on contract terms.

The *World Bank Group Entrepreneurship Survey* measures entrepreneurial activity around the world. The database includes cross-country, time-series data on the number of total and newly registered businesses for 84 countries. **Klapper** and her co-authors find significant relationships between entrepreneurial activity and indicators of economic and financial development and growth, the quality of the legal and regulatory environment, and governance. Their analysis shows the importance of electronic registration procedures to encourage greater business registration. These results can guide effective policymaking and deliver new capabilities for identifying the impact of reforms.

Using Census microdata, **Fairlie** and his co-authors provide the first comparative examination of the education levels, business ownership, and business performance of Asian immigrants in the United States, Canada, and the United Kingdom. They specifically compare the effects of education and other determinants of business ownership and performance in the three countries to help explain the heterogeneity across Asian immigrant groups

within countries and across countries. Asian immigrants to all three countries have education levels that are higher than the national average, and in the United States the education levels of Asian immigrants are particularly high relative to the entire population. Some of the variation in the education of Asian immigrants across the United States, Canada, and the United Kingdom is likely attributable to immigration policy. For example, the United Kingdom is more likely to accept immigrants in the refugee or asylee category than the other two countries. The business ownership rates of Asian immigrants in the United States and Canada are similar to the national average; and are substantially higher than the national average, and highest among all three countries, in the United Kingdom. In Canada and the United States, Koreans have high rates of business ownership, while Philipinos have low rates of business ownership. On average, the income of Asian immigrant business owners is only slightly above the national average (in the United States), or below the national average (in Canada), and is thus not the broad picture of success that is often portrayed. In both the United States and Canada, the business income of Indians is high relative to the national average. Estimates from regression models for business ownership, log business income, and employment reveal interesting differences across the three countries. In particular, education is found to be a positive, although not strong, determinant of business ownership in the United States and Canada, but not in the United Kingdom. In the United Kingdom, education has no effect on business ownership. When the authors examine business income, they find large, positive effects of education in the United States and Canada. In the United Kingdom, they find smaller positive effects of education on employment. The findings for education imply that the relatively high levels of education among some Asian immigrant groups do not have a large influence on business ownership rates for the groups, but have a large effect on business performance at least in the United States and Canada. In regres-

sion models for business ownership, the coefficients on Asian immigrant groups generally do not change after controlling for education and other demographic characteristics. In contrast, there are large changes in coefficients for log business income in the United States and Canada after controlling for education and other variables, suggesting that education differences are important. Decomposition estimates indicate that high levels of education contribute to higher business income levels among Indians and Pakistanis in the United States. Another interesting finding from the analysis is that Asian immigrants even from the same source country are generally much more educated in the United States than in Canada or the United Kingdom. For example, 76.2 percent of Indian immigrants in the United States have a college degree compared to 42.1 percent in Canada and 42.2 percent in the United Kingdom. Lower levels of education among Asian immigrants to the United Kingdom may partly be the result of the greater focus of immigration policy in the United Kingdom. In Canada, however, we would expect the point-based system of immigration to result in higher education levels among Asian immigrants than the United States. For every group except Koreans, Asian immigrants in the United States are more educated than those residing in Canada. Although there are many institutional, structural, and historical differences between the two countries that might be responsible, one possibility is that the higher returns to education in the United States result in a more selective immigrant pool. The researchers find that the returns to a college degree in business earnings are larger in the United States than in Canada. The returns to a college degree are also higher in the wage and salary sector in the United States than in Canada.

Is the vast army of the self-employed in low income countries a source of employment generation? **De Mel**, **McKenzie**, and **Woodruff** use data from surveys in Sri Lanka to compare the characteristics of own account workers (non-employers) with wage workers and with owners of larger firms. They use a rich set

of measures of background, ability, and attitudes, including lottery experiments measuring risk attitudes. Consistent with ILO's views of the self employed (represented by Tokman), the researchers find that two-thirds to three-fourths of the own account workers have characteristics more like wage workers than larger firm owners. This suggests that the majority of the own account workers are unlikely to become employers. Using a two and a half year panel of enterprises, the researchers further show that the minority of own account workers who are more like larger firm owners are likelier to expand by adding paid employees. This analysis explains the low rates of growth of enterprises supported by microlending.

Using a unique census dataset on all industrial firms (with more than 5 million yuan in sales), **Qian and Huang** document the phenomenon of missing entrepreneurship in Shanghai. Here, entrepreneurship is defined as private, new entrants. Specifically, in terms of employment size and growth, the relative ranking of Shanghai has always been near the bottom in the country. All of the empirical findings exist against a backdrop of the presumably huge locational advantages of Shanghai: the substantial human capital, rapid GDP growth, and a long and stellar, but pre-communist history of entrepreneurship. The authors propose a hypothesis that Shanghai adopted a particularly rigorous version of an industrial policy model of economic development and that this industrial policy proclivity led to the atrophy of entrepreneurship in Shanghai.

**Ardagna and Lusardi** use a micro data set that collects information across individuals, countries, and time to inves-

tigate the determinants of entrepreneurial activity in 37 developed and developing nations. They focus both on individual characteristics and on countries' regulatory differences. They show that individual characteristics, such as gender, age, and status in the work force are important determinants of entrepreneurship, and they also highlight the relevance of social networks, self-assessed skills, and attitudes toward risk. Moreover, they find that regulation plays a critical role, particularly for those individuals who become entrepreneurs to pursue a business opportunity. The individual characteristics that are affected most by regulation are those measuring working status, social network, self-assessed skills, and attitudes toward risk.

Why do governments set up market entry barriers? To answer this question, **Mullainathan and Schnabl** study a reform of entry regulation in Lima, Peru. They show that the reform reduced time-to-license from 110 to 5 days and increased the annual number of new licenses from 2,000 to 9,000. They further show that the reform focused on reorganizing internal government processes, but did not change licensing requirements targeted at fixing market failures. Interviews with newly licensed firms show that the primary motivation for getting a license is to avoid fines and bribes. These researchers argue that this evidence is consistent with a bureaucracy that sets up market entry barriers to extract rents.

**Brander, Egan, and Hellmann** investigate the relative performance of enterprises backed by government-sponsored venture capitalists and private venture capitalists. While previous studies focus mainly on investor returns, this paper

focuses on a broader set of public policy objectives, including value-creation, innovation, and competition. A number of novel data-collection methods, including web-crawlers, are used to assemble a near-comprehensive dataset of Canadian venture-capital backed enterprises. The results indicate that enterprises financed by government-sponsored venture capitalists underperform on a variety of criteria, including value-creation (as measured by the likelihood and size of IPOs and M&As), or innovation (as measured by patents). While the data does not allow for a definitive welfare analysis, the results cast some doubt on the desirability of government intervention in the venture capital market.

**Djankov** and his co-authors test two competing hypotheses on what makes an entrepreneur: nature — attitude towards risk, IQ, and self-confidence; or nurture — family background and social networks. To do so, they report the results of a new survey on entrepreneurship in Brazil, based on interviews of 400 entrepreneurs and 550 non-entrepreneurs of the same age, gender, education, and location in seven Brazilian cities. They find that family characteristics have the strongest influence on becoming an entrepreneur. In contrast, success as an entrepreneur is primarily determined by the individual's smartness and higher education in the family. Entrepreneurs are not more self-confident than non-entrepreneurs; and overconfidence is bad for business success.

These papers will be published by the University of Chicago Press in an NBER Conference Volume. They will also appear in "Books in Progress" on the NBER's website.

## Location of Biopharmaceutical Activity

The NBER held a conference on the topic “Location of Biopharmaceutical Activity” on March 7 and 8. Iain M. Cockburn, NBER and Boston University, and Matthew J. Slaughter, NBER and Dartmouth College, organized the program. The following papers were discussed:

**Ashish Arora and Chirantan Chatterjee**, Carnegie Mellon University; and **Lee J. Branstetter**, Carnegie Mellon University and NBER, “Strong Medicine: Patent Reform and the Emergence of a Research-Driven Pharmaceutical Industry in India”  
Discussant: Keith Maskus, University of Colorado

**Ernst R. Berndt**, MIT and NBER; **Iain M. Cockburn**; and **Fabio Thiers**, MIT, “The Globalization of Clinical Trials for New Medicines into Emerging Economies: Where Are They Going and Why?”  
Discussant: James Schuttinga, National Institutes of Health

**Jerry G. Thursby**, Georgia Institute of

Technology, and **Marie C. Thursby**, Georgia Institute of Technology and NBER, “Globalization of Healthcare Research: What Kind of Science is Conducted in New R&D Sites?”  
Discussant: Donald Conway, Dartmouth College

**Kira Fabrizio** and **L.G. Thomas**, Emory University, “Tacit Demand and Innovation in the Global Pharmaceutical Industry”  
Discussant: David Ridley, Duke University

**Pierre Azoulay**, MIT and NBER, and **Ariel Y. Fishman**, Yeshiva University, “Doctors, \$\$ and Drug Development: The Rise of For-Profit Experimental Medicine”  
Discussant: Benjamin Jones, Northwestern University and NBER

**Nick Argyres**, Boston University; **Elias Bruegmann**, Harvard University; and **Jeffrey Furman**, Boston University and NBER, “Post-Merger R&D Re-Organization in the Global Pharmaceutical Industry”

Discussant: Andrea Fosfuri, University Carlos III de Madrid

**Mercedes Delgado-Garcia**, Harvard University; **Margaret Kyle**, London Business School and NBER; and **Anita McGahan**, University of Toronto, “The Influence of TRIPS on Global Trade in Pharmaceuticals, 1994–2005”  
Discussant: Phillip McCalman, University of California, Santa Cruz

**Juan Alcacer**, Harvard University, and **John Cantwell** and **Michelle Gittelman**, Rutgers University, “Are Licensing Markets Local? An Analysis of the Geography of Vertical Licensing Agreements in Bio-Pharmaceuticals”  
Discussant: Matthew Higgins, Georgia Institute of Technology

**Pamina Koenig**, University of Paris X, and **Megan J. MacGarvie**, Boston University and NBER, “Regulatory Policy and the Location of Bio-Pharmaceutical FDI in Europe”  
Discussant: Deborah Swenson, University of California, Davis and NBER

How do private returns to inventive activity change in developing countries when IPR regimes are substantially strengthened? **Arora** and his co-authors investigate this question by looking at the impact of patent reforms in India on India-based pharmaceutical companies. In a fundamental policy shift, India agreed to introduce product patents for pharmaceuticals when it signed the WTO TRIPS treaty in 1995. This policy came into effect through enabling legislation in 2000 and final implementation in 2005. The authors estimate the impact of this policy shift by using data on a panel of 315 Indian pharmaceutical firms drawn from the years 1990 to 2005. They find evidence of an increase in both R and D investment and measured inventive output that appears to be broadly

coincident with patent reform. They also find that the private returns to R and D investment appear to be rising as a consequence of patent reform. Private returns to firms’ investments are measured using a hedonic stock market valuation of tangible total assets (A) and intangible inventive assets (K), measured as the stock of R and D spending. The findings indicate an economically and statistically significant increase in private returns to inventive activity. However, this effect appears to be highly concentrated in the most technologically progressive Indian firms.

**Berndt** and his co-authors report early stage findings from a long-term research program that seeks to understand factors affecting the increasing globalization of biopharmaceutical clinical trials (BCTs) for new medicines, particu-

larly into emerging economies. Previous literature dealing with the effects of intellectual property protection on innovation has been challenged by difficulties in quantifying both intellectual property and innovation. The relatively narrow focus here — assessing impacts of several alternative measures of intellectual property protection on a country’s level and AAGR of global share of clinical trial sites — has the advantage of focusing on a specific type of investment in development (D), not just overall R and D. Using data accessible from [clinicaltrials.gov](http://clinicaltrials.gov), the authors quantify and model the cumulative number of BCTs in the top 50 countries, and 2002–6 AAGRs in a country’s share of BCT sites registered at [clinicaltrials.gov](http://clinicaltrials.gov). Although the United States, Western Europe, and Canada still domi-



nate in terms of cumulative numbers of BCT sites, in general there has been a rapid growth in BCT numbers and shares in Eastern Europe, Latin America, and Asia, at the expense of Western Europe and North America. The researchers find that the elasticity of cumulative BCT sites with respect to GDP is about one, while the elasticity with respect to cost per patient is about -0.8; another important factor having a positive impact is the country's human capital index. Among three alternative measures of intellectual property protection developed by Park, the researchers find that only the broad measure encompassing 1990–2000 changes in patent coverage of pharmaceutical, chemical, and surgical tool and instrument products has a substantial and statistically significant positive impact. In terms of cross-country variations in AAGRs of trial sites, the results are largely consistent with emerging economies “catching up” with slower growing countries traditionally involved in clinical medicine. AAGRs are negatively correlated with GDP per capita, and to the cumulative number of first authors of articles reporting results from randomized clinical trials in major MedLine journals. The researchers also find that the 2000 level of the two broader measures of intellectual property protection have positive and significant impacts on growth rates of shares of BCT sites.

**Thursby and Thursby** examine data from a survey of 250 multinational firms regarding the location of recently established R and D facilities and the factors related to the location decisions. Their results show that R and D location decisions are quite complex and influenced by a variety of factors. In addition, while many of the facilities identified in the survey were located in emerging economies, a substantial portion of new facilities were in developed economies. The survey also asked firms to characterize whether the science conducted at these new facilities is “new” or “familiar” and whether the purpose of the science is for a “new” market for the firm or one that is “familiar” to the firm. Thursby and Thursby then analyze whether the type of science (new or

familiar) and the purpose of the science (new or familiar markets) are functions of location characteristics; they also compare results for healthcare firms versus firms in other industries and find some striking differences. Healthcare firms conduct more cutting edge science than other firms do. Collaborating with universities, and the quality of healthcare personnel, is more important to healthcare firms for the type of science. Healthcare firms are more likely than others to conduct R and D for new markets. The likelihood of healthcare firms conducting R and D for new markets is positively related to ease of collaboration with universities and faculty with specialized expertise.

**Fabrizio and Thomas** examine innovations of new drugs in the global pharmaceutical industry. They contrast anticipated demand and historical technological expertise as determinants of the realized pattern of innovations at the country level. They further contrast local versus foreign determinants of innovation. They find that the pattern of demand is as important as technological expertise in determining the pattern of innovation in this industry. They also find that innovation is a locally determined phenomenon, with very little evidence of positive cross-country knowledge spillovers.

Over the past 15 years, academic medical centers have ceased to be the primary locus of industry-sponsored clinical trial activity. Instead, clinical trials have increasingly been conducted in private practices and for-profit, dedicated study sites. **Azoulay and Fishman** examine the underlying causes of this startling evolution. On the demand side, the greater availability of non-academic investigators has enabled pharmaceutical firms to better match physicians' skills with specific projects. On the supply side, the authors argue that the growth of managed care health insurance has contributed to a rise in the number of non-academic physicians performing clinical research. They find evidence consistent with these claims using a unique dataset containing information about 85,919 site contracts for 7,735 clinical trials between 1991 and 2003. Furthermore, they examine the gap

in prevailing prices for comparable procedures conducted for clinical trials versus conventional medical care, and conclude that the effect of managed care on entry is consistent with non-academic physicians “inducing demand” so as to resist downward pressures on their income.

Over the past few decades, large pharmaceutical firms have merged at a high rate. Numerous motives appear to have encouraged this M&A activity, including the desire to refill emptying pipelines of new drugs, to achieve economies of scale and scope in increasingly costly R and D projects; and to gain access to marketing, distribution, and/or drug testing/approval networks and expertise. Regardless of the motives driving these mergers, managers of the newly combined firm face difficult questions regarding whether and how to re-organize its various R and D organizations in the post-merger period. Addressing this question involves a dilemma: whether to close laboratories and centralize R and D geographically (and possible organizationally as well) in order to capture economies of scale and scope within or across R and D projects, or to retain and possibly expand a dispersed structure of R and D organizations in order to continue to gain access to a variety of loci of knowledge in fundamental life sciences as well as drug development. **Furman** and his co-authors examine data that reflect the outcomes of the ways in which large pharmaceutical firms have been managing this trade-off. They study mergers and their attendant effects on the location of pharmaceutical research between 1984 and 1999. Their primary empirical approach takes advantage of NBER patent data and uses difference-in-differences techniques to examine the impact of mergers on the location of drug discovery research. They supplement their large-scale empirical analysis with brief qualitative accounts of the lab dispersion decisions of merged firms.

**Delgado** and her co-authors examine changes in the patterns of global trade in biopharmaceuticals before and after the implementation of the WTO TRIPS agreement on intellectual property. The purpose of their analysis is to explore the



evidence consistent with the objective of TRIPS, to promote “the transfer and dissemination of technology” particularly from advanced to least-developed countries. The evidence suggests that, during the period of TRIPS implementation between 1994 and 2005, global trade in biopharmaceuticals and other products dependent on intellectual property increased relative to sectors unaffected by TRIPS. But, the results also suggest that trade in technology-intensive products has not grown dramatically between developed and less developed countries. To explore alternative explanations for the patterns, the statistical analysis is supplemented with brief case analyses of the impact of TRIPS in South Africa, the United Kingdom, India, and Brazil.

