NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

***Reporter OnLine* at: www.nber.org/reporter** **SUMMER 2001**

In This Issue

Program Report

Industrial Organization

Nancy L. Rose*

The NBER's Program on Industrial Organization (IO) celebrates its tenth anniversary this year. The program has grown to include 34 members who are engaged in research on a wide range of topics. Rather than attempting an exhaustive review of program activity, this report provides an overview of the most active research areas since the last program report in 1997. These areas include e-commerce, restructured electricity markets, firm behavior in oligopoly markets, and the organization of firms and vertical relationships. Reviews of the substantial body of research on technology and technical change are deferred to reports of the NBER's Program on Productivity and Technological Change and the NBER's Working Group on Industrial Technology and Productivity. The NBER website **http://www.nber.org/programs/io/io.html** contains links to the full body of research done under the auspices of this and other NBER research programs.

E-Commerce Initiative

The NBER sponsored a yearlong research project on the organizational and competitive implications of e-commerce. The results of that project, which was organized by Garth Saloner and Severin Borenstein, were discussed at a two-day meeting in January 2001. The following month, key findings were showcased at an industry/academic conference held at Stanford University. This project focused on three themes: the impact of electronically mediated commerce on vertical relationships between firms; the effect of e-commerce on pricing behavior; and Internet auction performance. Later this year, the

**Rose is Director of the NBER's Program on Industrial Organization and a professor of economics at MIT.*

The Importance of Market Institutions

The detailed rules used to establish and operate the wholesale power market can have significant effects on the exercise of market power. Catherine D. Wolfram's work on strategic bidding in England and Wales focuses on incentives provided by the multi-unit nature of the auction.[19] The study by Wolak and Robert H. Patrick of the market in England and Wales suggests that the major generators exploit these rules in their strategic choices of capacity availability to enhance their profits.[20] Long-term contracting between generators and electricity buyers may mitigate the incentives to exploit market power. But the use of long-term supply or hedge contracts varies considerably across markets. California's restructuring specifically prohibited distribution companies from signing long-term supply contracts with most generators, while Australia's National Electricity Market required vesting contracts between generators and distributors. Wolak's work on the Australian market suggests that hedging contracts may have played a significant role in maintaining wholesale prices close to marginal costs after the restructuring in Australia.[21] Work by Patrick and Wolak on retail-customer response to real-time market prices for electricity explores another institution for mitigating market power — the introduction of demand-side sensitivity to market price.[22]

Firm Behavior in Oligopoly Markets

The behavior of firms in oligopoly markets is one of the mainstays of IO research. One important strand of this research focuses on the mechanisms through which firms exercise potential market power. Genesove and Wallace P. Mullin have continued their historical research into collusive behavior in environments that are subject to minimal antitrust scrutiny. They show how communication and price transparency enable firms to sustain collusive outcomes, even in the absence of explicit agreement on prices and output levels.[23] Aviv Nevo's analysis of the breakfast cereal market suggests that product differentiation and brand location may significantly improve firms' abilities to raise prices in this market, whether or not they engage in cooperative pricing behavior.[24] Steven T. Berry and Joel Waldfogel find evidence of similar spatial preemption in their analysis of mergers in the radio broadcasting industry.[25] In his analysis of Chrysler's introduction of the minivan, Amil Petrin finds that locational rents accruing to new product introductions also may be associated with substantial consumer benefits.[26]

The role of firms' promotional activities in oligopoly markets has attracted renewed empirical interest. For example, Nevo and Wolfram show that manufacturers' promotional coupons and retailers' price discounts are complements, rather than substitutes, in the breakfast cereal market. This contradicts simple models of couponing as a form of price discrimination.[27] The authors suggest that the patterns they observe are consistent with more complex models of oligopoly price discrimination, or managerial responses to sales or market share targets. To explore the interaction of advertising and price choices at the retail level, Jeffrey Milyo and Waldfogel use a natural experiment created by a Rhode Island court decision that struck down the state's ban on advertising liquor prices.[28] They find that although stores that advertise particular products tend to reduce the prices of those products, the prices of products that are not advertised and the prices at stores that don't advertise both tend to increase. In their analysis of supermarket pricing behavior and price margins, Chevalier, Anil K Kashyap, and Peter E. Rossi find support for similar loss-leader models of retail pricing and advertising competition.[29]

Antitrust policy may be better informed by a clearer understanding of which actions are likely to enhance the operation of a market via cost reductions or product enhancements and which are likely to improve profitability at the expense of overall economic surplus, by enabling firms to exercise market power more effectively. Most analyses of mergers and strategic alliances consider tradeoffs between concerns about efficiency versus market power. Martin Pesendorfer estimates significant cost efficiencies from mergers in the paper industry, and argues that these may offset price increases, thus raising overall welfare.[30] Gustavo E. Bamberger, Carlton, and Lynette R. Neumann's analysis of domestic-airline alliances uncovers potential benefits for both firms and consumers through improved service and reduced costs.[31] However, Shane Greenstein and his co-authors argue that analyses of market power may be quite sensitive to the method used to define local markets. Their research on hospital mergers suggests that, contrary to certain assumptions about many mergers in this industry, the existence of some consumers who are willing or able to travel to distant hospitals may provide little post-merger price discipline on local hospitals.[32]

Recent work emphasizes how important it is to model firm interactions and industry equilibrium in dynamic contexts. Ariel Pakes has been in the forefront of this research initiative. His provocative theoretical work with Chaim Fershtman suggests that once the dynamic structure of industries is considered, many of our working assumptions about the benefits of collusion may be misleading. In their model of dynamic oligopoly, price collusion among firms leads to increases in product variety and quality that are sufficient to generate net benefits for consumers despite higher prices.[33] In part because of substantial modeling complexities, empirical implementation of dynamic models of industries remains relatively uncommon. Pakes, in an effort to broaden the use of these methodologies, has developed a framework to guide empirical researchers interested in modeling the dynamic evolution of industries.[34] Recent work by C. Lanier Benkard on the development of the commercial aircraft industry illustrates the potential of these approaches.[35] In their work, David S. Evans and Richard Schmalensee discuss the implications of industry dynamics for antitrust policies.[36]

Internal Organization and Vertical Relationships among Firms

Economists are increasingly interested in studying the determinants and implications of firms' boundaries, the organization of activities within those boundaries, and the relationships across them. One important strand of research analyzes firms' objectives. Although traditional neoclassical models assume profit maximization, economists have been interested for some time in the empirical validity of this assumption, particularly across alternative market and governance structures. Randall S. Kroszner and Philip E. Strahan explore the determinants and implications of alternative governance structures, focusing on conflicting objectives that may emerge when commercial bankers serve on the boards of nonfinancial firms.[37] Chevalier and Glenn Ellison examine the organization of the mutual fund industry and the response of managers in this sector to implicit and explicit incentives. The researchers document systematic changes in managerial behavior over a career cycle and explore the implications of those changes for fund performance.[38] Borenstein and Joseph Farrell demonstrate that managers may minimize costs when economic pressures are intense, but in profitable periods, they will take advantage of financial slack to ease such constraints.[39] Scott Morton and Joel Podolny, in their analysis of the California wine industry, discuss how the existence of firms that do not maximize profits may affect the operation of profit-maximizing firms and of the overall market.[40]

Thomas N. Hubbard has used data on the trucking industry to explore the organization of trucking firms and shippers' decisions to purchase or provide their own transportation. He studies the development of onboard computer technologies that enhance the ability of trucking firm managers to monitor and communicate with their drivers. Hubbard investigates the determinants of diffusion for this technology and studies its implications for the choice between company drivers and owner-operators. Hubbard and George B. Baker argue that the development and introduction of onboard computers has had profound effects on the organization of and relationships among firms in this market.[41] Hubbard finds that market "thickness," measured as the density of potential trading partners for a given type of transaction, is an important determinant of this industry's contractual relationships.

Make-or-buy decisions that affect the vertical scope of activities within and between firms continue to attract enormous interest from economists.[42] In the retail sector, many make-or-buy decisions take the form of whether to operate company-owned or franchised outlets. Asher Blass and Carlton discuss the determinants of this choice in the retail gasoline sector, arguing that "divorcement" laws, which prohibit refiners from operating their own service stations, lead to higher retail gasoline prices.[43] Francine Lafontaine's long-term project on franchising has yielded a number of important insights about this practice. Her recent work with Margaret E. Slade documents a set of robust empirical regularities in the franchising literature and illustrates the inability of standard theoretical models to fully explain these facts.[44] One surprise is the high degree of contract uniformity among franchise outlets that operate under very different conditions. Lafontaine and Joanne Oxley show that this uniformity extends across national boundaries: U.S. and Canadian firms extend franchise operations into Mexico, setting the same conditions and terms that apply in their home markets.[45] Scott Morton and Zettelmeyer look at what might be termed make-and-buy decisions: what determines whether supermarkets will carry a store brand as well as national versions of a product.[46] Their theoretical model of supermarket-and-manufacturer bargaining over supply terms demonstrates the potential for a supermarket's strategic introduction of store brands to improve its bargaining position. Scott Morton and Zettelmeyer's empirical test, which uses data on private-label brands across product categories and supermarkets, provides support for this explanation of store-branding decisions.