As the value chain of the pharmaceutical industry disaggregates, upstream discovery is increasingly carried out by small

research-specialized firms while downstream development, testing and marketing is conducted by global pharmaceutical firms. Licensing plays an important role in this emerging division of labor. **Alcacer** and his co-authors theorize that, similar to markets for upstream inputs such as scientific knowledge, proximity also may matter for licensing, which they conceptualize as downstream end markets for small biotechnology firms. They examine whether co-location affects the likelihood of vertical licensing transactions between biotechnology firms and global pharmaceutical firms. Discussions with industry executives indicate that large firms search globally for in-licensing opportunities and that licensing transactions should not be sensitive to the geographic locations of the transacting parties. However, an analysis of compounds developed by small biotechnology firms licensed to global

pharmaceutical firms suggests that licensing transactions are more likely to occur between firms located in the same geographic area. The results point to the possibility that licensing markets are sensitive to the proximity of the partners, and that despite global search processes by multinationals in the pharmaceutical industry, licensing markets are localized.

**Koenig** and **MacGarvie** examine the relationship between cross-country differences in drug price regulation and the location of biopharmaceutical Foreign Direct Investment (FDI) in Europe. They use a theoretically-grounded location-choice model and data on 294 investments initiated in 27 European countries between 2002 and 2006 to test the hypothesis that biopharmaceutical companies are less likely to locate new investments in countries with more stringent price regulation.



## Incentive and Distributional Consequences of Tax Expenditures

The NBER recently held a conference on “Incentive and Distributional Consequences of Tax Expenditures.” James M. Poterba, the Director of the NBER’s Public Economics Program, also of MIT, organized the March 27–29 conference. It brought together academic researchers and tax professionals from various government entities to discuss the following papers:

**Rosanne Altshuler**, Rutgers University, and **Robert D. Dietz**, National Association of Home Builders, “Reconsidering Tax Expenditure Estimation: Challenges and Reforms”  
Discussant: Thomas Barthold, Joint Committee on Taxation

**Robert Carroll**, Tax Foundation, and **David Joulfaian** and **James Mackie**, U.S. Treasury Department, “Income versus Consumption Tax Baselines for Tax Expenditures”  
Discussant: Eric Toder, Urban Institute

**Susan J. Guthrie**, and **James R. Hines, Jr.**, University of Michigan and NBER, “Tax Expenditures and Government Purchases: The Case of U.S. Military Procurement Contracts after the Tax Reform Act of 1986”

Discussant: Christopher Heady, Organization for Economic Cooperation and Development

**Jonathan Gruber**, MIT and NBER, “The Tax Exclusion for Employer-Sponsored Health Insurance”  
Discussant: Leonard Burman, Urban Institute

**Deena Ackerman** and **Gerald Auten**, U.S. Treasury Department, “Tax Expenditures from Noncash Charitable Contributions”  
Discussant: John Karl Scholz, University of Wisconsin and NBER

**Jon Bakija**, Williams College, and **Bradley T. Heim**, U.S. Treasury Department, “How Does Charitable Giving Respond to Incentives and Income? Dynamic Panel Estimates Accounting for Predictable Changes in Taxation”  
Discussant: Daniel Feenberg, NBER

**James Poterba**, and **Todd Sinai**, University of Pennsylvania and NBER, “Revenue Cost and Incentive Effects of Tax Expenditures for Owner-Occupied Housing”

Discussant: George Zodrow, Rice University

**Mihir A. Desai** and **Monica Singhal**, Harvard University and NBER, and **Dharmika Dharmapala**, University of Connecticut, “Investable Tax Credits: The Case of the Low Income Housing Tax Credit”  
Discussant: Therese McGuire, Northwestern University

**Nada Eissa**, Georgetown University and NBER, and **Hilary Hoynes**, University of California, Davis and NBER, “Redistribution and Tax Expenditures: The Earned Income Tax Credit”  
Discussant: Emmanuel Saez, University of California, Berkeley and NBER

**Gilbert E. Metcalf**, Tufts University and NBER, “Tax Expenditures for State and Local Tax Payments”  
Discussant: Roger Gordon, University of California, San Diego and NBER

**James M. Poterba**, and **Arturo Ramirez Verdugo**, Protego, “Portfolio Substitution and the Tax Expenditure for State and Local Government Borrowing”  
Discussant: William Gentry, Williams College

To most tax policy analysts and academics, the term “tax expenditure” means special provisions of the tax system that result in reduced tax liability for certain subsets of taxpayers. Moreover, for many in the tax policy community, the term suggests tax breaks for limited constituencies that result in a narrow tax base and higher marginal tax rates. Others are blunter: tax expenditures are loopholes that need to be closed. **Altshuler** and **Dietz** leave it to other authors to examine the legitimacy from tax policy or economic efficiency perspectives of tax expenditure provisions. They instead examine the measurement of tax expenditures and offer recommendations

aimed at improving their value to analysts and policymakers. They use calculations from NBER’s TAXSIM to illustrate some of the problems with the current methodology for estimating tax expenditures. Unlike most previous work on the topic, theirs focuses on how features of the current tax system that were not in place when Stanley Surrey introduced the expenditure concept in 1967, such as the alternative minimum tax (AMT) and sunset rules, complicate and compromise the value of information provided by the tax expenditure budget. Their recommendations for reform include presenting revenue estimates for major tax expenditures, reporting some negative tax expen-

ditures, and establishing an appendix for tax expenditure estimates of permanent versions of expiring provisions and AMT interaction effects, among others. These proposed changes to existing tax expenditure estimation process will increase the value of tax expenditure reporting for academics, policymakers, and others in the tax analysis community.

**Carroll** and his co-authors explore the implications of evaluating income tax expenditures under a consumption tax. First, they examine the conceptual differences between income and consumption taxes. Next, they use an X-tax prototype of a consumption tax to gauge the sensitivity of the estimates to the two

baselines: current law income tax and the X-tax. The estimated capital income preferences are vastly different under the two regimes.

**Guthrie** and **Hines** consider the impact of the tax treatment of U.S. military contractors on government procurement contracts. Prior to passage of the Tax Reform Act of 1986, taxpayers were permitted to use the completed contract method of accounting to defer taxation of profits earned on long-term contracts. The Tax Reform Act and subsequent legislation passed in 1987 required that at least 70 percent of the profits earned on long-term contracts be taxed as accrued, thereby significantly reducing the tax benefits associated with long-term contracting. Comparing contracts that were ineligible for the tax benefits associated with long-term contracting with those that were eligible, it appears that between 1981 and 1989 the duration of U.S. Department of Defense contracts shortened by an average of between one and 3.5 months, or somewhere between 6 and 29 percent of average contract length. This pattern suggests that the tax benefits associated with long-term contracts promoted artificial contract lengthening prior to passage of the 1986 Act. The evidence is consistent with a behavioral model in which the Department of Defense ignores the federal income tax consequences of its procurement actions, thereby indirectly rewarding contractors who are able to benefit from tax expenditures of various types.

The tax exclusion of employer-sponsored insurance from taxable income costs the United States almost \$250 billion per year in foregone revenue. In his paper, **Gruber** discusses the rationales for and against this tax subsidy, presents estimates of its magnitudes and distributional consequences, and shows the impacts of a variety of approaches to reform.

**Ackerman** and **Auten** examine tax expenditure for noncash charitable giving. They begin with an analysis of issues that arise specifically with donations of property rather than cash. These concerns include valuation of the donated property, potential differences between the

value for donor and donee, design and enforcement of appropriate tax rules, the relative responsiveness of noncash donations to the deduction incentive, and the potential effects on charities that accept these gifts. Using a special study of tax return data from 2003–5, the researchers show the deductions claimed for different types of property. Donations of corporate stock accounts for the largest dollar amount, but two-thirds of those deducting over \$500 in non-cash items donate clothing, and these deductions actually exceeded real estate donations by 2005. The authors then explore vehicle donations in more detail. Using a unique dataset that combines tax return information on vehicle donations with sales information from on-line auctions, they show that prior to the law change in 2005, the implied quality of the vehicles donated by taxpayers exceeded plausibility. They conclude by summarizing recent proposals for reform, such as increasing reporting requirements, tightening valuation and appraisal standards, and limiting or eliminating the additional tax benefit from donating appreciated property.

**Bakija** and **Heim** estimate the elasticity of charitable giving with respect to tax prices and aftertax incomes using a panel of nearly 500,000 disproportionately high-income tax returns spanning the years 1979 through 2005. They improve upon the previous literature by using state tax variation to help identify their model while controlling for unobserved heterogeneity, allowing people at different income levels to have different degrees of responsiveness to taxation, and carefully dealing with the fact that, because of lags between proposal, enactment, and implementation of tax reforms, near-future changes in taxes are generally predictable in advance. To address the omitted variable bias that would otherwise arise from failing to control for unobservable expectations of future prices and future incomes, they use predictable changes in future federal and state marginal tax rates and tax liabilities, arising from their pre-announced and phased-in nature, as instruments for future changes in prices and income. In models where identifica-

tion of price effects comes largely from different time paths of marginal income tax rates across different states and across people at different income levels within the same income class, there is robust evidence of a modest but statistically significant elasticity of charitable giving with respect to persistent changes in tax-price among people with incomes in excess of \$100,000, generally in the range of -0.5 to -0.8. Evidence on the persistent price elasticity for lower-income people is weaker and more mixed. Despite a large spike in giving among very-high income people in apparent anticipation of lower future tax benefits from charitable giving arising from enactment of the Tax Reform Act of 1986, there is surprisingly little evidence that people re-time their giving in response to anticipated differences between current and future tax savings from doing so over the sample period as a whole and across income groups. Several results here are consistent with the permanent income hypothesis. The estimates suggest that expenditures on charitable giving respond strongly to persistent changes in income, while responding very little to transitory fluctuations in income. Moreover, there is strong evidence that people will increase their charitable giving now in response to a predictable reduction in future tax liability arising from tax reform.

**Poterba** and **Sinai** examine the effects of the mortgage interest deduction, the property tax deduction, and the absence of taxation on imputed rent on the effective cost of housing services, federal income tax revenues, and the distribution of tax liabilities. They consider how several changes in these tax provisions would affect taxpayer incentives, and assess the potential revenue consequences of each. Their analysis recognizes that changing tax provisions, such as the mortgage interest deduction, would induce changes in homeowner behavior, both with respect to housing finance and the quantity of housing demanded. These changes can affect estimates of the revenue cost of housing-related tax expenditures. With regard to the mortgage interest deduction, for example, they estimate that without any behavioral response, income

tax revenues would have been \$69.8 billion higher in 2003. Allowing for portfolio adjustments in the financing of homes reduces this estimate to \$63.4 billion, and the value could be lower still if they made alternative assumptions about financial changes. The results point generally to the importance of recognizing behavioral responses to tax incentives when calculating the revenue costs of tax expenditures.

The Low Income Housing Tax Credit (LIHTC) represents a novel tax expenditure program that employs “investable” tax credits to spur production of low-income rental housing. While it has grown into the largest source of new affordable housing in the United States and is now being replicated in other programs, its curious structure has also drawn skepticism and calls for its repeal. **Desai** and his co-authors outline a conceptual framework for exploring the conditions under which investable tax credits may be the most effective mechanism for delivering a production subsidy and discuss the desirability of employing investable tax credits in other policy domains. Estimates of tax expenditures under this program are provided and efficiency costs, distributional issues, and the likely effects of reforms to tax provisions such as the AMT are considered.

In the United States, the primary means of providing cash assistance to lower-income families with children is now the federal income tax system. A series of tax acts beginning with the 1986 Tax Reform Act—running parallel to the erosion of the traditional welfare system—have increased assistance to the working poor through expansions of the Earned Income Tax Credit (EITC). In 2007, an estimated 22 million families are estimated to benefit from the EITC, at a total cost to the federal government of more than 43 billion dollars (U.S. Office of Management and Budget, 2008). **Eissa** and **Hoynes** examine the distributional and behavioral effects of the Earned Income Tax Credit. They first review the current design of the credit and its growth over time, and then examine the evidence on individual behavioral

responses. They argue that EITC expansions show that real responses to taxes are important. As for distribution, the tax data show that the current credit transfers cash to families who are well above the median of the cash-income distribution. **Eissa** and **Hoynes** then examine the cost, coverage, and change in the distribution of benefits under hypothetical reforms of the credit. Finally, using survey data from the Current Population Survey, they calculate the efficiency effects of marginal changes in EITC parameters. Targeting the EITC to lower-income families by raising the phase-out rate would generate a welfare loss for single mothers, primarily because of the disincentive to enter the labor market.

Federal deductibility for state and local taxes constitutes one of the largest tax expenditures in the federal budget and provides a significant source of federal support to state and local governments. Deductibility was restricted in the Tax Reform Act of 1986 by removing the deduction for general sales taxes. More recently, the President’s Advisory Panel on Federal Tax Reform recommended eliminating the deduction altogether as one of several revenue-raising initiatives to finance comprehensive tax reform. **Feldstein** and **Metcalf** (1987) argued that estimates of the revenue gain from eliminating deductibility were too high, as they did not take into account a likely shift away from once-deductible taxes to non-deductible taxes and fees in the absence of deductibility. Many of these latter taxes and fees are paid by businesses. As business costs rise, federal business tax collections would fall, offsetting some of the gains of ending deductibility. **Feldstein** and **Metcalf** also found that ending deductibility would have little if any impact on state and local spending itself. Using a large panel of data on state and local governments, **Metcalf** here revisits this issue and finds that the **Feldstein-Metcalf** results are robust to adding more years of analysis. He then carries out a number of distributional analyses—considering both variation across income and across states—of the subsidy from deductibil-

ity. In addition, he considers three counterfactuals for 2004—a tax system without the Bush tax cuts for 2001 and 2003, a tax system without the 2004 AMT patch, and a tax system without the AMT—to see how the benefits of deductibility are affected by these changes in the tax law.

**Poterba** and his co-author explore how estimates of the revenue cost of exempting interest payments by state and local governments from the federal income tax are affected by alternative assumptions about the portfolio behavior of individual investors. Most tax expenditure estimates assume that current holders of tax-exempt bonds would replace their holdings with taxable bonds if the tax expenditure were eliminated. The authors consider a number of alternative possible portfolio responses and examine how they would affect estimates of the aggregate revenue cost of tax exemption as well as the distribution of tax burdens. Because taxable bonds are among the most heavily taxed assets, the assumption that investors holding tax-exempt bonds switch to taxable bonds yields a larger estimate of the revenue cost of tax exemption than alternative portfolio response assumptions. Using household-level data from the 2004 Survey of Consumer Finances, the researchers estimate that the revenue cost of tax exemption under the taxable bond substitution hypothesis is \$14.2 billion, compared with \$10.1 billion if they assume that corporate stock replaces tax-exempt bonds and \$7.9 billion if they assume that investors distribute their tax-exempt bond holdings in proportion to their current portfolio holdings of all asset classes. They also explore the revenue effects of other policy alternatives to full elimination, such as capping the dollar amount of tax-exempt interest per tax return or limiting tax-exempt interest as a fraction of AGI.

These papers will be published by the University of Chicago Press in an NBER Conference Volume. They will also appear in “Books in Progress” on the NBER’s website.



## The New World of Private Equity

The NBER held a conference on “The New World of Private Equity” on April 4 and 5. Organizers Josh Lerner, NBER and Harvard Business School, and Per Stromberg, NBER and Stockholm Institute for Financial Research, brought together a group of academics who study this subject with professionals who work in the field. These papers were discussed:

**Shourun Guo** and **Edith S. Hotchkiss**, Boston College, and **Weihong Song**, University of Cincinnati, “Do Buyouts (Still) Create Value?”  
Discussant: Jeremy C. Stein, Harvard University and NBER

**Ulf Axelson**, Stockholm Institute for Financial Research; **Tim Jenkinson**, Oxford University; **Per Stromberg**; and **Michael S. Weisbach**, University of Illinois at Urbana-Champaign and NBER, “Leverage and Pricing in Buyouts: An Empirical Analysis”  
Discussant: Christopher James, University of Florida

**Alexander Ljungqvist**, New York University, and **Matthew Richardson** and **Daniel Wolfenzon**, New York University and NBER, “The Investment

Behavior of Buyout Funds: Theory and Evidence”  
Discussant: Mike Wright, University of Nottingham

**Alexander Peter Groh**, University of Navarra, and **Oliver Gottschalg**, HEC School of Management, “Measuring The Risk Adjusted Performance of U.S. Buyouts”  
Discussant: Andrew Metrick, Yale University and NBER

**Joost Driessen**, **Tse-Chun Lin**, and **Ludovic Phalippou**, University of Amsterdam, “A New Method to Estimate Risk and Return of Non-traded Assets from Aggregate Cash Flows: the Case of Private Equity Funds”  
Discussant: Annette Vissing-Jorgensen, Northwestern University and NBER

**Sharon P. Katz**, Harvard University, “Earnings Management and Conservatism: The Role of Private Equity Sponsors”  
Discussant: Yael Hochberg, Northwestern University

**Steven J. Davis**, University of Chicago

and NBER; **John Haltiwanger**, University of Maryland and NBER; **Ron Jarmin** and **Javier Miranda**, Bureau of the Census; and **Josh Lerner**, “Private Equity and Employment”  
Discussant: Antoinette Schoar, MIT and NBER

**Steven N. Kaplan**, University of Chicago and NBER; and **Mark M. Klebanov** and **Morten Sorensen**, University of Chicago, “Which CEO Characteristics and Abilities Matter?”  
Discussant: Malcolm Baker, Harvard University and NBER

**Toby E. Stuart** and **Soojin Yim**, Harvard University, “Board Interlocks and the Propensity to be Targeted in Private Equity Transactions”  
Discussant: Matthew Rhodes-Kropf, Columbia University

**Phillip Leslie** and **Paul Oyer**, Stanford University and NBER, “Managerial Incentives and Strategic Change: Evidence from Private Equity”  
Discussant: Bengt Holmstrom, MIT and NBER

**Hotchkiss** and her co-authors examine whether, and how, leveraged buyouts from the most recent wave of public-to-private transactions create value. For a sample of 192 buyouts completed between 1990 and 2006, they show that these deals are somewhat more conservatively priced and lower levered than their predecessors from the 1980s. For the subsample of deals with post-buyout data available, median market adjusted returns to pre- and post-buyout capital invested are 78 percent and 36 percent, respectively. Gains in operating performance, however, are either comparable to or slightly above those observed for benchmark firms. The researchers find that cash flow gains are greater for firms

with larger increases in leverage, and when the CEO has been replaced at the time of the buyout. Finally, they examine the relative contribution of potential determinants of returns; in addition to gains in operating performance, returns are driven by increases in industry valuation multiples and are greater for deals involving more than one private equity firm. Overall, these results provide insights into how transactions from the most recent wave of leveraged buyouts create value.