Relationships among firms in a vertical supply chain raise a number of questions for antitrust policymakers. It can be difficult to determine which contractual restrictions between firms facilitate efficient transactions and which are used to exercise or extend market power, but making the wrong choice may substantially impede the operation of a market. NBER researchers have been studying tradeoffs between efficiency and market power and assessing the relative strengths of each in various contexts. Recent work has looked at exclusionary contracts (which bar certain firms from buying products, usually for resale), tying contracts (which link the sales of two of a firm's products), and collective determination of credit card system interchange fees.[47] This area of research addresses issues that have arisen in controversial antitrust proceedings in several technology-intensive network industries. Understanding the effects of vertical restraints, their operation in network sectors, and their implications for both competition and individual competitors is critical to constructing appropriate policy responses.

Summary

This report presents an overview of four of the major research areas in the NBER's IO Program over the past four years. A wealth of IO working papers outside these areas may be viewed at the NBER web site at **http://papers.nber.org/papersbyprog/IO.html**. Coincidentally, work by Ellison documents a dramatic slowdown in the publication process of leading economics journals. He tests a variety of possible explanations for this phenomenon, preferring the one based on development of social norms that are intensifying the review process.[48] Given such widespread delays, the NBER's Working Paper series will continue to be an invaluable source of information on recent research in IO.

---

[1] *NBER researchers also have studied the development of the Internet, independent of e-commerce. See, for example, S. Greenstein, "Building and Delivering the Virtual World: Commercializing Services for Internet Access," NBER Working Paper No. 7690, May 2000; and D. Elfenbein and J. Lerner, "Links and Hyperlinks: An Empirical Analysis of Internet Portal Alliances, 1995-1999," NBER Working Paper No. 8251, April 2001.*

[2] *L. Garicano and S. N. Kaplan, "The Effects of Business-to-Business E-Commerce on Transaction Costs," NBER Working Paper No. 8017, November 1990.*

[3] *R. H. Gertner and R. Stillman, "Vertical Integration and Internet Strategies in the Apparel Industry" (paper presented at E-Commerce Project Academic/Industry Conference, Stanford, Calif., February 2001).*

[4] *D. W. Carlton and J. A. Chevalier, "Free Riding and Sales Strategies for the Internet," NBER Working Paper No. 8067, January 2001.*

[5] *A. Goolsbee, "Competition in the Computer Industry: Online versus Retail" (paper presented at E-Commerce Conference, Bodega Bay, Calif., January 2001).*

[6] *F. M. Scott Morton, F. Zettelmeyer, and J. S. Risso, "Internet Car Retailing," NBER Working Paper No. 7961, October 2000.*

[7] *J. R. Brown and A. Goolsbee, "Does the Internet Make Markets More Competitive?" NBER Working Paper No. 7996, November 2000.*

[8] *K. Clay, R. Krishnan, and E. Wolff, "Prices and Price Dispersion on the Web: Evidence from the Online Book Industry," NBER Working Paper No. 8271, May 2001.*

[9] *M. D. Smith and E. Brynjolfsson, "Consumer Choice Behavior at an Internet Shopbot" (paper presented at E-Commerce Conference, Bodega Bay, Calif., January 2001).*

[10] *K. Hendricks, J. Pinske, and R. H. Porter, "Empirical Implications of Equilibrium Bidding in First-Price, Symmetric, Common-Value Auctions," NBER Working Paper No. 8294, May 2001; E. M. R. A. Engel, R. D. Fischer, and A. Galetovic, "How to Auction an Essential Facility When Underhand Integration Is Possible," NBER Working Paper No. 8146, March 2001; and S. Athey and J. Levin, "Information and Competition in U.S. Forest Service Timber Auctions," NBER Working Paper No. 7185, June 1999.*

[11] *P. Resnick and R. Zeckhauser, "Trust among Strangers in Internet Transactions: Empirical Analysis of eBay's Reputation System" (paper presented at E-Commerce Conference, Bodega Bay, Calif., January 2001).*