**Axelson** and his co-authors provide an empirical analysis of the financial structure of large recent buyouts. They collect detailed information on the financings of 153 large buyouts

(averaging over \$1 billion in enterprise value). They document the manner in which these important transactions are financed. Buyout leverage is cross-sectionally unrelated to the leverage of matched public firms, and is largely driven by other factors than what explains leverage in public firms. In particular, the economy-wide cost of borrowing seems to drive leverage. Prices paid in buyouts are related to the prices observed for matched firms in the public market, but are also strongly affected by the economy-wide cost of borrowing. These results are consistent with a view in which the availability of financing affects booms and busts in the private equity market.

**Ljungqvist** and his co-authors analyze the determinants of buyout funds' investment decisions. In a model in which the supply of capital is "sticky" in the short run, the researchers link the timing of funds' investment decisions, their risk-taking behavior, and the returns they subsequently earn on their buyouts to changes in the demand for private equity, conditions in the credit market, and funds' ability to influence their perceived talent in the market. Using a proprietary dataset of 207 buyout funds that invested in 2,274 buyout targets over the last two decades, the researchers then investigate the implications of their model. Their dataset contains precisely dated cash inflows and outflows in every portfolio company, links every buyout target to an identifiable buyout fund, and is free from reporting and survivor biases. Thus, they are able to characterize every buyout fund's precise investment choices. Their empirical findings are consistent with the model. First, established funds accelerate their investment flows and earn higher returns when investment opportunities improve, competition for deal flow eases, and credit market conditions loosen. Second, the investment behavior of first-time funds is less sensitive to market conditions. Third, younger funds invest in riskier buyouts, in an effort to establish a track record. Fourth, following periods of good performance, funds become more conservative, and this effect is stronger for younger funds.

**Groh and Gottschalg** measure the risk-adjusted performance of U.S. buyouts. They draw on a unique and proprietary set of data on 133 U.S. buyouts between 1984 and 2004. For each of them, they determine a public market equivalent that matches it with respect to its timing and its systematic risk. After a correction for selection bias in the data, the regression of the buyout internal rates of return on the internal rates of return of the mimicking portfolio yields a positive and statistically significant alpha. The sensitivity analyses highlight the necessity of a comprehensive risk-adjustment that considers

both operating risk and leverage risk for an accurate assessment of buyout performance. This finding is particularly important as existing literature on that topic tends to rely on performance measures without a proper risk-adjustment.

**Driessen** and his co-authors develop a new methodology to assess the abnormal performance and risk exposure of a non-traded asset from a cross-section of cash flow data. They apply this method to a sample of 958 mature private equity funds spanning 24 years. In contrast to existing work, their methodology mainly uses actual cash flow data and not intermediary self-reported net asset values. They find a beta for venture capital funds above 3 and a beta for buyout funds below 1. Venture capital funds have significantly negative abnormal performance while the abnormal performance of buyout funds is close to zero. Larger funds have higher returns because of higher risk exposures, not higher alphas. The authors also show that Net Asset Values overstate fund market values for the subset of mature and inactive funds.

**Katz** explores the change in earnings management and conservatism as firms backed by private equity (PE) sponsors make the transition between private and public ownership. Using a unique sample of U.S. firms, she compares a private phase, in which firm equity is privately held while firm debt is publicly held, to a public phase, in which firm equity is also publicly held. In addition, she separately analyzes PE-backed firms and non-PE-backed firms within the private phase. Katz finds that during the public phase, PE-backed firms engage in greater upward earnings management in order to avoid small earnings decreases, and they recognize losses in a more timely manner than during the private phase. Furthermore, she finds that PE-backed private firms engage less in upward earnings management, and recognize losses more promptly, than do non-PE-backed private firms. These results are robust for various measures and controls, and are not affected by factors such as endogenous listing status and PE financing choices.

The impact of private equity on employment outcomes arouses considerable controversy. Critics claim that private equity buyouts bring huge job losses, while recent research sponsored by private equity associations and others claims big positive employment effects. To address the issue, **Davis** and his co-authors construct and analyze a new dataset that overcomes many of the limitations in previous research. They examine U.S. private equity transactions from 1980 to 2000, following 5,000 target firms and 300,000 establishments before and after acquisition by private equity groups. They compare employment outcomes at target firms and their establishments to controls that do not have private equity ties and that are similar in terms of industry, size, and age. The key findings are: 1) Employment declines more rapidly at target establishments than at controls in the wake of private equity buyouts. 2) Target establishments create roughly as many new jobs as control establishments post-buyout, but they destroy old jobs at a faster pace. 3) Employment also grows more slowly at target establishments than at controls in the two years preceding the buyout transaction. 4) The target firms acquired by private equity groups create more new jobs at new facilities than control firms. Combining this greater job creation response at new establishments with the greater job loss at existing establishments, the researchers find little difference in net job growth between controls and target firms in the wake of private equity buyouts. Taken together, these results suggest that private equity groups act as a catalyst for creative destruction in the labor market.

Using a detailed dataset with assessments of CEO candidates for companies involved in private equity (PE) transactions, including both buyout (LBO) and venture capital (VC) deals, **Kaplan** and his co-authors study how CEOs' characteristics and abilities relate to hiring decisions, PE investment decisions, and subsequent performance. The candidates are assessed on more than 40 individual characteristics in seven gen-

eral areas — leadership, personal, intellectual, motivational, interpersonal, technical, and specific. In general, all characteristics and abilities are found to be highly correlated. For both LBO and VC firms, outside CEO candidates are more highly rated than incumbents. Both LBO and VC firms are more likely to hire and invest in more highly rated and talented CEOs, and the investors also value “soft” or team-related skills in the hiring decisions. However, these skills are not necessarily associated with greater success. For LBO deals in particular, “hard” abilities and execution skills predict success. Finally, the researchers find that incumbents are no more likely to succeed than outside CEOs, holding observable talent and ability constant.

**Stuart** and **Yim** examine the propensity for U.S. public companies to

become targets for private equity-backed, take-private transactions. They consider the characteristics of 483 private equity-backed deals in the 2000–7 period relative to public companies and find that, in addition to the financial drivers studied in previous works, board characteristics and director networks are associated with deal generation. They further find that a company with a director who has had LBO experience through prior board service is about 40 percent more likely to receive a private equity offer, and that the strength of this effect varies with the influence of the director and the quality of the prior LBO experience. This effect is robust to the most likely alternative explanations and supports the idea that directors and social networks play an influential role in change-of-control transactions.

**Leslie** and **Oyer** analyze the differences between companies owned by private equity (PE) investors and similar public companies. They document that PE owned companies use much stronger incentives for their top executives and have substantially higher debt levels. However, there is little evidence that PE owned firms outperform public firms in profitability or operational efficiency. The researchers also show that the compensation and debt differences between PE owned companies and public companies disappear over a very short period (one to two years) after the PE owned firm goes public. Their results raise questions about whether and how PE firms and the incentives they put in place create value.



## Program and Working Group Meetings

### Law and Economics

The NBER's Program on Law and Economics met in Cambridge on February 8. Program Director Christine Jolls of Yale Law School organized this agenda:

**Andrei Shleifer**, Harvard University and NBER; **Anthony Niblett**, Harvard University; and **Richard Posner**, U.S. Court of Appeals, "The Evolution of a Legal Rule" (NBER Working Paper No. 13856)

Discussant: Richard Holden, MIT and NBER

**Suzanne Scotchmer**, University of California, Berkeley and NBER, and **Nisvan Erkal**, University of Virginia, "Scarcity of Ideas and Options for R&D"

Discussant: Louis Kaplow, Harvard Law School and NBER

**Edward L. Glaeser**, Harvard University and NBER, and **Cass R. Sunstein**, University of Chicago School of Law, "Extremism and Social Learning" (NBER Working Paper No. 13687)

Discussant: Oliver Hart, Harvard University and NBER

**Mireille Jacobson**, University of California-Irvine, and **Heather N. Royer**, Case Western University, "TRAPs: How Do Clinic Regulations Affect the Market for Abortions?" Discussant: Jeffrey Miron, Harvard University and NBER

**C. Fritz Foley**, Harvard Business School and NBER, "Welfare Payments and Crime"

Discussant: Lars Lefgren, Brigham Young University

**Betsey Stevenson**, University of Pennsylvania, "Beyond the Classroom" Discussant: J. J. Prescott, University of Michigan Law School

**John M. de Figueiredo**, University of California, Los Angeles and NBER, and **Charles M. Cameron**, Princeton University, "Endogenous Cost Lobbying: Theory and Evidence" Discussant: Joshua Fischman, Tufts University

The efficiency of common law rules is central to achieving efficient resource allocation in a market economy. While many theories suggest reasons why judge-made law should tend toward efficient rules, the question of whether the common law actually does converge in commercial areas has remained untested empirically. **Shleifer**, **Niblett**, and **Posner** create a new dataset of 465 state-court appellate decisions involving the application of the Economic Loss Rule in construction disputes and track the evolution of law in this area from 1970 to 2005. They find that over this period the law did not converge to any stable resting point, but evolved differently in different states. They further find that legal evolution is influenced by plaintiffs' claims, the relative economic power of the parties, and nonbinding federal precedent.

**Scotchmer** and **Erkal** consider a model of the innovative environment where there is a distinction between ideas for R and D investments and the invest-

ments themselves. They investigate the optimal reward policy and how it depends on whether ideas are scarce or obvious. By foregoing investment in a current idea, society as a whole preserves an option to invest in a better idea for the same market niche, but with delay. Because successive ideas may occur to different people, there is a conflict between private and social optimality. The researchers argue that private incentives to create socially valuable options can be achieved by giving higher rewards where "ideas are scarce." They then explore how rewards should be structured when the value of an innovation comes from its applications, and ideas for the innovation may be more or less scarce than ideas for the applications.

When members of deliberating groups speak with one another, their pre-deliberation tendencies often become exacerbated as their views become more extreme. The resulting phenomenon—group polarization—has been observed in many settings, and it bears on

the actions of juries, administrative tribunals, corporate boards, and other institutions. Polarization can result from rational Bayesian updating by group members, but in many contexts, this rational interpretation of polarization seems implausible. **Glaeser** and **Sunstein** argue that people are better seen as Credulous Bayesians, who insufficiently adjust for idiosyncratic features of particular environments and put excessive weight on the statements of others where there are: 1) common sources of information; 2) highly unrepresentative group membership; 3) statements that are made to obtain approval; and 4) statements that are designed to manipulate. Credulous Bayesianism can produce extremism and significant blunders. These authors discuss the implications of Credulous Bayesianism for law and politics, including media policy and cognitive diversity on administrative agencies and courts.

Since the early 1980s, the number of abortion providers throughout the



United States has fallen from a high of nearly 3,000 to under 2,000 today (Alan Guttmacher Institute, 2008). A persistent question in the abortion literature is why. Much of the existing literature concerns demand-side factors, such as parental notification laws and public-funding of abortions, but to date, supply-side factors largely have remained unexplored. To address this, **Jacobson** and **Royer** examine the impact of laws regulating abortion clinics. More specifically, they analyze “Targeted Regulation of Abortion Providers” or TRAPs as termed by Pro-Choice advocates, which typically require abortion clinics to obtain special operating licenses and may impose civil and criminal penalties for failure to obtain them. Some TRAPs allow warrantless inspection and others regulate the physical plant, employee qualifications, and administrative practices of a facility. While these laws ostensibly serve to protect the welfare of women seeking abortions, their real intent may be to raise the costs of abortions and to limit access to abortion services. The researchers examine the extent to which these laws have affected: 1) providers’ decisions to offer abortion services; and 2) a woman’s decision about whether and where to have a pregnancy terminated. They find clear evidence of a decline in the number of non-hospital providers after the adoption of a TRAP law. The decline is sizeable: 0.3 to 0.5 per 100,000, off a base of about two per 100,000 women ages 15 to 44. Interestingly, they find only modest evidence of a small decline in abortion rates, suggesting that many women bear the cost of these regulations by, for example, traveling farther within the state to

obtain an abortion. If this is so, then the primary effect of TRAP laws is to cause geographic displacement and to increase costs, rather than to decrease abortions per se.

**Foley** tests the hypothesis that the timing of welfare payments affects criminal activity. Analysis of daily reported incidents of major crimes in twelve U.S. cities reveals an increase in crime over the course of monthly welfare payment cycles. This reflects increases in crime that are likely to have a direct financial motivation—like burglary, larceny-theft, motor vehicle theft, and robbery—as opposed to other kinds of crime, such as arson, assault, homicide, and rape. Temporal patterns in crime are observed in jurisdictions in which disbursements are focused at the beginning of monthly welfare payment cycles and not in jurisdictions in which disbursements are relatively more staggered.

Previous research has found that male high school athletes experience better outcomes than non-athletes, including higher educational attainment, more employment, and higher wages. Students self-select into athletics, however, so these may be selection effects rather than causal effects. To address this issue, **Stevenson** examines Title IX, which provides a unique quasi-experiment in female athletic participation. Between 1972 and 1978, U.S. high schools rapidly increased their female athletic participation rates (to approximately the same level as their male athletic participation rates) in order to comply with Title IX. This paper uses variation in the level of boys’ athletic participation across states before Title IX as an instrument for

the change in girls’ athletic participation over the 1970s. Analyzing differences in outcomes for both the pre- and post-Title IX cohorts across states, **Stevenson** finds that a 10-percentage point rise in state-level female sports participation generates a 1 percentage point increase in female college attendance and a 1 to 2 percentage point rise in female labor force participation. Furthermore, greater opportunities to play sports leads to greater female participation in previously male-dominated occupations, particularly for high-skill occupations.

Special interests attempt to influence lawmakers through campaign contributions and through informational lobbying. Both types of influence activities have been explored in theoretical models, but only the former has received much empirical scrutiny. **de Figueiredo** and **Cameron** provide the first empirical tests of a major class of models of costly legislative informational lobbying as distinct from campaign contributions, the Potters-van Winden-Grossman-Helpman (PWGH) signaling model. Using data derived from over 50,000 observations of annual lobbying expenditures by special interest groups in the American states, they find that, as predicted, special interest groups increase lobbying expenditures when the legislature is controlled by “enemies” rather than “friends.” In addition, lobbying expenditures vary across states with different budgeting institutions in ways predicted by the model, when extended to multiple periods. Overall, the results provide substantial support for the PWGH class of lobbying models.

## Economic Fluctuations and Growth

The NBER's Program on Economic Fluctuations and Growth held a research meeting at the Federal Reserve Bank of New York on February 8. Organizers Per Krusell, NBER and Uppsala University, and Monika Piazzesi, NBER and Federal Reserve Bank of Minneapolis, chose these papers for discussion:

**Gauti B. Eggertsson**, Federal Reserve Bank of New York, "Was the New Deal Contractionary?"  
Critic: Marvin Goodfriend, Carnegie Mellon University and NBER

**Alejandro Justiniano**, Federal Reserve Board; **Giorgio E. Primiceri**, Northwestern University and NBER; and **Andrea Tambalotti**, Federal

Reserve Bank of New York, "Investment Shocks and Business Cycles"  
Critic: Frank Schorfheide, University of Pennsylvania and NBER

**Marco Battaglini**, Princeton University, and **Stephen Coate**, Cornell University and NBER, "Fiscal Policy over the Real Business Cycle: A Positive Theory"  
Critic: Marco Bassetto, Federal Reserve Bank of Chicago and NBER

**Matthew Chambers**, Towson University; **Carlos Garriga**, Federal Reserve Bank of St. Louis; and **Donald E. Schlagenhauf**, Florida State University, "Accounting for Changes in the Homeownership Rate"  
Critic: Dirk Krueger, University of

Pennsylvania and NBER

**Mark Huggett**, Georgetown University; **Gustavo Ventura**, University of Iowa; and **Amir Yaron**, University of Pennsylvania and NBER, "Sources of Lifetime Inequality" (NBER Working Paper No. 13224)  
Critic: Luigi Pistaferri, Stanford University

**Chang-Tai Hsieh**, University of California, Berkeley and NBER, and **Peter J. Klenow**, Stanford University and NBER, "Misallocation and Manufacturing TFP in China and India"  
Critic: Samuel Kortum, University of Minnesota and NBER

Can government policies that increase the monopoly power of firms and the militancy of unions increase output? **Eggertsson** studies this question in a dynamic general equilibrium model with nominal frictions and shows that these policies are expansionary when certain "emergency" conditions apply. He argues that these emergency conditions—zero interest rates and deflation—were satisfied during the Great Depression in the United States. Therefore, the New Deal, which facilitated monopolies and union militancy, was expansionary, according to the model. This conclusion is contrary to the one reached by Cole and Ohanian (2004), who argue that the New Deal was contractionary. The main reason for this divergence is that the current model incorporates nominal frictions so that inflation expectations play a central role in the analysis. The New Deal has a strong effect on inflation expectations in the model, changing excessive deflation to modest inflation, thereby lowering real interest rates and stimulating spending.

Shocks to the marginal efficiency of investment are the most important drivers of business cycle fluctuations in U.S. output and hours. Moreover, these distur-

bances drive prices higher in expansions, like a textbook demand shock. **Justiniano** and his co-authors reach these conclusions by estimating a model with several shocks and frictions. They also find that neutral technology shocks are not negligible, but their share in the variance of output is only around 25 percent, and even lower for hours. Labor supply shocks explain a large fraction of the variation of hours at very low frequencies, but not over the business cycle. Finally, they show that imperfect competition and, to a lesser extent, technological frictions are the key to the transmission of investment shocks in the model.

**Battaglini** and **Coate** present a political economy theory of the behavior of fiscal policy over the business cycle. The theory predicts that, in the short run, fiscal policy can be pro-cyclical with government debt spiking up upon entering a boom. In the long run, though, fiscal policy is counter-cyclical, with debt increasing in recessions and decreasing in booms. Government spending does increase in booms and decrease during recessions, but tax rates decrease during booms and increase in recessions. The correlations between fiscal policy

variables and national income that are implied by the theory are consistent with much of the evidence from the United States and other countries. The theory also provides new predictions that have yet to be tested.

After three decades of being relatively constant, the homeownership rate increased from 1994 to 2005 to attain record highs. **Chambers** and his co-authors attempt to account for the observed boom in ownership by examining the role played by changes in demographic factors and innovations in the mortgage market that lessened downpayment requirements. To measure the aggregate and distributional impact of these factors, they construct a quantitative general equilibrium overlapping generation model with housing. They find that the long-run importance of the introduction of new mortgage products for the aggregate homeownership rate ranges from 56 to 70 percent. Demographic factors account for between 16 and 31 percent of the change. Transitional analysis suggests that demographic factors play a more important, but not dominant, role the further away from the long-run equilibrium. From a distributional perspec-

tive, mortgage market innovations have a larger impact, explaining participation rate changes of younger households, while demographic factors seem to be the key to understanding the participation rate changes of older households. This suggests that the key to understanding the increase in the homeownership rate is expansion of the set of mortgage contracts. The researchers test the robustness of this result by considering changes in mortgage financing after World War II. They find that the introduction of the conventional fixed rate mortgage, which replaced balloon contracts, accounts for at least 50 percent of the observed increase in homeownership during that period.

Is lifetime inequality mainly attributable to differences across people established early in life or to differences in luck experienced over the working lifetime?

**Huggett** and his co-authors answer this question within a model that features idiosyncratic shocks to human capital, estimated directly from data, as well as heterogeneity in ability to learn, initial human capital, and initial wealth—features chosen to match observed properties of earnings dynamics by cohorts. They find that as of age 20, differences in initial conditions account for more of the variation in lifetime utility, lifetime earnings, and lifetime wealth than do differences in shocks received over the lifetime. Among initial conditions, variation in initial human capital is substantially more important than variation in learning ability or initial wealth for determining how an agent fares in life. An increase in an agent's human capital affects expected lifetime utility by raising an agent's expected earnings profile, whereas an increase in

learning ability affects expected utility by producing a steeper expected earnings profile.

Resource misallocation can lower aggregate total factor productivity (TFP). **Hsieh** and **Klenow** use micro data on manufacturing establishments to quantify the extent of this misallocation in China and India compared to the United States in recent years. They measure sizable gaps in marginal products of labor and capital across plants within narrowly-defined industries in China and India as compared to the United States. When capital and labor are hypothetically reallocated to equalize observed U.S. marginal products, the researchers calculate manufacturing TFP gains of 25–40 percent in China and 50–60 percent in India.

## Environmental and Energy Economics

NBER's Program on Environmental and Energy Economics met at Stanford University on February 8. Program Director Don Fullerton, University of Texas, and Catherine Wolfram, NBER and University of California, Berkeley, organized this agenda:

**Severin Borenstein**, University of California, Berkeley and NBER, "The Market Value and Cost of Solar Photovoltaic Electricity Production"

Discussant: William Pizer, Resources for the Future

**Stephen P. Holland**, University of North Carolina at Greensboro; **Christopher R. Knittel**, University of California, Davis and NBER; and **Jonathan E. Hughes**, University of California, Davis, "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" (NBER Working Paper No. 13266)

Discussant: Kenneth Small, University of California, Irvine

**Matthew J. Kotchen**, University of California, Santa Barbara and NBER, and **Laura E. Grant**, University of California, Santa Barbara, "Does Daylight Saving Time Save Energy? Evidence from a Natural Experiment in Indiana"  
Discussant: Matthew Kahn, University of California, Los Angeles and NBER

The high cost of power from solar photovoltaic (PV) panels has been a major deterrent to the technology's market penetration. Proponents have argued, however, that typical analyses overlook many of the benefits of solar PV. Some of those benefits are in the realm of environmental and security externalities, but others occur within the electricity markets. **Borenstein** attempts to do a more complete market valuation of

solar PV. He incorporates the fact that power from solar PV panels is generated disproportionately at times when electricity is most valuable because of high demand and increased line losses. He finds that the degree to which the timing of solar PV production enhances its value depends very much on the extent to which wholesale prices peak with demand, which in turn depends on the proportion of reserve capacity held in

the system. In a typical U.S. system with substantial excess capacity, the favorable timing of solar PV production increases its value by as much as 20 percent, but if the system were run with more reliance on price-responsive demand and peaking prices, the premium value of solar PV would be in the 30–50 percent range. Solar PV also may have enhanced value within an electrical grid, because the power is produced at the location of

the end-user and therefore can reduce the costs of transmission and distribution investments. This analysis, however, suggests that actual installation of solar PV systems in California has not significantly reduced the cost of transmission and distribution infrastructure, and is unlikely to do so in other regions. Borenstein brings together these adjustments to the valuation of solar PV power with calculations of its cost to analyze the market value of solar PV. The market benefits of installing the current solar PV technology, even after adjusting for its timing and transmission advantages, are calculated to be much smaller than the costs. The difference is so large that including current plausible estimates of the value of reducing greenhouse gases still does not come close to making the net social return on installing solar PV today positive.

A low carbon fuel standard (LCFS) seeks to reduce greenhouse gas emissions by limiting a fuel producer's carbon emissions per unit of output. California has launched an LCFS for transportation fuels; others have called for a national LCFS. **Holland** and his co-authors show that this policy decreases production of high-carbon fuels but increases production of low-carbon fuels. The net effect of this may be an increase in carbon emis-

sions. The LCFS cannot be first best, and the best LCFS may reduce social welfare. The authors simulate the outcomes of a national LCFS, focusing on gasoline and ethanol as the high- and low-carbon fuels. For a broad range of parameters, they find that the LCFS is unlikely to increase CO<sub>2</sub> emissions. However, the surplus losses from the LCFS are likely to be quite large (\$80 to \$760 billion annually for a national LCFS reducing carbon intensities by 10 percent), energy prices are likely to increase, and the average carbon cost (\$307 to \$2,272 per ton of CO<sub>2</sub> for the same LCFS) can be much larger than damage estimates. The authors describe an efficient policy that achieves the same emissions reduction at a much lower surplus cost (\$16 to \$290 billion) and much lower average carbon cost (\$60 to \$868 per ton of CO<sub>2</sub>).

The history of Daylight Saving Time (DST) has been long and controversial. Throughout its implementation during World Wars I and II, the oil embargo of the 1970s, and more regular practice today, the primary rationale for DST has always been to promote energy conservation. Nevertheless, there is surprisingly little evidence that DST actually saves energy. **Kotchen** and **Grant** take advantage of a natural experiment in the state of Indiana to provide the first

empirical estimates of DST effects on electricity consumption in the United States since the mid-1970s. Focusing on residential electricity demand, they conduct the first-ever study that uses micro-data on households. The dataset consists of more than 7 million observations on monthly billing data for nearly all households in southern Indiana for three years. Their main finding is that, contrary to the policy's intent, DST increases residential electricity demand. Estimates of the overall increase range from 1 to 4 percent, but they find that the effect is not constant throughout the DST period. There is some evidence of electricity savings during the spring, but the effect lessens, changes sign, and appears to cause the greatest increase in consumption near the end of the DST period in the fall. These findings are consistent with simulation results that point to a tradeoff between reducing demand for lighting and increasing demand for heating and cooling. Based on the dates of DST practice before the 2007 extensions, the authors estimate a cost of increased electricity bills to Indiana households of \$8.6 million per year. They also estimate social costs of increased pollution emissions that range from \$1.6 to \$5.3 million per year.



## Industrial Organization Program Meeting

The NBER's Industrial Organization (IO) Program, directed by Nancy L. Rose of MIT, met jointly with NBER's Program on Environmental and Energy Economics at Stanford University on February 8. Erin T. Mansur, NBER and Yale School of Management, and Catherine Wolfram, NBER and University of California, Berkeley, organized the combined session. On the following day, the IO Program held its winter meeting, also at Stanford University. The following papers were discussed during the two-day gathering:

**Haitao Yin**, University of Michigan, and **Howard Kunreuther** and **Matthew W. White**, University of Pennsylvania and NBER, "Risk-Based Pricing and Risk-Reducing Effort: Does the Private Insurance Market Reduce Environmental Accidents?"  
Discussant: Lucas Davis, University of Michigan

**Jean-Francois Houde**, University of Wisconsin, Madison, "Spatial Differentiation in Retail Markets for Gasoline"  
Discussant: Justine Hastings, Yale University and NBER

**Meredith Fowlie**, University of Michigan, "Incomplete Environmental Regulation, Imperfect Competition, and Emissions Leakage"  
Discussant: Stephen Ryan, MIT and NBER

**Christopher R. Knittel**, University of California, Davis and NBER, and **Konstantinos Metaxoglou**, Bates White, "Estimation of Random Coefficient Demand Models: Challenges, Difficulties and Warnings"  
Discussant: Frank Wolak, Stanford University and NBER

**Orley Ashenfelter**, Princeton University and NBER, and **Daniel**

**Hosken**, Federal Trade Commission, "The Effect of Mergers on Consumer Prices: Evidence from Five Selected Case Studies" (NBER Working Paper No. 13859)  
Discussant: Carl Shapiro, University of California, Berkeley

**Paul B. Ellickson** and **Stephannie Houghton**, Duke University, and **Christopher Timmins**, Duke University and NBER, "Estimating Network Economies in Retail Chains: A Revealed Preference Approach"  
Discussant: Tim Bresnahan, Stanford University and NBER

**Jean-Pierre Dube**, **Gunter J. Hitsch**, and **Pradeep Chintagunta**, University of Chicago, "Tipping and Concentration in Markets with Indirect Network Effects"  
Discussant: Dan Akerberg, University of California, Los Angeles

**Yin** and his co-authors ask whether risk-based pricing, which is common in private insurance markets but rarely incorporated in government assurance programs, promotes risk-reducing effort. They analyze accidental underground fuel tank leaks—a source of environmental damage to water supplies—over a 14-year period, using disaggregate (facility-level) data and policy variation in the financing of cleanups of leaking tanks over time. The data suggest that eliminating a state-level government assurance program and switching to private insurance markets to finance cleanups reduces the frequency of costly underground fuel storage tanks leaks by more than 20 percent. This corresponds to more than 3,000 avoided fuel-tank release accidents over eight years in one state alone, a benefit in avoided cleanup costs and environmental harm exceeding \$400 million. These benefits arise because private insurers mitigate moral hazard by providing

financial incentives for tank owners to close or replace leak-prone tanks prior to accidents that require costly cleanup.

**Houde** studies spatial competition using an empirical model that features formal specification of commuting paths as the "locations" of consumers (in a Hotelling-type model of spatial competition). This modeling choice is motivated by the fact that consumers are moving across the market when consuming gasoline. Although this feature is perhaps more relevant for gasoline markets, it also applies to most retail markets, since consumers are mobile. The consequence of mobility is that competition is not fully localized, as in the standard address-model. In particular, the substitution patterns between gas stations depend in an intuitive way on the structure of the road network and the direction of traffic flows. Another feature of the model is that consumers' available options are linked directly to their com-

muting behavior; consumers who commute more encounter more stations and observe more prices. **Houde** estimates the demand-side of the model by combining a model of traffic allocation with econometric techniques used to estimate models of demand for differentiated products (**Berry**, **Levinsohn** and **Pakes** [1995]). He computes the empirical distribution of commuters with a shortest-path (or Dijkstra) algorithm, combining detailed data on the Québec City road network with aggregate origin-destination commuting probabilities. He then estimates the model's parameters using a unique panel dataset on the Québec City gasoline market from 1995 to 2001.

For political, jurisdictional, and technical reasons, environmental regulation of industrial pollution is often incomplete: regulations apply to only a subset of facilities contributing to a pollution problem. Policymakers are increasingly concerned about the emissions leakage

that may occur if unregulated production can be substituted easily for production at regulated firms. **Fowlie** analyzes emissions leakage in an incompletely regulated and imperfectly competitive industry. When regulated producers are less polluting than their unregulated counterparts, emissions under incomplete regulation exceed the level of emissions that would have occurred under complete regulation. The reverse can be true when regulated firms are relatively more polluting. In a straightforward application of the theory of the second best, she shows that incomplete regulation can welfare-dominate complete regulation of emissions from an asymmetric oligopoly. Fowlie uses the model to simulate greenhouse gas emissions from California's electricity sector under a source-based cap-and-trade program. Incomplete regulation that exempts out-of-state producers achieves approximately one third of the emissions reductions achieved under complete regulation, at almost three times the cost per ton of emissions abated.

**Knittel** and his co-author analyze the sensitivity of parameter estimates, and most importantly of economic variables of interest, to starting values and the type of non-linear optimization algorithm employed. They focus on a class of demand models for differentiated products that have been used extensively in industrial organization. They find that convergence may occur at a number of local extremes, saddles, and in regions of the objective function where the first-order conditions are not satisfied. In the interest of a routine market power analysis exercise, they find own- and cross-price elasticities that differ by a factor of over 100 depending on the set of candidate parameter estimates. In an attempt to evaluate the welfare effects of a change in an industry's structure, they undertake a hypothetical merger exercise. Their calculations indicate consumer welfare effects varying from positive values to negative seventy billion

dollars, depending on the set of parameter estimates used.

**Ashenfelter** and his co-author propose a method for evaluating the effectiveness of U.S. horizontal merger policy and apply it to the study of five recent consumer product mergers. They selected the mergers from those that, from the public record, seemed to be most problematic for the antitrust agencies. Thus they estimate an upper bound on the likely price effect of completed mergers. Their study uses retail scanner data and familiar procedures for panel data program evaluation to measure price changes. The results indicate that four of the five mergers resulted in some increases in consumer prices, while the fifth merger had little effect.

Many industries are characterized by a small number of firms making many entry decisions over a large choice set. Nowhere is this more true than in the case of the discount retail sector, where Target, Wal-Mart, and Kmart compete in a national market. Traditional discrete choice models of firm entry are ill-suited to this high dimensional choice problem. **Ellickson** and his co-authors instead draw on recent innovations in the application of maximum score estimators to models of revealed preference (Bajari and Fox (2006), Fox (2007)). Unlike previous work on this sector, their approach allows them to consider any number of potential rivals, any number of stores per location, the endogeneity of the distribution network, and unobserved (to the econometrician) location attributes that might cause firms to cluster their stores. Moreover, they show how recent innovations in set identification and inference can be used to separate the role of these unobservables from observed location attributes, like population. They find that all firms (especially Target and Kmart) find it advantageous to cluster stores around distribution centers. Conditional upon that clustering, though, it is costly to locate stores in

close proximity to one another (that is, there is an "own business stealing" effect). All firms (especially Kmart) find it even more costly to locate in close proximity to a rival. Both of these strategic effects are understated if unobservable market attributes are ignored. Using counterfactual simulations, the researchers explore the role of the distribution network in determining the level of retail competition experienced by consumers in markets of varying size. Density economies arising from the distribution network lead consumers in small, isolated markets to be underserved by Target, giving Wal-Mart more market power and the ability to raise prices there.

**Dube** and his co-authors develop a framework to measure "tipping": the increase in a firm's market share dominance caused by indirect network effects. Their measure compares the expected concentration in a market to the hypothetical expected concentration that would arise in the absence of indirect network effects. In practice, this measure requires a model that can predict the counter-factual market concentration under different parameter values capturing the strength of indirect network effects. They build such a model for the case of dynamic standards competition in a market characterized by the classic hardware/software paradigm. To demonstrate its applicability, they calibrate it using demand estimates and other data from the 32/64-bit generation of video game consoles, a canonical example of standards competition with indirect network effects. In their example, indirect network effects can lead to a strong, economically significant increase in market concentration. They also find important roles for beliefs on both the demand side, as consumers tend to pick the product they expect to win the standards war, and on the supply side, as firms engage in penetration pricing to invest in growing their networks.