[12] *A. E. Roth and A. Ockenfels, "Last Minute Bidding and the Rules for Ending Second-Price Auctions: Theory and Evidence from a Natural Experiment on the Internet," NBER Working Paper No. 7729, June 2000.*

[13] *R. Katkar and D. Lucking-Reiley, "Public versus Secret Reserve Prices in eBay Auctions: Results from a Pokemon Field Experiment," NBER Working Paper No. 8183, March 2001.*

[14] *S. Borenstein, J. Bushnell, and S. Stoft, "The Competitive Effects of Transmission Capacity in a Deregulated Electricity Industry," NBER Working Paper No. 6293, November 1997.*

[15] *F. A. Wolak, "Identification and Estimation of Cost Functions Using Observed Bid Data: An Application to Electricity Markets," NBER Working Paper No. 8191, March 2001.*

[16] *S. Borenstein and J. Bushnell, "An Empirical Analysis of the Potential for Market Power in California's Electricity Industry," NBER Working Paper No. 6463, March 1998, and* The Journal of Industrial Economics, *47 (September 1999).*

[17] *S. Borenstein, J. Bushnell, and F. A. Wolak, "Diagnosing Market Power in California's Restructured Wholesale Electricity Market," NBER Working Paper No. 7868, September 2000.*

[18] *P. Joskow and E. Kahn, "A Quantitative Analysis of Pricing Behavior in California's Wholesale Electricity Market during Summer 2000," NBER Working Paper No. 8157, March 2001.*

[19] *C. D. Wolfram, "Strategic Bidding in a Multi-Unit Auction: An Empirical Analysis of Bids to Supply Electricity," NBER Working Paper No. 6269, November 1999, and the* RAND Journal of Economics, *29 (Winter 1998), pp. 703-25.*

[20] *F. A. Wolak and R. H. Patrick, "The Impact of Market Rules and Market Structure on the Price Determination Process in the England and Wales Electricity Market," NBER Working Paper No. 8248, April 2001.*

[21] *F. A. Wolak, "An Empirical Analysis of the Impact of Hedge Contracts on Bidding Behavior," NBER Working Paper No. 8212, April 2001.*

[22] *R. H. Patrick and F. A. Wolak, "Estimating the Customer-Level Demand for Electricity Under Real-Time Market Prices," NBER Working Paper No. 8213, April 2001.*

[23] *D. Genesove and W. P. Mullin, "Rules, Communication, and Collusion: Narrative Evidence from the Sugar Institute Case," NBER Working Paper No. 8145, March 2001.*

[24] *A. Nevo, "Measuring Market Power in the Ready-to-Eat Cereal Industry," NBER Working Paper No. 6387, January 1998.*

[25] *S. T. Berry and J. Waldfogel, "Mergers, Station Entry, and Programming Variety in Radio Broadcasting," NBER Working Paper No. 7080, April 1999; and S. T. Berry and J. Waldfogel, "Public Radio in the United States: Does It Correct Market Failure or Cannibalize Commercial Stations?" NBER Working Paper No. 6057, June 1997.*

[26] *A. Petrin, "Quantifying the Benefits of New Products: The Case of the Minivan," NBER Working Paper No. 8227, April 2001.*

[27] *A. Nevo and C. Wolfram, "Prices and*

Coupons for Breakfast Cereals," NBER Working Paper No. 6932, February 1999.

[28] J. Milyo and J. Waldfogel, "The Effect of Price Advertising and Prices: Evidence in the Wake of 44 Liquormart," NBER Working Paper No. 6488, March 1998.

[29] J. A. Chevalier, A. K Kashyap, and P. E. Rossi, "Why Don't Prices Rise During Periods of Peak Demand? Evidence from Scanner Data," NBER Working Paper No. 7981, October 2000.

[30] M. Pesendorfer, "Horizontal Mergers in the Paper Industry," NBER Working Paper No. 6751, October 1998.

[31] G. E. Bamberger, D. W. Carlton, and L. R. Neumann, "An Empirical Investigation of the Competitive Effects of Domestic Airline Alliances," NBER Working Paper No. 8197, March 2001.

[32] C. S. Capps, D. Dranove, S. Greenstein, and M. Satterwaite, "The Silent Majority Fallacy of the Elzinga-Hogarty Criteria: A Critique and New Approach to Analyzing Hospital Mergers," NBER Working Paper No. 8216, April 2001.

[33] C. Fershtman and A. Pakes, "A Dynamic Oligopoly with Collusion and Price Wars," NBER Working Paper No. 6936, February 1999.

[34] A. Pakes, "A Framework for Applied Dynamic Analysis in IO," NBER Working Paper No. 8024, December 2000.

[35] C. L. Benkard, "A Dynamic Analysis of the Market for Wide-Bodied Commercial Aircraft," NBER Working Paper No. 7710, May 2000.

[36] D. S. Evans and R. Schmalensee, "Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries," NBER Working Paper No. 8268, May 2001.

[37] R. S. Kroszner and P. E. Strahan, "Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability," NBER Working Paper No. 7319, August 1999.

[38] J. A. Chevalier and G. Ellison, "Career Concerns of Mutual Fund Managers," NBER Working Paper No. 6394, February 1998, and Quarterly Journal of Economics, 114 (May 1999).

[39] S. Borenstein and J. Farrell, "Do Investors Forecast Fat Firms? Evidence from the Gold Mining Industry," NBER Working Paper No. 7075, April 1999.

[40] F. M. Scott Morton and J. M. Podolny, "Love or Money? The Effects of Owner Motivation in the California Wine Industry," NBER Working Paper No. 6743, October 1998.

[41] T. N. Hubbard, "How Wide Is the Scope of Hold-Up-Based Theories? Contractual Form and Market Thickness in Trucking," NBER Working Paper No. 7347, September 1999; T. N. Hubbard, "Why are Process Monitoring Technologies Valuable? The Use of On-Board Information Technology in the Trucking Industry," NBER Working Paper No. 6482, March 1998; and G. P. Baker and T. N. Hubbard, "Contractibility and Asset Ownership: On-Board Computers and Governance in U.S. Trucking," NBER Working Paper No. 7634, April 2000.

[42] G. M. Grossman and E. Helpman, "Incomplete Contracts and Industrial Organization," NBER Working Paper No. 7303, August 1999.

[43] A. Blass and D. W. Carlton, "The Choice of Organizational Form in Gasoline Retailing and the Costs of Laws Limiting Choice," NBER Working Paper No. 7435, December 1999.

[44] F. Lafontaine and M. E. Slade, "Incentive Contracting and the Franchise Decision," NBER Working Paper No. 6544, May 1998.

[45] F. Lafontaine and J. Oxley, "International Franchising: Evidence from U.S. and Canadian Franchisors in Mexico," NBER Working Paper No. 8179, March 2001.

[46] F. M. Scott Morton and F. Zettelmeyer, "The Strategic Positioning of Store Brands in Retailer-Manufacturer Bargaining," NBER Working Paper No. 7712, May 2000.

[47] D. W. Carlton, "A General Analysis of Exclusionary Conduct and Refusal to Deal — Why Aspen and Kodak are Misguided," NBER Working Paper No. 8105, February 2001; D. W. Carlton and M. Waldman, "Competition, Monopoly, and Aftermarkets," NBER Working Paper No. 8086, January 2001; D. W. Carlton and M. Waldman, "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries," NBER Working Paper No. 6831, December 1998; and R. Schmalensee, "Payment Systems and Interchange Fees," NBER Working Paper No. 8256, April 2001.

[48] G. Ellison, "The Slowdown of the Economics Publishing Process," NBER Working Paper No. 7804, July 2000; and G. Ellison, "Evolving Standards for Academic Publishing: A q-r Theory," NBER Working Paper No. 7805, July 2000.

Research Summaries

The Gender Pay Gap

Francine D. Blau and
Lawrence M. Kahn*

Over the past 25 years, the gender pay gap has narrowed dramatically in the United States. In our recent research, we analyze the sources of the relative wage gains for women in the United States, and we study the determinants of gender differences in pay using international comparisons of the gender gap.

Trends over the 1980s and 1990s in the United States

After a long period of constancy at about 60 percent, the gender pay ratio in the United States started to increase in the late 1970s. The pace of change was especially rapid during the 1980s, but it appears to have slowed considerably during the 1990s. We examine the sources of the robust trends of the 1980s in detail and investigate the reasons for the slower gains for women during the 1990s.

Looking first at the 1980s experience, it is striking that the wage gains for women occurred during a time when overall wage inequality increased substantially. This raises the question of how women were able to narrow the gender gap in pay when overall labor-market trends were increasingly unfavorable for low-wage workers in general, and women were disproportionately represented at the bottom of the wage distribution.