## National Security

The NBER's Working Group on National Security, directed by NBER President Martin Feldstein of Harvard University, met in Cambridge on February 28. The following papers were discussed:

**David Clingingsmith**, Case Western Reserve University; **Asim Ijaz Khwaja**, Harvard University; and **Michael Kremer**, Harvard University and NBER, "Islam's Melting Pot: How the Hajj Impacts the Pilgrim"

**Matthew A. Hanson**, College of William and Mary, "The Economics of Roadside Bombs"

**Philippe Martin** and **Thierry Mayer**, Paris School of Economics, and **Mathias Thoenig**, University of Geneva, "Civil Wars and International Trade"

**Peter Berck**, University of California, Berkeley, and **Jonathan Lipow**, Oberlin College, "Military Conscription and the (Socially) Optimal Number of Boots on the Ground"

**Eli Berman**, University of California, San Diego and NBER, and **David D. Laitin**, Stanford University, "Religion, Terrorism and Public Goods: Testing the Club Model" (NBER Working Paper No. 13725)

**Naomi E. Feldman** and **Bradley J. Ruffle**, Ben-Gurion University, "Religious Terrorism: A Cross-Country Analysis"

**Stefano DellaVigna**, University of California, Berkeley and NBER, and **Eliana La Ferrara**, University of Bocconi, "Detecting Illegal Arms Trade" (NBER Working Paper No. 13355)

**Deepa Dhume**, Harvard University, "Economic Prospects for Iraq: Encouraging Growth amid Security Challenges"

**Kremer** and his co-authors estimate the impact of the Hajj pilgrimage to Mecca on pilgrims by comparing successful and unsuccessful applicants to a lottery that Pakistan uses to allocate Hajj visas. Pilgrim accounts stress that Hajj leads to a feeling of unity with fellow Muslims, but outsiders sometimes have feared that this could be accompanied by antipathy toward non-Muslims. The researchers find that participation in the Hajj increases observance of global Islamic practices, such as prayer and fasting, and reduces participation in localized practices and beliefs, such as using amulets and dowry. It increases belief in equality and compromise among ethnic groups and Islamic sects, and leads to more favorable attitudes toward women, including greater acceptance of women receiving education and working. Increased unity within the Islamic world is not accompanied by antipathy toward non-Muslims. Hajjis have increased belief in peace and in equality and compromise among religions. The evidence suggests that these changes are more likely attributable to interaction with Hajjis from around the world and attendant awareness of diversity within Islam than to religious instruction or changes in the social role of pilgrims upon return.

The U.S. military has been criticized for its failure to stop the Iraqi insurgency's use of improvised explosive devices (IEDs), which have caused most of the Coalition casualties. **Hanson** uses instrumental variables to estimate a microeconomic model of insurgent responses to U.S. military countermeasures. He finds that insurgents increase the number of IED attacks when IEDs are made less effective, but that the insurgents' overall capacity to inflict damage decreases. These results suggest that a major benefit of IED countermeasures comes in reducing non-IED attacks, which decrease 2 percent with every 1 percent decrease in IED effectiveness. Previous evaluations of the U.S. military's \$13 billion counter-IED effort, which have not included its causal impact on non-IED attacks, have significantly understated its success.

**Martin** and his co-authors empirically analyze the relationship between civil wars and international trade. They first show that trade destruction attributable to civil wars is very large and persistent and increases with the severity of the conflict. They then test the presence of two effects that trade can have on the risk of civil conflicts: it may act as a deterrent if trade gains are put at risk during civil wars, but it also may act as

insurance if international trade provides a substitute for internal trade during civil wars. The researchers find support for the presence of these two mechanisms and conclude that trade openness may deter the most severe civil wars (those that destroy the largest amount of trade) but may increase the risk of lower scale conflicts.

There is a wide consensus among economists that military conscription is an inefficient and inequitable tax, and that volunteer-based armed forces are always preferable. Several recent papers, however, have suggested that conscription should be compared to other forms of taxation rather than to a volunteer military, and that conscription may result in welfare gains. **Berck** and **Lipow** develop a general model of the military manpower problem, and compare the efficacy of volunteer and conscription based systems within a framework of social welfare maximization. They find that neither conscription nor a volunteer approach is likely to be first best because of asymmetries of information, externalities related to the size of the military, and constraints on the military pay structure. They then modify the general model by considering the possibility that recruits with high civilian productivity

are also more capable soldiers, and find that under such circumstances, conscription becomes a far more benign form of manpower mobilization than previously understood, and may even be superior to dependence on volunteers, even in the absence of tax efficiency considerations.

Can rational choice modeling explain why Hamas, Taliban, Hezbollah, and other radical religious rebels are so lethal? The literature rejects theological explanations. **Berman** and **Laitin** propose a club framework, which emphasizes the function of voluntary religious organizations as efficient providers of local public goods in the absence of government provision. The sacrifices that religious clubs require are economically efficient (Iannaccone 1992), making them well suited for solving the extreme principal-agent problems faced by terrorist and insurgent organizations. Thus religious clubs can be potent terrorists. That explanation is supported by data on terrorist lethality in the Middle East. The same approach explains why religious clubs often choose suicide attacks. Using three data sources spanning a half century, and comparing suicide attackers to civil war insurgents, the researchers show that suicide attacks are chosen when targets are “hard,” that is difficult to destroy. Data from Israel/Palestine confirm that prediction. To explain why radical religious clubs specialize in suicide attacks, the authors model the choice of tactics by rebels attacking hard targets, considering the human costs and tactical benefits of suicide attacks. They ask what a suicide attacker would have to believe to be rational. They then embed that attacker and other operatives in a club model. The model has testable implications for tactic choice and damage achieved by clubs and other rebels, which are supported by data on terrorist attacks in the Middle East: radical religious clubs are more lethal and choose suicide terrorism more often, when they provide benign local public goods. These results suggest benign tactics to counter terrorism by religious radicals.

A growing theoretical literature explains why religious organizations are better suited to perpetrating suicide bombings in particular and terror attacks more generally than their non-religious rivals. **Feldman** and **Ruffle** offer the first comprehensive test of the roles of religion and religious ideology in terrorism using a unique country-level database on domestic terrorism. Their results show that religious terror groups actually carry out fewer attacks on average than groups of other ideologies (for example, nationalist and communist). Yet, in line with the theoretical literature (for example, Berman and Laitin 2008), religious groups claim at least as many victims as non-religiously motivated attackers for almost all tactics, not just suicide bombings as commonly perceived. In support of Adam Smith’s beneficent view of religious competition, the authors find that increased religious diversity is associated with less terrorism, particularly religious terrorism. Moreover, their results reveal that communist and nationalist terrorist groups commit more terror attacks as terror groups in their country become more numerous, whereas religious terror groups are unresponsive to the number of competing terrorist groups. The researchers conjecture that this difference follows from the greater lethality of religious terrorism. Religious terrorist groups behave as market leaders, while less efficient non-religious groups act as followers responding to competitive pressures.

Illegal arms are responsible for thousands of deaths in civil wars every year. Yet, their trade is very hard to detect. **DellaVigna** and **La 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, and analyze 18 events during the embargo that suddenly increase or decrease conflict intensity. If the weapon-making companies are not trading or are trading legally, then an event worsening the hostilities should not affect their stock

prices or affect them adversely, because it delays the removal of the embargo. Conversely, if the companies are trading illegally, the event may increase stock prices, since it increases the demand for illegal weapons. The researchers detect no significant effect overall. However, they find a large and significant positive reaction for companies headquartered in countries where the legal and reputation costs of illegal trades are likely to be lower. They identify such countries using measures of corruption and transparency in arms trade. They also suggest a method of detecting potential embargo violations based on stock reactions by individual companies, including chains of reactions. The presumed violations are higher for conflicts with more UN investigations and for companies with more Internet stories regarding embargo.

While there is no doubt that the future of Iraq depends upon major progress for its political and security environments, there is also much to be gained from analysis of present and future growth prospects for Iraq’s economy. Various institutions and governments are working on multiple economic initiatives, but these programs largely lack cohesion and prioritization. In order to take advantage of the present window for reform, Iraq must identify key economic objectives. **Dhume** discusses action steps for the short, medium, and long term that focus on the following five priorities: 1) rebuilding oil infrastructure, including metering, pipeline maintenance, and legal frameworks; 2) careful management of short-term deficits and medium-term surpluses; 3) strengthening and modernizing the banking sector; 4) deploying capital effectively for private sector development; and 5) revitalizing agriculture for economic diversification. To be most effective, Iraq will need a detailed program of reform that is continually updated to respond to shifts in institutional and political capacity constraints, as well as developments in the security environment.



## Development of the American Economy

NBER's Program on the Development of the American Economy, directed by Claudia Goldin of Harvard University, met in Cambridge on March 2. The following papers were discussed:

**Daniel Bogart**, University of California, Irvine, and **Gary Richardson**, University of California, Irvine and NBER, "Institutional Adaptability and Economic Development: The Property Rights Revolution in Britain, 1700 to 1830" (NBER Working Paper No. 13757)

**Charles Calomiris**, Columbia University and NBER, and **Jonathan Pritchett**, Tulane University, "Preserving Slave Families for Profit: Traders Incentives and Pricing in the New Orleans Slave Market"

**Joseph H. Davis**, Vanguard Group and NBER; **Christopher Hanes**, SUNY Binghamton; and **Paul W. Rhode**, University of Arizona and NBER, "Harvests and Business Cycles in Nineteenth Century America"

**Leah P. Boustan**, University of

California, Los Angeles and NBER, and **Robert A. Margo**, Boston University and NBER, "Spatial Mismatch and the Formation of Bad Ghettos: New Evidence from the U.S. Postal Service"

**Claudia Goldin** and **Lawrence F. Katz**, Harvard University and NBER, "Transitions: Career and Family Lifecycles of the Educational Elite"

**Daniel Raff**, University of Pennsylvania and NBER, "The Book-of-the-Month Club: A Reconsideration"

Adaptable property-rights institutions, **Bogart** and **Richardson** argue, foster economic development. The British example illustrates this point. Around 1700, Parliament established a forum where rights to land and resources could be reorganized. This venue enabled landholders and communities to take advantage of economic opportunities that could not be accommodated by the inflexible rights regime inherited from the past. In this essay, historical evidence, archival data, and statistical analysis demonstrate that Parliament increased the number of acts reorganizing property rights in response to increases in the public's demand for such acts. This evidence corroborates a cornerstone of the authors' hypothesis.

**Calomiris** and **Pritchett** investigate the determinants of slave family discounts, using data from the New Orleans slave market. Large discounts occur in family transactions with and without children. Scale effects do not explain family discounts. Selectivity bias is likely, because in the absence of a scale discount, and in the absence of selectivity bias, family discounts would have created huge unrealized profit opportunities for slave traders from breaking up families that were sold together. Data from the manifests of ships carrying slaves to be sold in New Orleans provide direct evidence for the impor-

ance of selectivity bias in explaining slave family discounts. Children likely to have been shipped with their mothers are 1-2 inches shorter than children of the same sex and age who are unaffiliated, depending on age. Family discounts reflect the fact that the market selectively attached value to keeping some families together to take advantage of family members' willingness to provide care to other family members.

**Davis** and his co-authors observe that most major American industrial business cycles in the era from the late 1870s to WWI were caused by fluctuations in the size of the cotton harvest attributable to economically exogenous factors such as weather. The wheat and corn harvests did not affect industrial production; nor did the cotton harvest before the late 1870s. The unique effect of the cotton harvest on nonagricultural activity in this period can be explained by a standard open-economy Keynesian model of the U.S. economy under the gold standard.

Today, residential segregation is associated with poor economic outcomes for African-Americans but, in the mid-twentieth century, the opposite was true. What changed? One explanation emphasizes the relative loss of jobs in the central city. **Boustan** and **Margo** focus on black employment at the U.S. Postal Service, which has remained centralized for largely

exogenous reasons. If job access matters, they should see African-Americans substituting toward postal employment over time, particularly in cities whose black neighborhoods are clustered downtown. From 1960 onward, blacks in segregated cities have been more likely than whites to work for the postal service. This relationship did not exist in 1940 or 1950, when private sector jobs near black enclaves were plentiful. Furthermore, this pattern does not hold for mail carriers whose work is distributed throughout the metropolitan area. As blacks gained access to the suburbs, the magnitude of this relationship has declined. Black occupational choices suggest that spatial mismatch was potent in the 1950s and 1960s, when firms began to suburbanize but black households were unable to follow, but is less important today.

Large changes in family and career transitions among college graduates since the early 1970s have led to marked increases in the ages at marriage and birth, enormous increases in the fraction women among professionals, and a large decrease in the gender earnings gap. **Goldin** and **Katz** ask whether these general trends can be observed, as well, among those graduating from one of the most elite institutions of higher education. They use data from the recently compiled Harvard and Beyond (H&B) dataset, which concerns

three cohorts with the approximate graduation dates of 1970, 1980, and 1990. They find that even as early as 1970 Harvard/Radcliffe women were pursuing professional careers to about the same degree as in recent cohorts. Although they married considerably earlier than those in recent classes, they had their children just as late and fewer of them. The amount of time off from career among women is about the same in all cohorts. Certain professions appear to be more amenable to combining family and career. The gender gap in earnings in the entire H&B sample is

enormously large mainly because the men in these cohorts earn enormously large incomes, especially in finance.

The Book-of-the-Month Club—much written about by English and Cultural Studies professors—was probably once the largest single firm in American book retailing. But its economic logic and significance are grossly understudied. Using oral histories taken from senior officials of the firm about 20 years after it started (among them all of the original employees), quantitative evidence given in an unusually detailed

S-1 registration statement from its 1947 IPO, and manuscripts of research by the Gallup Organization, **Raff** studies the Club. In an industry famous for low margins all along the value chain, the firm's profitability in its initial 20 years was startlingly high, he shows. He argues that this relative superiority in performance derives from the exploitation of a vertical architecture quite unusual in the industry, and he documents how the exploitation worked. He also explores present-day counterparts.

## Labor Studies

The NBER's Program on Labor Studies met in Cambridge on March 7. Program Director Richard B. Freeman and NBER Research Associate Lawrence F. Katz, both of Harvard University, organized the meeting. These papers were discussed:

**Amitabh Chandra**, Harvard University and NBER, and **Douglas O. Staiger**, Dartmouth College and NBER, "Identifying Provider Prejudice in Healthcare"

**Patricia Cortes**, University of Chicago, and **Jose Tessada**, MIT, "Cheap Maids and Nannies: How Low-Skilled

Immigration is Changing the Labor Supply of High-Skilled American Women"

**Jennifer Hunt**, McGill University and NBER, "How Much Does Immigration Boost Innovation?"

**Sumit Agarwal**, Federal Reserve Bank of Chicago; **John C. Driscoll**, Federal Reserve Board; **Xavier Gabaix**, New York University and NBER; and **David Laibson**, Harvard University and NBER, "The Age of Reason: Financial Decisions over the Life Cycle"

**Jeffrey R. Kling**, Brookings Institution

and NBER; **Sendhil Mullainathan**, Harvard University and NBER; **Eldar Shafir**, MIT; **Lee Vermeulen**, University of Wisconsin; and **Marian V. Wrobel**, Harvard University, "How We Choose: Medicare Drug Plan Selection"

**Eric D. Gould**, Hebrew University; **Victor Lavy**, Hebrew University and NBER; and **M. Daniele Paserman**, Boston University and NBER, "Sixty Years after the Magic Carpet Ride: The Long-Run Effect of the Early Childhood Environment on Social and Economic Outcomes"

There are large racial and gender disparities in healthcare that are not explained by differences in patient access, preferences, or severity. These disparities are believed to contribute to differences in health outcomes, and often are ascribed to prejudicial providers. To evaluate this theory, **Chandra** and **Staiger** use simple economic insights to distinguish between two competing views of physician behavior, each with very different policy implications. If prejudicial providers use a higher benefit threshold before providing care to minority

groups; these patients should therefore have higher returns from being treated. Under statistical-discrimination, race and gender are statistically related to the benefit from treatment. Using data on heart-attack treatments, the researchers find no evidence of prejudicial behavior against women or minorities by providers. They also evaluate alternative explanations for differences in the treatment of women and minorities, such as different triage rules, different implicit values of life, different treatment objectives, greater clinical uncertainty, differences

in costs, or differences in provider skill. They find no evidence to support these alternative explanations. Understanding why women and minorities receive less benefit from intensive treatment deserves further examination as the underlying cause of disparities in the treatment of heart attacks.

Low-skilled immigrants represent a significant fraction of the labor employed in service sectors, which closely substitutes for such household work as house-keeping, gardening, and babysitting services. **Cortes** and **Tessada** study whether

the increased supply of low-skilled immigrants has led high-skilled women, who have the highest opportunity cost for their time, to change their time-use decisions. The authors find that low-skilled immigration has increased hours worked by women with a professional degree or a PhD. The estimated magnitudes suggest that the low-skilled immigration flow of the period 1980–2000 increased between 50 and 70 minutes a week the average time of market work among women with a professional degree or a Ph.D. Consistently, the researchers find a decrease in the time that highly-skilled women spend in household work and an increase in their reported expenditures on housekeeping services. They also find that the fraction of women in this group working more than 50 (and 60) hours a week increases with low-skilled immigration, and that the labor supply effects are significantly larger for those with young children. Except for smaller but significant effects on the probability of women with a college education or masters degree working long hours, there is no evidence of similar effects for any other education group of the female population.