In analyzing the decline in the gender pay gap, it makes sense to start with the two major explanations economists have developed for group differences in pay: differences in human capital investments or other qualifications; and labor market discrimination — differences in the treatment of men and women who are equally qualified. These two explanations are not necessarily mutually exclusive, and indeed considerable evidence supports each explanation for gender pay differences at any particular point in time. There also may be important feedback effects: discrimination in the labor market may lower women's incentives to invest in their qualifications, and women's lower qualifications reinforce statistical discrimination against them.[1]

Building on earlier work by Chinhui Juhn, Kevin M. Murphy, and Brooks Pierce, we argue that to explain trends over time in the gender pay differential, we also must consider a third factor: overall trends in wage structure.[2] Wage structure refers to the returns the market sets for various skills or for employment in particular occupations or industries. Although wage structure was previously overlooked, both the human capital and the discrimination explanations of the pay gap imply that it plays a potentially important role in determining how women fare over time. For example, despite recent pay gains, women still have less work experience than men, on average. This means that if the market return to experience rises over time, women will be increasingly disadvantaged by having less experience. In addition, both the human capital and the discrimination models suggest reasons why women and men are likely to be employed in different occupations and perhaps in different industries. This implies that an increase in the rewards for employment in "male" occupations or industries will further place women at an increasing disadvantage. In fact, the patterns of rising overall wage inequality for both men and women have been associated with precisely such increases in the market rewards to skill and to employment in high-paying male sectors. This means that, during the 1980s, women as a group were essentially "swimming upstream" in a labor market that was growing increasingly unfavorable for workers with below-average skills — in this case experience — and for workers employed in disproportionately female-dominated occupations and industries.

How can we explain the decrease in the gender pay gap in the 1980s, when overall shifts in labor market returns were working against women as a group? Our analysis of this period, using data from the Panel Study of Income Dynamics,[3] indicates that women were able to more than overcome the effect of adverse shifts in overall wage structure (that is rising labor-market returns to skills and to employment in high-paying male sectors) on their relative wages by improving their qualifications relative to men. So,

Blau is a Research Associate in the NBER's Program on Labor Studies. She is also the Frances Perkins Professor of Industrial and Labor Relations and Labor Economics, and Kahn is Professor of Labor Economics and Collective Bargaining, at Cornell University's School of Industrial and Labor Relations.

although on average women continue to have less labor-market experience than men, they have narrowed the gender difference in experience considerably. They also have upgraded their occupations relative to men's, as they moved out of clerical and service occupations and into professional and managerial jobs.[4] Women also have benefited from a decrease in the "unexplained" pay gap. Such a shift may reflect an upgrading of women's unmeasured labor-market skills, a decline in labor market discrimination against women, or a shift in labor market demand favoring women over men. Indeed all of these factors may well have played a role, and all appear credible during this period.

Since women improved their relative level of measured skills, as shown by the narrowing of the gap in full-time job experience, it is plausible that they also enhanced their relative level of unmeasured skills. For example, women's increasing labor-force attachment may have encouraged them to acquire more on-the-job training. There is also evidence that women have increasingly acquired more market-oriented formal education, reducing gender differences in college majors and in professional education. The male-female difference in SAT math scores also has declined.[5]

It may seem less credible that discrimination against women declined in the 1980s than that women's unmeasured human capital improved, because the federal government actually scaled back its antidiscrimination enforcement effort during the 1980s.[6] However, as women increased their commitment to the labor force and improved their job skills, the rationale for statistical discrimination against them diminished. Thus, it is plausible that this type of discrimination decreased. And in the presence of feedback effects, the revised views of employers can generate further increases in women's wages by raising the returns to investments in job qualifications and skills. To the extent that one does not fully control for such job qualifications in the statistical analysis used to explain the change in the gender wage gap, they may also help to explain the decline in the unexplained gap.

Finally, the underlying labor-market demand shifts that widened wage inequality during the 1980s may have favored women relative to men in certain ways and thus, also may have contributed to a decrease in the unexplained gender gap. There is some evidence that technological change has produced intra-industry demand shifts that have favored white-collar workers in general.[7] Given the traditional male predominance in blue-collar jobs, one might expect this shift to benefit women more than men and partly to offset the large increase in female labor supply that also occurred during this time.[8] In addition, increasing computer use favors women both because they are more likely than men to use computers at work and because computers restructure work in ways that de-emphasize physical strength.[9]

The framework we used to obtain these results assumes that labor market returns to skills and to employment in particular sectors — as estimated from a sample of male workers — are determined by forces outside the gender pay gap and are a useful indicator of the market rewards for both men and women.[10] This assumption is consistent with evidence that widening wage inequality in the 1980s and 1990s was significantly affected by economywide forces, including technological change, international trade, the decline in unionism, and the falling real value of the minimum wage.[11] And increases in wage inequality during this period were similar for men and women, suggesting that both groups may have been affected similarly by these trends.[12] This implies that our assumption is reasonable. However, under some circumstances, the gender pay gap could influence male wage inequality. For example, suppose there is a fixed overall hierarchy of jobs and that jobs determine wages. In this case, as women succeed in narrowing the gender pay gap by moving up in the overall distribution of jobs (and wages), men who are displaced move down resulting in widening male inequality. Nichole M. Fortin and Thomas Lemieux argue that recent trends in the gender pay gap and male wage inequality are consistent with such a model.[13] In this view, women's gains to some extent have come at the expense of men's losses.

Unfortunately, the data are not yet available to undertake the type of detailed study for the 1990s that we summarize above for the 1980s. Most important, datasets that contain information on actual labor-market experience, a crucial variable for analyzing the male-female pay gap, have not yet been released for a period that covers most of the decade. However, we have explored what could be learned from preliminary analyses of available data, specifically the Current Population Surveys.[14] We find that changes in the composition of the male and female workforces by age and education cannot explain the slowing of convergence in the gender pay gap in the 1990s. Nor does it appear that the effect of changes in wage structure on changes in the gender gap was more adverse in the 1990s than in the previous decade. These findings suggest that the slower progress of women during the 1990s was probably attributable to one or more of the following factors: less rapid improvement in women's qualifications (such as experience) relative to men's in the 1990s than in the 1980s; a smaller decline in discrimination against women in the 1990s than in the 1980s; and less favorable demand shifts for women in the 1990s than in the 1980s. Future research is needed to sort out these explanations.

International Differences in the Gender Pay Gap

Our work on international differences in the gender pay gap addresses the following paradox: while the relative qualifications of U.S. women are high compared with those of women in other countries, and the United States has had a longer and often stronger commitment to antidiscrimination laws than most industrialized nations, the United States has long been among the countries with the largest gender gaps. The especially rapid narrowing of the gender pay gap that occurred in the United States during the 1980s moved it closer to the middle of the pack, but one might still question why U.S. women do not rank higher relative to their counterparts in other advanced countries.

Our analysis of these international differences – particularly the relatively low ranking of the United States – indicates that wage-setting institutions differ considerably by country. These differences have implications for wage structures and hence, for wage inequality and the gender-earnings ratio. The manner in which wages are determined may be highly centralized, as is true in many other OECD countries. These countries have very strong unions; and wages in both the union and nonunion sector are often determined largely by a collective bargaining process. Many collective bargaining agreements extend to nonunion workers, and nonunion firms voluntarily imitate union pay structures.[15] This contrasts with the highly decentralized pattern of wage setting in the United States.

Applying techniques similar to those we use to analyze trends over time in the gender gap, we find that the higher level of wage inequality in the United States than in a number of other advanced countries is the primary reason for its relatively high gender pay gap.[16] As noted earlier, this approach is essentially an accounting technique and does not explicitly test such assumptions as the applicability of the same set of estimated labor-market returns to both men and women. However, in another paper, we report the results of a more direct test for the effect of overall male inequality on the gender pay gap across a number of countries in a regression context. This research design also allows us to determine whether our earlier results were specific to the U.S. situation compared to other countries or were more generally true for a broad range of international comparisons.

Our findings are strikingly similar to those obtained using the Juhn-Murphy-Pierce decomposition technique. Specifically, using International Social Survey Programme microdata for each country and year from 1985-94 (100 country-year observations in all), we find that higher inequality of male wages (controlling for the distribution of male productivity characteristics) and higher female labor supply had large, statistically significant, positive effects on the gender pay gap. The differences in inequality of male wages were quantitatively more important than female labor supply in explaining differences across countries in the size of the gap. Based on these regression estimates, the contribution of higher wage inequality and higher female labor supply in the United States to the larger U.S. gender pay gap can be estimated. Both factors help explain the higher U.S. gap, with wage inequality being considerably more important than female labor supply. It is interesting to note that because these variables are more than sufficient to account for the higher U.S. gender pay gap, the implication is that unmeasured factors — perhaps higher female qualifications or less discrimination — favor U.S. women compared to their counterparts in other countries.[17]