**Hunt** combines patent, decennial census, and other data to measure the extent to which skilled immigration increased innovation in the United States from 1950–2000. She instruments the change in the share of skilled immigrants in a state with the initial share of immigrant high school dropouts from Europe, China, and India, and considers changes of between ten and 50 years. She finds that a one percentage point rise in the share of immigrant college graduates in the population increases patenting by 8–15 percent; the equivalent range for immigrants with post-college education is 15–33 percent. A one percentage point rise in the share of immigrant scientists and engineers in the workforce increases patenting by at least 41 percent. The effects are similar in the short and long run, and appear to be much larger than the effect of skilled natives, especially in the short run. This may be related to Hunt's finding that natives are crowded out by immigrants in the

short run, but not in the long run. Her analysis shows the importance of convergence among states for the evolution of patents.

In cross-sectional data sets from ten credit markets, **Agarwal** and his co-authors find that middle-aged adults borrow at lower interest rates and pay fewer fees than younger and older adults. Fee and interest payments are minimized around age 53. The measured effects are not explained by observed risk characteristics. The researchers discuss several leading factors that may contribute to these effects, including age-related changes in experience and cognitive function, selection effects, and cohort effects.

Choices increasingly abound for various government supported services, ranging from charter schools to health plans. Twenty-four million elderly Americans have enrolled in Medicare Part D prescription drug coverage during the past two years, and may choose among at least 40 plans. **Kling** and his co-authors examine the informational context in which choices are made and conduct an experiment of information provision, focusing on the decision about whether to switch plans during the open enrollment period in 2006, one year after the program began. Their randomized experiment provided an intervention of personalized information (highlighting the predicted out-of-pocket cost of the current plan and the least expensive plan, and also listing costs of all plans — based on information about prescription use entered into the Medicare website) in comparison to a group that was provided information about accessing the Medicare website. The intervention group plan-switching rate was 28 percent, while the comparison group rate was 17 percent. The potential cost savings for those affected by the intervention was at least \$230 on average. The authors interpret these results as evidence of misperception of prices in the comparison group. They find that most participants obtain their information from mailings from plans and from Medicare. This information is not personalized, although the costs and benefits for a given plan vary

greatly depending on specific prescriptions are used. Knowledge of how plans work is low. Personalized information is available by calling Medicare, but most participants do not seek information. The researchers conclude that additional efforts to distribute simple, personalized drug plan information would lead to significant reductions in Medicare beneficiaries' out-of-pocket costs and that the costs of such a program would likely be offset by reduced Medicare expenditures on subsidies to drug plans.

**Gould** and his co-authors estimate the effect of the childhood environment on a large array of social and economic outcomes lasting almost 60 years, for both the affected cohorts and for their children. To do this, they exploit a natural experiment provided by the 1949–51 Magic Carpet operation, where over 50,000 Yemenite immigrants were airlifted to Israel. The Yemenites, who lacked any formal schooling or knowledge of a western-style culture or bureaucracy, believed that they were being “redeemed,” and put their trust in the Israeli authorities to make decisions about where they should go and what they should do. As a result, they were scattered across the country in essentially a random manner. This quasi-random assignment produced a natural experiment whereby the environmental conditions of the immigrant children can be considered exogenous to their family background and parental decisions. The researchers construct three summary measures of the childhood environment: 1) whether the home had running water, sanitation and electricity; 2) whether the locality of residence was in an urban environment with a good economic infrastructure; and 3) whether the locality of residence was a Yemenite enclave. They find that children who were placed in a good environment (a home with good sanitary conditions, in a city, and outside of an ethnic enclave) were more likely to achieve positive long-term outcomes. They were more likely to obtain higher education, marry at an older age, have fewer children, be more assimilated into Israeli society, be less religious, and have more

worldly tastes in music and food. These effects are much more pronounced for women than for men. The authors find weaker and somewhat mixed effects on

health and employment outcomes, and no effect on political views. They do find an effect on the next generation — children who lived in a better environment

grew up to have children who achieved higher educational attainment.

## Entrepreneurship Working Group

The NBER's Working Group on Entrepreneurship met in Cambridge on March 14. Director Josh Lerner of Harvard University organized this program:

**Asim I. Khwaja**, Harvard University; **Atif Mian**, University of Chicago; and **Abid Qamar**, State Bank of Pakistan, "The Value of Business Networks"  
Discussant: Erica Field, Harvard University

**Amar Bhide**, Columbia University, "Founders and Staff: Global At Home"  
Discussant: William Kerr, Harvard University

**Aaron Chatterji**, Duke University; **Kenneth Y. Chay**, University of California, Berkeley; and **Robert W. Fairlie**, University of California, Santa Clara, "The Impact of City Contracting Set-Asides on Minority Self-Employment"  
Discussant: Barton Hamilton, Washington University in St. Louis

**Ulrike Malmendier**, University of California, Berkeley and NBER, and **Josh Lerner**, "With a Little Help from My (Random) Friends: Success and Failure in Post-Business School Entrepreneurship"  
Discussant: David Robinson, Duke University

**Brent Goldfarb**, **Gerard Hoberg**, **David Kirsch**, and **Alexander Triantis**, University of Maryland, "Are Angels Preferred Venture Investors?"  
Discussant: Enrico Perotti, University of Amsterdam

**Thomas Chemmanur** and **Karthik Krishnan**, Boston College, and **Debarshi Nandy**, York University, "How Does Venture Capital Financing Improve Efficiency in Private Firms? A Look beneath the Surface"  
Discussant: Rebecca Zarutskie, Duke University

**Khwaja** and his co-authors construct the topology of business networks across the entire population of private firms in Pakistan, and estimate the value of network membership in enhancing bank credit and improving financial viability. They link two firms together if they have a common director and find that the resulting topology includes a "super-network" comprising 5 percent of firms but over one-half of all bank credit. They estimate the value of joining the super-network by instrumenting network membership with "incidental" entry and exit of firms over time. 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. These benefits are stronger when firms connect through more powerful network nodes, and newly networked firms are more likely to start new banking

relationships with banks already lending to its super-network neighbors.

The participation of immigrant scientists and engineers in the U.S. high-tech industry is in some ways a forerunner of, and a substitute for, the offshoring of innovative activities. Programmers from abroad working "on-site" (on client premises) in the United States paved the way for offshoring; now that offshoring is well established, overseas programmers can work for U.S.-based companies as immigrants or as offshore workers. Like offshoring, immigration evokes anxiety and debate. Critics argue that immigration depresses the wages of scientists and engineers in the United States. This discourages the native-born from pursuing careers in these fields and makes the United States dangerously dependent on the labor of foreigners, presumably because they might decamp if they find better opportunities in their native lands.

Advocates, however, claim that highly qualified and enterprising immigrants help create many new jobs in the United States by starting new businesses or helping established high-tech firms that can compete in international markets. **Bhide** examines the role of immigrants in VC-backed businesses. On the one side, his analysis raises questions about the extent to which the exceptional enterprise or brilliance of immigrant scientists and engineers actually matters to many players in the innovation game. On the other side, he highlights the valuable role that immigrants who may not be wizards play in providing the run-of-the-mill technical labor required for mid-level innovation.

In the 1980s many U.S. cities initiated programs reserving a fixed proportion of local government contracts for minority-owned businesses. **Chatterji** and his co-authors use the staggered introduction of these set-aside programs across cities to



estimate their impact on the self-employment and employment rates of black men. They find that black self-employment rates increase significantly after program initiation, with the black-white gap falling 3 percentage points within five years. There is no evidence of a pre-existing trend in self-employment in the targeted industries, or of post-program gains in industries that were not targeted; this suggests that any potential bias attributable to the programs' nonrandom location and timing is small. The racial gap in the employment-to-population ratio falls by 2 to 3 percentage points for every percentage point decrease in the self-employment gap. There is increased employment among younger, less-educated black men; however, the gains are more decisive for their older, better-educated counterparts. In the aggregate, the programs redistributed self-employment and employment from whites to blacks, with little change in cities' total male employment rates. The welfare consequences for cities depend on the importance of equity and efficiency concerns, although the researchers find little evidence of an efficiency loss.

A central question in the entrepreneurship literature is how to encourage entrepreneurship and whether peers affect the decision to become an entrepreneur. **Malmendier** and **Lerner** exploit the fact that Harvard Business School assigns students into sections, which have varying representation of former entrepreneurs. The authors find that the presence of entrepreneurial peers strongly predicts subsequent entrepreneurship rates, but in a more complex way than the literature has previously suggested. A higher share of students with an entrepreneurial background in a given section leads to lower rather than higher subsequent rates of entrepreneurship. However, the decrease in entrepreneurship is entirely driven by a reduction in unsuccessful entrepreneurial ventures. The relationship between the shares of pre-HBS and successful post-

HBS entrepreneurs is insignificantly positive. Sections with few prior entrepreneurs have a considerably higher variance in their rates of unsuccessful entrepreneurs. The researchers argue that these results are consistent with intra-section learning, where the close ties between section-mates lead to insights about the merits of business plans.

**Goldfarb** and his co-authors examine the impact of business angels on 182 Series A financings and subsequent company outcomes. Their studied rounds have a varied mix of business angel and formal venture capital investors (VCs). They find that when only angels participate in a financing round and VCs are absent, control rights are more entrepreneur-friendly, legal expenses are lower, and investors are more geographically proximate to the company. Such angel-backed companies are less likely to fail and are more likely to have a successful liquidity event. They also find that companies financed exclusively by VC investors perform well, particularly when deals are large. Companies financed by both angels and VCs experience inferior outcomes. These results suggest that entrepreneurs consider business angels to be preferred investors and VCs investing in small deals face adverse selection. For larger deals, where deeper-pocket VC participation is required, these roles reverse and angels face adverse selection when investing alongside powerful VC syndicates.

Using a unique sample from the Longitudinal Research Database (LRD) of the U.S. Census Bureau, **Chemmanur** and his co-authors study several related questions regarding the efficiency gains generated by venture capital (VC) investment in private firms. First, does VC backing improve the efficiency (total factor productivity, TFP) of private firms, and are certain kinds of VCs (higher reputation versus lower reputation) better at generating such efficiency gains than others? Second, how are such efficiency gains

generated: do venture capitalists invest in more efficient firms to begin with (screening) or do they improve efficiency after investment (monitoring)? Third, how are these efficiency gains spread out over time subsequent to VC investment? Fourth, what are the channels through which such efficiency gains are generated: increases in product market performance (sales) or reductions in various costs (labor, materials, total production costs)? Finally, how do such efficiency gains affect the probability of a successful exit (IPO or acquisition)? They find: 1) the overall efficiency of VC backed firms is higher than that of non-VC backed firms. 2) This efficiency advantage of VC backed firms arises from both screening and monitoring: the efficiency of VC backed firms prior to receiving financing is higher than that of non-VC backed firms and further, the growth in efficiency subsequent to receiving VC financing is greater for such firms relative to non-VC backed firms. 3) The above increase in efficiency of VC backed firms relative to non-VC backed firms is monotonically increasing over the four years subsequent to the year of initial VC financing, and continues till exit. 4) While the efficiency of firms prior to VC financing is similar across higher and lower reputation VC backed firms, the increase in efficiency subsequent to financing is significantly higher for the former firms, consistent with higher reputation VCs having greater monitoring ability. 5) The efficiency gains generated by VC backing arise primarily from improvement in product market performance (sales); however for high reputation VCs, the additional efficiency gains arise from both an additional improvement in product market performance and from reductions in various input costs. Finally, both the level of efficiency of VC backed firms prior to receiving financing and the growth in efficiency subsequent to VC financing positively affect the probability of a successful exit (IPO or acquisition).

## International Finance and Macroeconomics

The NBER's Program on International Finance and Macroeconomics met in Cambridge on March 21. Roberto Chang, NBER and Rutgers University, and Menzie D. Chinn, NBER and University of Wisconsin, organized this program:

**Charles Engel**, University of Wisconsin and NBER, and **Jian Wang**, Federal Reserve Bank of Dallas, "International Trade in Durable Goods: Understanding Volatility, Cyclicalities, and Elasticities" (NBER Working Paper No. 13814)  
Discussant: Paul Bergin, University of California, Davis and NBER

**Yu-chin Chen**, University of Washington; **Kenneth S. Rogoff**, Harvard University and NBER; and **Barbara Rossi**, Duke University, "Can Exchange Rates Forecast

Commodity Prices?" (NBER Working Paper No. 13901)

Discussant: Jeffrey A. Frankel, Harvard University and NBER

**A. Craig Burnside**, Duke University and NBER; **Martin S. Eichenbaum**, Northwestern University and NBER; and **Sergio Rebelo**, Northwestern University and NBER, "Understanding the Forward Premium Puzzle: A Microstructure Approach" (NBER Working Paper No. 13278)

Discussant: Andrew K. Rose, University of California, Berkeley and NBER

**Fabio Ghironi**, Boston College and NBER, and **Viktors Stebunovs**, Boston College, "The Domestic and International Effects of Financial Deregulation"

Discussant: Cedric Tille, University of Geneva

**Maurice Obstfeld**, University of California, Berkeley and NBER; **Jay C. Shambaugh**, Dartmouth College and NBER; and **Alan M. Taylor**, University of California, Davis and NBER, "Financial Stability, the Trilemma, and International Reserves"  
Discussant: Sebnem Kalemli-Ozcan, University of Houston and NBER

**Laura Alfaro**, Harvard University and NBER, and **Fabio Kanczuk**, University of Sao Paulo, "Optimal Reserve Management and Sovereign Debt" (NBER Working Paper No. 13216)  
Discussant: Vivian Yue, New York University

Data for OECD countries document that: 1) imports and exports are about three times as volatile as GDP; 2) imports and exports are pro-cyclical, and positively correlated with each other; and 3) *net* exports are counter-cyclical. Standard models fail to replicate the behavior of imports and exports, although they can match net exports relatively well. Inspired by the fact that a large fraction of international trade is in durable goods, **Engel** and **Wang** propose a two-country two-sector model, in which durable goods are traded across countries. Their model can match the business cycle statistics on the volatility and comovement of the imports and exports relatively well. In addition, the model with trade in durables helps us to understand the empirical regularity noted in the trade literature: home and foreign goods are highly substitutable in the long run, but the short-run elasticity of substitution is low. The researchers note that durable consumption also has implications for the appropriate measures of consumption and prices to assess risk-sharing opportunities, as in the empirical work on the Backus-Smith puzzle. The fact that this model can match data better in multiple dimensions suggests that trade in dura-

ble goods may be an important element in open-economy macro models.

**Chen** and her co-authors demonstrate that "commodity currency" exchange rates have remarkably robust power in predicting future global commodity prices, both in-sample and out-of-sample. A critical element of their in-sample approach is to allow for structural breaks, endemic to empirical exchange rate models, by implementing the approach of Rossi (2005b). Aside from its practical implications, their forecasting results provide perhaps the most convincing evidence to date that the exchange rate depends on the present value of identifiable exogenous fundamentals. They also find that the reverse relationship holds; that is, that commodity prices Granger-cause exchange rates. However, consistent with the vast post-Meese-Rogoff (1983a,b) literature on forecasting exchange rates, they find that the reverse forecasting regression does not survive out-of-sample testing. They argue, however, that it is quite plausible that exchange rates will be better predictors of exogenous commodity prices than vice-versa, because the exchange rate is fundamentally forward looking. Therefore, following Campbell and Shiller (1987) and

Engel and West (2005), the exchange rate is likely to embody important information about future commodity price movements well beyond what econometricians can capture with simple time-series models. In contrast, prices for most commodities are extremely sensitive to small shocks to current demand and supply, and are therefore likely to be less forward looking.

High-interest-rate currencies tend to appreciate relative to low-interest-rate currencies. **Burnside** and his co-authors argue that adverse-selection problems between participants in foreign exchange markets can account for this "forward premium puzzle." The key feature of their model is that the adverse selection problem facing market makers is worse when an agent wants to trade against a public information signal. So, when based on public information the currency is expected to appreciate, there is more adverse selection associated with a sell order than with a buy order.

**Ghironi** and **Stebunovs** study the domestic and international effects of financial deregulation in a dynamic, stochastic, general equilibrium model with endogenous producer entry. They model deregulation as a decrease in the monopoly power

of financial intermediaries. They show that the economy that deregulates experiences producer entry, real exchange rate appreciation, and a current account deficit. The rest of the world experiences a long-run increase in GDP and consumption. Less monopoly power in financial intermediation results in less volatile business creation, reduced markup countercyclicality, and weaker substitution effects in labor supply in response to productivity shocks. Financial deregulation thus contributes to a moderation of firm-level and aggregate output volatility. In turn, trade and financial ties between the two countries allow also the foreign economy to enjoy lower volatility. The results of the model are consistent with features of U.S. and international data following the U.S. banking deregulation started in 1977.

The rapid growth of international

reserves—a development concentrated in the emerging markets—remains a puzzle. **Obstfeld** and his co-authors suggest that a model based on financial stability and financial openness goes far toward explaining reserve holdings in the modern era of globalized capital markets. The size of domestic financial liabilities that could potentially be converted into foreign currency (M2), financial openness, the ability to access foreign currency through debt markets, and exchange rate policy are all significant predictors of reserve stocks. Their empirical financial-stability model seems to outperform both traditional models and recent explanations based on external short-term debt.

Most models currently used to determine optimal foreign reserve holdings take the level of international debt as given.

However, given the sovereign's willingness-to-pay incentive problems, reserve accumulation may reduce sustainable debt levels. In addition, assuming constant debt levels does not allow addressing one of the puzzles behind using reserves as a means to avoid the negative effects of crisis: why don't sovereign countries reduce their sovereign debt instead? To study the joint decision of holding sovereign debt and reserves, **Alfaro** and **Kanczuk** construct a stochastic dynamic equilibrium model calibrated to a sample of emerging markets. They find that the reserve accumulation does not play a quantitatively important role in this model. In fact, the optimal policy is not to hold reserves at all. This finding is robust to considering interest rate shocks, sudden stops, contingent reserves, and reserve dependent output costs.

## International Trade and Investment

The NBER's Program on International Trade and Investment met in Cambridge on March 28 and 29. Program Director Robert C. Feenstra of the University of California, Davis organized the meeting. These papers were discussed:

**Nathan Nunn**, Harvard University and NBER, and **Daniel Trefler**, University of Toronto and NBER, "The Boundaries of the Multinational Firm: An Empirical Analysis"

**Ann Harrison**, University of California, Berkeley and NBER, and **Margaret McMillan**, Tufts University and NBER, "Offshoring Jobs? Multinationals and U.S. Manufacturing Employment"

**Robert C. Feenstra; Marshall B. Reinsdorf**, U.S. Bureau of Economic Analysis; and **Matthew J. Slaughter**, Dartmouth College and NBER, "Effects of Terms of Trade Gains and Tariff Changes on the Measurement of U.S. Productivity Growth"

**Susana Iranzo**, Universitat Rovira Virgili, and **Giovanni Peri**, University of California, Davis and NBER, "Migration and Trade in a World of Technological Differences: Theory with an Application to Eastern-Western European Integration"(NBER Working Paper No. 13631)

**Ram C. Acharya**, Industry Canada, and **Wolfgang Keller**, University

of Colorado, Boulder and NBER, "Technology Transfer Through Imports"(NBER Working Paper No. 13086)

**Gerard Padró i Miquel**, London School of Economics and NBER, and **Pol Antràs**, Harvard University and NBER, "A Theory of Foreign Influence"

**Susumu Imai**, Queen's University; **Hajime Katayama**, University of Sydney; and **Kala Krishna**, Pennsylvania State University and NBER, "A Quantile-Based Test of Protection for Sale Model"(NBER Working Paper No. 13900)

Using data on U.S. intra-firm and arm's-length imports for 5,423 products and 210 countries, **Nunn** and **Trefler** examine the determinants of the share of U.S. imports that are intra-firm. Three determinants of this share have been proposed: 1) Antràs (2003) focuses on the share of inputs pro-

vided by the headquarter firm. Nunn and Trefler provide added confirmation and further strengthen the empirical findings in that paper and Yeaple (2006). 2) In a model featuring heterogeneous productivities, Antràs and Helpman (2004) focus on the interaction between the firm's pro-

ductivity level and the headquarter's input share. Nunn and Trefler find very strong support for this determinant. 3) Antràs and Helpman (2006) add to this the possibility of partially incomplete contracting. The authors here find that, consistent with the novel prediction of their model, improved



contracting of the supplier's inputs can *increase* the share of U.S. imports that are intra-firm. In short, the data bear out the primary predictions of this class of models about the share of U.S. imports that make up intra-firm trade.

Critics of globalization claim that U.S. manufacturing firms are being driven to shift employment abroad by the prospects of cheaper labor. Others argue that the availability of low-wage labor has allowed U.S.-based firms to survive and even prosper. Yet evidence for either hypothesis, beyond anecdotes, is slim. Using firm-level data collected by the U.S. Bureau of Economic Analysis (BEA), **Harrison** and **McMillan** estimate the impact on U.S. manufacturing employment of changes in foreign affiliate wages, controlling for changing demand conditions and technological change. They find that the evidence supports both perspectives on globalization. For firms most likely to perform the same tasks in foreign affiliates and at home ("horizontal" foreign investment), foreign and domestic employees appear to be substitutes. For these firms, lower wages in affiliate locations are associated with lower employment in the United States. However, for firms that perform significantly different tasks at home and abroad ("vertical" foreign investment), foreign and domestic employment are complements. These offsetting effects may be combined to show that offshoring is associated with a quantitatively small decline in manufacturing employment. In fact, for vertical multinationals, offshoring is associated with significant employment gains. Other factors, such as declining prices for consumer goods, import competition, and falling prices for investment goods (which substitute for labor) play a more important role in explaining the contraction in U.S. manufacturing employment.

Since 1995, growth in productivity in the United States has accelerated dramatically, due in large part to the information technology sector. **Feenstra** and his co-authors argue that part of the apparent speedup in productivity growth actually represents gains in the terms of trade and tariff reductions, especially for high-tech products. Unmeasured gains in the terms of trade and declines in tariffs cause real

output growth and productivity growth to be overstated. Building on the GDP function approach of Diewert and Morrison, the authors develop methods for measuring these effects. The growth rates of their alternative price indexes for U.S. imports are as much as 2 percent per year lower than the growth rate of price indexes calculated using official methods. Because non-petroleum imports amount to around 10 percent of GDP during the late 1990s, the period they study, this terms-of-trade gain can account for close to 0.2 percentage points per year, or about 20 percent of the apparent increase in productivity growth for the U.S. economy. Deflators for domestic absorption are beyond the scope of the research in this paper, and it is possible that biases in the domestic price indexes offset some of the effects of the biases in the export and import indexes on the measurement of output and productivity growth.

Two prominent features of globalization in recent decades are the remarkable increase in trade and migratory flows between industrializing and industrialized countries. Because of restrictive laws in the receiving countries and high migration costs, the increase in international migration has involved mainly highly educated workers. During the same period, technology in developed countries has become progressively more skill-biased, increasing the productivity of highly educated workers more than less educated workers. **Iranzo** and **Peri** extend a model of trade in differentiated goods to analyze the joint phenomena of migration and trade in a world where countries use different skill-specific technologies and workers have different skill levels (education). They calibrate the model to match the features of the Western European countries (EU-15) and the new Eastern European members of the EU. They then simulate the effects of freer trade and higher labor mobility between the two regions. Even in a free trade regime the removal of the restrictions on labor movements would benefit Europe as a whole by increasing the GNP of Eastern and Western Europe. Interestingly, they also find that the resulting skilled migration (the so-called "brain drain") from Eastern European countries

would not only benefit the migrants but, through trade, could benefit the workers remaining in Eastern Europe as well.

While there is general agreement that technology differences must figure prominently in any successful account of the cross-country income variation, not much is known on the source of these technology differences. **Acharya** and **Keller** examine cross-country income differences in terms of factor accumulation, domestic R and D, and foreign technological spillovers. Their empirical analysis encompasses 17 industrialized countries in four continents over three decades, at a level disaggregated enough to identify innovations in a number of key high-tech sectors. International technology transfer plays a crucial part in accounting for income differences. The authors also relate technology transfer to imports, showing that imports are often a major channel. At the same time, their analysis highlights that international technology transfer varies importantly across industries and countries.

How do foreign interests influence the setting of policies by particular countries? What are the implications of such foreign influence? **Padró i Miquel** and **Antràs** develop a theory of foreign influence and apply it to the study of optimal tariffs. They develop a two-country probabilistic voting model of electoral competition, where they allow the incumbent party in each country to take costly actions that affect the electoral outcome in the other country. They show that policies end up maximizing a weighted sum of domestic and foreign welfare, and they study the determinants of this weight. They show that although foreign influence is zero in equilibrium, its "threat" may be welfare-enhancing from the point of view of aggregate world welfare. This is because foreign influence helps alleviate externalities arising from cross-border effects of policies. The threat of foreign influence can, however, prove harmful in the presence of large imbalances in influence power across countries. The authors apply their model of foreign influence to the study of optimal trade policy. They derive a modified formula for the optimal import tariff and show that a country's import tariff is more distorted whenever



the influenced country is small relative to the influencing country and whenever natural trade barriers between the two countries are small.

**Krishna** and her co-authors propose a new test of the Protection for Sale (PFS) model by Grossman and Helpman (1994).

Unlike existing methods in the literature, their approach does not require any data on political organizations. They formally show that the PFS model predicts that the quantile regression of the protection measure on the inverse import penetration ratio, divided by the import demand

elasticity, should yield a positive coefficient for quantiles close to one. They test this prediction using the data from Gawande and Bandyopadhyay (2000). The results do not provide any evidence favoring the PFS model.

## Public Economics Program Meeting

The NBER's Program on Public Economics met in Cambridge on April 3 and 4. NBER Research Associates Jeffrey R. Brown and Scott Weisbenner, both of the University of Illinois, organized the meeting. These papers were discussed:

**Liran Einav**, Stanford University and NBER; **Amy Finkelstein**, MIT and NBER; and **Paul Schrimpf**, MIT, "The Welfare Cost of Asymmetric Information: Evidence from the U.K. Annuity Market" (NBER Working Paper No. 13228)

Discussant: Dan Silverman, University of Michigan and NBER

**Ran Abramitzky**, Stanford University, "The Limits of Equality: Insights from the Israeli Kibbutz"

Discussant: Emmanuel Saez, University of California, Berkeley and NBER

**Yuriy Gorodnichenko**, University of California, Berkeley and NBER, and **Jorge Martinez-Vazquez** and **Klara Sabirianova Peter**, Georgia State University, "Myth and Reality of Flat Tax Reform: Micro Estimates of Tax Evasion Response and Welfare Effects in Russia" (NBER Working Paper No. 13719)

Discussant: Joel B. Slemrod, University of Michigan and NBER

**Mark Duggan**, University of Maryland and NBER, and **Fiona Scott Morton**, Yale School of Management and NBER, "The Effects of Medicare Part D on Pharmaceutical Prices and Utilization" (NBER Working Paper No. 13917)

Discussant: Jonathan Gruber, MIT and NBER

**Peter A. Diamond**, MIT and NBER,

and **James Banks**, University College London, "The Base for Direct Taxation" Discussant: Alan J. Auerbach, University of California, Berkeley and NBER

**Daniel Bergstresser**, Harvard University, and **Jeffrey Pontiff**, Boston College, "Investment Taxation and Portfolio Performance" Discussant: William Gentry, Williams College

**Bruce D. Meyer**, University of Chicago and NBER, and **James X. Sullivan**, University of Notre Dame, "Three Decades of Consumption and Income Poverty"

Discussant: Kathleen M. McGarry, Dartmouth College and NBER

Much of the extensive empirical literature on insurance markets has focused on whether adverse selection can be detected. Once detected, however, there has been little attempt to quantify its importance. **Einav** and his co-authors start by showing theoretically that the efficiency cost of adverse selection cannot be inferred from reduced-form evidence of how "adversely selected" an insurance market appears to be. Instead, an explicit model of insurance contract choice is required. The authors develop and estimate such a model in the context of the U.K. annuity market. The model allows for private information about risk type (mortality) as well as het-

erogeneity in preferences over different contract options. The researchers focus on the choice of length of guarantee among individuals who are required to buy annuities. Their results suggest that asymmetric information along the guarantee margin reduces welfare relative to a first-best, symmetric information benchmark by about £127 million per year, or about 2 percent of annual premiums. They also find that government mandates, the canonical solution to adverse selection problems, do not necessarily improve on the asymmetric information equilibrium. Depending on the contract mandated, mandates could reduce welfare by as much as £107 million annually,

or increase it by as much as £127 million. Since determining which mandates would be welfare improving is empirically difficult, these findings suggest that achieving welfare gains through mandatory social insurance may be harder in practice than simple theory suggests.

What limits the capacity of society to redistribute and provide insurance? What determines the structure of compensation in organizations striving for income equality? **Abramitzky** addresses these questions by investigating the economic and sociological forces underlying the persistence of the Israeli kibbutzim, communities based on the principle of income equality. To do this, he exploits

newly-assembled data on kibbutzim, and a financial crisis in the late-1980s that affected them differentially. He finds that: 1) productive individuals are the most likely to exit, and a kibbutz's wealth serves as a lock-in device that increases the value of staying; 2) higher wealth reduces exit and supports a high degree of income equality; 3) ideology contributes to income equality. Using a simple model, he shows that these findings are consistent with a view of the kibbutz as providing optimal insurance without commitment to stay, namely when participation is at-will. More generally, these findings contribute to an understanding of how mobility limits redistribution, and to an understanding of the determinants of the sharing rule in other types of organizations, such as professional partnerships, cooperatives and labor-managed firms.

Using micro-level data, **Gorodnichenko** and his co-authors examine the effects of Russia's 2001 flat rate income tax reform on consumption, income, and tax evasion. They use the gap between household expenditures and reported earnings as a proxy for tax evasion and data from a household panel for 1998–2004. They find that large and significant changes in tax evasion following the flat tax reform are associated with changes in voluntary compliance and cannot be explained by changes in tax enforcement policies. They also find that the productivity response of taxpayers to the flat tax reform is small relative to the tax evasion response. Finally, they develop a feasible framework for assessing the deadweight loss from personal income tax in the presence of tax evasion. They show that, because of the strong tax evasion response, the efficiency gain from the Russian flat tax reform is at least 30 percent smaller than the gain implied by conventional approaches.

On January 1, 2006 the federal government began providing insurance coverage for Medicare recipients' prescription drug expenditures through a new program known as Medicare Part D. Rather than setting pharmaceutical prices itself, the government contracted

with private insurance plans to provide this coverage. Enrollment in Part D was voluntary, with each Medicare recipient allowed to choose from one of the private insurers with a contract to offer coverage in her geographic region. **Duggan** and **Scott Morton** evaluate the effect of this program on the price and utilization of pharmaceutical treatments. Theoretically, it is ambiguous whether the expansion in insurance coverage would increase or reduce pharmaceutical prices. Insurance-induced reductions in demand elasticities would predict an increase in pharmaceutical firms' optimal prices. However, Part D plans could potentially negotiate price discounts through their ability to influence the market share of specific treatments. Using data on product-specific prices and quantities sold in each year in the United States, the researchers find that Part D substantially lowered the average price and increased the total utilization of prescription drugs by Medicare recipients. Their results further suggest that the magnitude of these average effects varies across drugs as predicted by economic theory.

Historically, the debate over the appropriate base for annual taxation has been an argument between total (Haig-Simons) income and annual consumption as the best measure of ability to pay and thus the ideal base for taxation. **Banks** and **Diamond** argue for an optimal tax approach and focus on the question of how annual capital income should be taxed: not at all; at a flat rate (as in the Nordic dual income tax); by a structure that relates the marginal tax rates on capital and labor incomes to each other (as in the United States); or by taxing all income the same? A succession of papers (following Atkinson-Stiglitz and Chamley and Judd) have shown that under certain conditions the optimal tax schedule should not include taxes on capital. Drawing on both theory and empirical evidence, with particular attention to differences in savings rates and in age-earnings profiles and to uncertainty about future wage rates, they conclude that there should be some role

for including capital income as a part of the tax base and they lean toward relating marginal tax rates on capital and labor incomes rather than the Nordic dual tax. They also argue for more use of age-dependent taxes (for example different taxation of earnings for workers of different ages).

Most financial research mistakenly assumes that growth/value and market capitalization portfolios command similar tax burdens. The ability to defer capital gains creates more heterogeneity in aftertax returns than previously recognized. **Bergstresser** and **Pontiff** use the 1926 to 2002 Federal Tax code to generate tax-optimized aftertax returns that investors at different income levels would have realized on a set of benchmark portfolios. For an investor at the 95 percent income level, the historical tax cost of holding "Small Minus Big" and "High book-to-market Minus Low" is, respectively, almost 3 and 17 times greater than the cost on the market premium.

**Meyer** and **Sullivan** examine poverty in the United States from 1972 through 2005. They investigate how poverty rates and poverty gaps have changed over time, explore how these trends differ across demographic groups, and contrast these trends for several different income and consumption measures of poverty. They document sharp differences, particularly in recent years, between different income poverty measures, and between income and consumption poverty rates and gaps. Moving from the official pretax money income measure to a disposable income measure that incorporates taxes and transfers has a substantial effect on poverty rate changes over the past two decades. Furthermore, consumption poverty rates often indicate large declines, even in recent years when income poverty rates have risen. The patterns are very different across demographic groups, with consumption poverty falling much faster than income poverty for the elderly, but more slowly for married couples with children. Income and consumption measures of deep poverty and of poverty gaps generally have moved sharply and in oppo-

site directions in the last two decades: income deep poverty and poverty gaps are rising, but consumption deep pov-

erty and poverty gaps are falling. Poverty measures that account for the overstatement of inflation in official price indexes

indicate sharp declines in poverty, while changes in relative poverty have been fairly small over the past three decades.

## Cohort Studies

The NBER's Working Group on Cohort Studies, directed by Dora Costa of University of California, Los Angeles, met in California on April 11. These papers were discussed:

**Eric D. Gould**, Hebrew University; **Victor Lavy**, Hebrew University and NBER; and **M. Daniele Paserman**, Boston University and NBER, "Sixty Years after the Magic Carpet Ride: The Long-Run Effect of the Early Childhood Environment on Social and Economic Outcomes" (see "Labor Studies" earlier in this issue for a description of this paper)

**Louis Cain**, Loyola University, and **Sok Chul Hong**, University of Chicago,

"Survival in 19th Century Cities: The Larger the City, the Smaller Your Chances"

**Robert A. Pollak**, Washington University and NBER, and **Janice Compton**, University of Manitoba, "Intergenerational Transfers and the Proximity of Adult Children to their Parents"

**Stefania Albanesi**, Columbia University and NBER, and **Claudia Olivetti**, Boston University, "Gender Roles and Technological Progress" (NBER Working Paper No. 13179)

**Valerie A. Ramey**, University of

California, San Diego and NBER, "Time Spent in Home Production in the 20th Century: New Estimates from Old Data"

**Raquel Fernandez**, New York University and NBER, "Culture as Learning: The Evolution of Female Labor Force Participation over a Century" (NBER Working Paper No. 13373)

**Ulrike Malmendier**, University of California, Berkeley and NBER, and **Stefan Nagel**, Stanford University and NBER, "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?"

Although it is widely known that, during the nineteenth century, life expectancy was substantially lower in cities than in rural areas, the difference in survival rates by urban size and rural environmental characteristics is less widely known. Further, the longitudinal impact of lifetime mobility on life expectancy during this period rarely has been studied. **Cain** and **Hong** examine these less explored subjects using historical data on Union Army veterans' lifetime socioeconomic and health records collected by the Center for Population Economics. In particular, they estimate the differentials in survival rate by urban size at three stages of life: birth, late adolescence, and death. They also exploit the association between rural area survival rates and the local malaria ecology to differentiate rural areas. Their survival analyses show a significant hierarchy in survival rates by urban size, which is consistent for all the stages of lifetime. The results of geographical mobility analyses suggest that late adolescence and adulthood may be an important period

for the urban mortality penalty. While the data permit the authors to document the magnitude of the urban mortality penalty, it persists after the inclusion of all their explanatory variables. While they cannot yet explain why it occurred, they are able to narrow the search for an explanation.

**Pollak** and **Compton** examine the determinants of close proximity between adult children and their mothers, and the manner in which proximity affects transfers of time and money. The authors focus solely on proximity, not co-residence, and separately analyze partnered and un-partnered adult children. The results suggest that close proximity is more probable under circumstances in which the adult children are likely to benefit—when they are young and when they have children. There is no increased likelihood of proximity when it would be expected to benefit the mothers—for example, when they are in poor health or over the age of 75. Time transfers between adult children and their mothers are strongly influenced by proximity. These

transfers are economically important: the probability of work force participation and hours of work of partnered women are positively related to close proximity to their mothers or mothers-in-law. Money transfers are higher to adult children who live in close proximity to their mothers if they are the only sibling living near her.

Until the early decades of the twentieth century, women spent more than 60 percent of their prime-age years either pregnant or nursing. Since then, improved medical knowledge and obstetric practices have reduced the time cost associated with women's reproductive role. The introduction of infant formula also reduced women's comparative advantage in infant care, by providing an effective breast milk substitute. **Albanesi** and **Olivetti** hypothesize that these developments enabled married women to increase their participation in the labor force, thus providing the incentive to invest in market skills, potentially narrowing gender earnings differentials. They document these changes and develop a

quantitative model that aims to capture their impact. Their results suggest that progress in medical technologies related to motherhood was essential to generate the significant rise in the participation of married women between 1920 and 1960, in particular those with children. By enabling women to reconcile work and motherhood, these medical advancements laid the ground for the revolutionary change in women's economic role.

**Ramey** presents new estimates of time spent in home production in the United States during the twentieth century. Regressions based on detailed tabulations from early time diary studies are used to construct nationally representative estimates for the first half of the twentieth century. These estimates are then linked to estimates from individual-level data from 1965 to the present. The new estimates show that time spent in home production by housewives fell by less than six hours per week from 1900 to 1965, whereas time spent by all prime-age women fell ten hours. For prime-age men and women combined, hours in home production were unchanged from 1900 to 1965, and then fell modestly thereafter. The new estimates are used to assess leading theories about long-run trends in home production.

Married women's labor force participation increased dramatically over the last century. Why this occurred has been the subject of much debate. **Fernandez** investigates the role of changes in culture arising from learning in generating this increase. To do so, she develops a dynamic model of culture in which individuals hold heterogeneous beliefs regarding the relative long-run payoffs for women who work in the market versus the home. These beliefs evolve rationally via an intergenerational learning process. Women are assumed to learn about the long-term payoffs of working by observing (noisy) private and public signals. This process generically generates an S-shaped figure for female labor force participation (LFP), which is what is found in the data. The S-shape results from the dynamics of learning. She calibrates the model to several key statistics and shows that it does a good job in replicating the quantitative evolution of female LFP in the United States over the last 120 years. The model highlights a new dynamic role for changes in wages via their effect on intergenerational learning. The calibration shows that this role was quantitatively important in several decades.

**Malmendier** and **Nagel** investigate whether individuals' experiences of macroeconomic shocks have long-term effects

on their risk attitudes, as often suggested for the generation that experienced the Great Depression. Using data from the Survey of Consumer Finances from 1964–2004, the authors find that individuals who have experienced high stock-market returns throughout their lives report lower risk aversion, are more likely to be stock-market participants, and, if they participate, invest a higher fraction of liquid wealth in stocks. At the same time, individuals who have experienced high inflation are less likely to invest their (non-stock) assets in bonds and favor inflation-proof cash-like investments. All results are estimated controlling for age, year effects, and a broad set of household characteristics. The estimates indicate that the most recent returns and inflation rates have the strongest effect, but experiences earlier in life still have some influence, even several decades later. Thus, the experience of risky asset payoffs over the course of an individual's life affects subsequent risk-taking. These results can explain, for example, the relatively low rates of stock-market participation among young households in the early 1980s (following the disappointing stock-market returns in the 1970s depression) and the relatively high participation rates of young investors in the late 1990s (following the boom years in the 1990s).



## Monetary Economics

NBER's most recent program meeting on Monetary Economics took place at the Federal Reserve Bank of Chicago on April 18. Organizers Anil K Kashyap, University of Chicago and NBER, and Virgiliu Midrigan, New York University and NBER, chose these papers for discussion:

**Atif Mian**, University of Chicago and NBER, and **Amir Sufi**, University of Chicago, "The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis" (NBER Working Paper No. 13936)  
Discussant: Stijn Van Nieuwerburgh, New York University

**Christopher L. House**, University of Michigan and NBER, "Fixed Cost and Long-Lived Investments"  
Discussant: Nancy Stokey, University of Chicago

**David O. Lucca**, Federal Reserve Board, and **Francesco Trebbi**, University of Chicago and NBER, "Measuring Central Bank Communication: An Automated Approach with Application to FOMC Statements"  
Discussant: Kenneth Kuttner, Oberlin College and NBER

**Emmanuel Farhi**, Harvard University and NBER, and **Xavier Gabaix**, New York University and NBER, "Rare

Disasters and Exchange Rates" (NBER Working Paper No. 13805)  
Discussant: Nelson Mark, University of Notre Dame and NBER

**Arvind Krishnamurthy**, Northwestern University, and **Annette Vissing-Jorgensen**, Northwestern University and NBER, "The Aggregate Demand for Treasury Debt"  
Discussant: Pierre-Olivier Weill, University of California, Los Angeles

**Michael Woodford**, Columbia University, "Information Constrained State-Dependent Pricing"  
Discussant: Mikhail Golosov, MIT and NBER

**Mian** and **Sufi** demonstrate that a rapid expansion in the supply of mortgages driven by disintermediation explains a large fraction of recent U.S. house price appreciation and subsequent mortgage defaults. They identify the effect of shifts in the supply of mortgage credit by exploiting within-county variation across zip codes that differed in latent demand for mortgages in the mid-1990s. From 2001 to 2005, high latent demand zip codes experienced large relative decreases in denial rates, increases in mortgages originated, and increases in house price appreciation, despite the fact that these zip codes experienced significantly negative relative income and employment growth over this time period. These patterns for high latent demand zip codes were driven by a sharp relative increase in the fraction of loans sold by originators shortly after origination, a process which the authors refer to as "disintermediation." The increase in disintermediation-driven mortgage supply to high latent demand zip codes from 2001 to 2005 led to subsequent large increases in mortgage defaults from 2005 to 2007. These results suggest that moral hazard on behalf of originators selling mortgages is a main culprit for the U.S. mortgage default crisis.

Neoclassical investment models predict that firms should make frequent, small adjustments to their capital stocks. However, the microeconomic evidence shows just the opposite: firms make infrequent, large adjustments to their capital stocks. Researchers therefore have developed models with fixed costs of adjustment to explain the data. While these models generate the observed firm-level investment behavior, their aggregate behavior may not differ significantly from the aggregate behavior of neoclassical models. This is important because most of our existing understanding of investment is based on models without fixed costs. Moreover, models with fixed costs have non-degenerate, time-varying distributions of capital holdings across firms, making them extremely difficult to analyze. **House** shows that, for sufficiently long-lived capital, 1) the cross-sectional distribution of capital holdings has virtually no bearing on the equilibrium and 2) the aggregate behavior of the fixed-cost model is virtually identical to the neoclassical model. These findings are not due to consumption smoothing but instead come from the near infinite elasticity of investment timing for long-lived capital, a feature that the fixed-cost model and the

neoclassical models have in common. This analysis shows that the so-called "irrelevance results" obtained in recent numerical studies of fixed-cost models are not parametric special cases but instead are fundamental properties of investment in long-lived capital.

**Lucca** and **Trebbi** present a new automated, objective, and intuitive scoring method to measure the content of central bank communication about future policy rate moves. They apply the methodology to statements released by the Federal Open Market Committee (FOMC) after monetary policy meetings. Using intraday financial data, they find that short-term nominal yields on Treasury securities respond to changes both in policy rates and the content of the statement. By contrast, medium- and long-term yields only react to changes in communication. Using lower frequency data, they find that changes in the content of the statements lead policy rate moves by about six months in both univariate and vector autoregression models. These results are consistent with the view that the FOMC releases information about future policy actions in the statement and market participants include this information when pricing short- and medium-term securities.

**Farhi** and **Gabaix** propose a new model of exchange rates, which yields a theory of the forward premium puzzle. Their explanation combines two ingredients: the possibility of rare economic disasters and an asset view of the exchange rate. Their model is frictionless, has complete markets, and works for an arbitrary number of countries. In the model, rare worldwide disasters can occur and affect each country's productivity. Each country's exposure to disaster risk varies over time according to a mean-reverting process. Risky countries command high risk premia: they feature a depreciated exchange rate and a high interest rate. As their risk premium mean reverts, their exchange rate appreciates. Therefore, currencies of high interest rate countries appreciate on average. To make the notion of disaster risk more implementable, the authors show how options prices might, in principle, uncover latent disaster risk and help forecast exchange rate movements. They then extend the framework to incorporate two factors: a disaster risk factor, and a business cycle factor. They calibrate the model and obtain quantitatively realistic values for the volatility of the exchange rate, the forward premium puzzle regression coefficients, and near-random walk exchange rate dynamics. Finally, they solve a model of stock markets across countries, which yields a series of predictions about the joint behavior of

exchange rates, bonds, options, and stocks across countries. The evidence from the options market appears to be supportive of the model.

The U.S. debt/GDP ratio is negatively correlated with the spread between corporate bond yields and Treasury bond yields, **Krishnamurthy** and **Vissing-Jorgensen** show. This result holds even after they control for the default risk on corporate bonds. The authors argue that the corporate bond spread reflects a convenience yield that investors attribute to Treasury debt. Changes in the supply of Treasury debt trace out the demand for convenience by investors. They also show that the aggregate demand curve for the convenience provided by Treasury debt is downward sloping, and they provide estimates of the elasticity of demand. They analyze disaggregated data from the Flow of Funds Accounts of the Federal Reserve and show that individual groups of Treasury holders also have downward sloping demand curves. Groups for whom the liquidity of Treasuries is likely to be more important have steeper demand curves. These results are relevant for important questions in finance and macroeconomics. The authors discuss their implications for the behavior of corporate bond spreads, interest rate swap spreads, the riskless interest rate, and the value of aggregate liquidity. They also discuss the implications of their results for the financ-

ing of the U.S. deficit, Ricardian equivalence, and the effects of foreign central bank demand on Treasury yields.

**Woodford** presents a generalization of the standard (full-information) model of state-dependent pricing in which decisions about when to review a firm's existing price must be made on the basis of imprecise awareness of current market conditions. The imperfect information is endogenized using a variant of the theory of "rational inattention" proposed by Sims (1998, 2003, 2006). This results in a one-parameter family of models, indexed by the cost of information, which nests both the standard state-dependent pricing model and the Calvo model of price adjustment as limiting cases (corresponding to a zero information cost and an unboundedly large information cost respectively). For intermediate levels of the information cost, the model is equivalent to a "generalized *S*s model" with a continuous "adjustment hazard" of the kind proposed by Caballero and Engel (1993a, 1993b), but provides an economic motivation for the hazard function and very specific predictions about its form. For moderate levels of the information cost, the Calvo model of price-setting is found to be a fairly accurate approximation to the exact equilibrium dynamics, except in the case of (infrequent) large shocks.

## Political Economy

The NBER's Political Economy Program met in Cambridge on April 18. NBER Research Associate Alberto Alesina of Harvard University organized the meeting. These papers were discussed:

**James M. Snyder, Jr.**, MIT, and **David Strömberg**, Stockholm University, "Press Coverage and Political Accountability" Discussant: John Friedman, University of California, Berkeley

**Casey B. Mulligan**, University of Chicago and NBER, and **Kevin K. Tsui**, Clemson University, "Political

Entry, Public Policies, and the Economy" (NBER Working Paper No. 13830) Discussant: Gerard Padro i Miquel, London School of Economics and NBER

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

**David Clingingsmith**, Case Western Reserve University; **Asim Ijaz Khwaja**,

Harvard University; and **Michael Kremer**, Harvard University and NBER, "Estimating the Impact of the Hajj: Religion and Tolerance in Islam's Global Gathering" (See "National Security" Working Group meeting earlier in this section for a description of this paper.) Discussant: Daniele Paserman, Boston University and NBER

**Ernesto Dal Bó**, Stanford University and NBER, and **Marko Tervio**, University of California, Berkeley, "Self-Esteem, Moral Capital, and Wrongdoing" Discussant: Roland Benabou, Princeton University and NBER

**Snyder** and **Strömberg** estimate the impact of press coverage on citizen knowledge, politicians' actions, and policy. They find that a poor fit between newspaper markets and political districts reduces press coverage of politics. They use variation in this fit attributable to redistricting to identify the effects of reduced coverage. Exploring the links in the causal chain of media effects—voter information, politicians' actions, and policy—they find statistically significant and substantively important effects. Voters living in areas with less coverage of their U.S. House representative are less likely to recall their representative's name, and less able to describe and rate them. Congressmen who are less covered by the local press work less for their constituencies: they are less likely to stand witness before congressional hearings, to serve on constituency-oriented committees (perhaps), and to vote against the party line. Finally, this congressional behavior affects policy. Federal spending is lower in areas where there is less press coverage of the local members of congress.

**Mulligan** and **Tsui** present a theory of competition for political leadership between incumbent leaders and their challengers in which the possible equilibrium political market structures range from pure monopoly (unchallenged dictatorship) to perfectly competitive (ideal

democracy). Leaders are constrained by the threat of "entry" or their ability to tax (or both), so that regimes with no challengers nonetheless may implement policies in the public interest. The authors offer economic interpretations of why democratic countries are associated with higher wages, why resource abundant countries tend to be nondemocratic, and how technological change affects political development. By focusing on the incentives for political entry, they show how trade sanctions and other policies designed to promote democracy may actually have the unintended consequences of discouraging political competition.

It is usually thought that the wealthy have an ability to limit wider access to economic institutions only in poor, undemocratic countries. **Rajan** and **Ramcharan** find that even in the United States in the early decades of the twentieth century, landed interests seem to play a significant role in the spread of financial institutions. Counties with very concentrated land holdings tended to have disproportionately fewer banks per capita and fewer national banks. Moreover, aggregating land distribution up to the state level, states that had higher land concentration passed more restrictive banking legislation. Finally, financial underdevelopment, as determined historically by land con-

centration, was negatively correlated with subsequent manufacturing growth, right up to the 1970s. Since these effects are observed across counties possessing similar political and legal institutions at the state level, the evidence is suggestive that the origins of underdevelopment lie, in part, in the historical pattern of constituencies or interests.

In order to help understand adherence to moral standards and the force of intrinsic motivation, **Dal Bó** and **Tervio** present an infinite-horizon model where an individual receives random temptations (such as bribe offers) and must decide which to resist. Temptations yield consumption value, but keeping a good self-image (a high belief of being the type of person that resists) yields self-esteem. Individual actions depend both on types and intent, so selecting a good intent does not guarantee good behavior and past resistance is informative of a good type. The authors identify conditions for individuals to build an introspective reputation for goodness ("moral capital") and for good actions to lead to a stronger disposition to do good. Bad actions destroy moral capital and lock-in further wrongdoing. Economic shocks that result in higher temptations have persistent effects on wrongdoing that fade only as new generations replace the shocked cohorts. Societies with the same

moral fundamentals may display different wrongdoing rates depending on how much past luck has polarized the distribu-

tion of individual beliefs. The model helps rationalize taboos, harsher punishment of repeat offenders, and a tendency of indi-

viduals with low moral capital to enter high-temptation activities.

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## Bureau Books

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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). Garcia is an Associate Professor of Economics at Pontificia Universidade Católica in Rio de Janeiro.



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