---

[1] *For a summary of this evidence, see F.D. Blau and L.M. Kahn, "Gender Differences in Pay," NBER Working Paper No. 7732, June 2000, and* Journal of Economic Perspectives *14, (Fall 2000), pp. 75–99.*
[2] *C. Juhn, K.M. Murphy, and B. Pierce, "Accounting for the Slowdown in Black-White Wage Convergence," in* Workers and Their Wages, *M. Kosters, ed. Washington, DC: AEI Press, 1991; F.D. Blau and L.M. Kahn, "Rising Wage Inequality and the U.S. Gender Gap,"* American Economic Review Papers and Proceedings, *84 (May 1994), pp. 23–8; F.D. Blau and L.M. Kahn, "The Impact of Wage Structure on Trends in U.S. Gender Wage Differentials 1975-1987," NBER Working Paper No. 6078, June 1997, and F.D. Blau and L.M. Kahn, "Swimming Upstream: Trends in the Gender Wage Differential in the 1980s,"* Journal of Labor Economics, *15 (January 1997), pp. 1–42.*
[3] *F.D. Blau and L.M. Kahn, "Swimming Upstream."*
[4] *In this work, we analyze the impact on women's relative wages of shifts in broad (one digit) occupations and industries. For a description of the trends in occupational segregation by sex over the 1970s and 1980s, see F.D. Blau, P. Simpson, and D. Anderson, "Continuing Progress? Trends in Occupational Segregation over the 1970s and 1980s," NBER Working Paper No. 6716, September, 1998, and* Feminist Economics *4, (Fall 1998), pp. 29–71.*
[5] *For evidence on these trends, see F.D. Blau, M.A. Ferber, and A.E. Winkler, Chapter 6, "Differences in Occupations and Earnings: The Human Capital Model," in* The Economics of Women, Men, and Work. *4th ed., forthcoming from Prentice-Hall.*
[6] *J.S. Leonard, "Women and Affirmative Action,"* Journal of Economic

Perspectives, *3 (Winter 1989), pp. 61–75.*

[7] *E. Berman, J. Bound, and Z. Griliches, "Changes in the Demand of Skilled Labor Within U.S. Manufacturing Industries: Evidence From the Annual Survey of Manufacturing,"* Quarterly Journal of Economics, *109 (May 1994), pp. 367–97.*

[8] *F.D. Blau and L.M. Kahn, "Swimming Upstream" and "Gender Differences in Pay."*

[9] *A.B. Krueger, "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984–1989,"* Quarterly Journal of Economics, *108 (February 1993), pp. 33–60; B.A. Weinberg, "Computer Use and the Demand for Female Workers,"* Industrial and Labor Relations Review, *53 (January 2000), pp. 290–308; and F. Welch, "Growth in Women's Relative Wages and in Inequality Among Men: One Phenomenon or Two?"* American Economic Review, *90 (May 2000), pp. 444–9, in which Welch emphasizes the growing importance of "brains" relative to "brawn" as a factor narrowing the gender pay gap.*

[10] *We use male wage regressions to estimate the prices of (returns to) the various characteristics.*

[11] *See, for example, L.F. Katz and D.H. Autor, "Changes in the Wage Structure and Earnings Inequality," in* Handbook of Labor Economics, *vol. 3A, O.C. Ashenfelter and D.Card, eds. Amsterdam: Elsevier, 1999.*

[12] *See, for example, F.D. Blau, "Trends in the Well-Being of American Women, 1970–1995," NBER Working Paper No. 6206, October 1997, and* Journal of Economic Literature, *36 (March 1998), pp. 112–65; and F.D. Blau, M.A. Ferber, and A.E. Winkler, Chapter 8, "Recent Developments in the Labor Market: Their Impact on Women and Men," in* The Economics of Women, Men, and Work.

[13] *N.M. Fortin and T. Lemieux, "Are Women's Wage Gains Men's Losses? A Distributional Test,"* American Economic Review, *90 (May 2000), pp. 456–60.*

[14] *F.D. Blau and L.M. Kahn, "Gender Differences in Pay."*

[15] *See for example, F.D. Blau and L.M. Kahn, "Institutions and Laws in the Labor Market," in* Handbook of Labor Economics, *vol. 3A, O.C. Ashenfelter and D. Card, eds. Amsterdam: Elsevier, 1999; F.D. Blau and L.M. Kahn, "International Differences in Male Wage Inequality: Institutions Versus Market Forces," NBER Working Paper No. 4678, September 1996, and* Journal of Political Economy, *104 (August 1996), pp. 791–837; L.M. Kahn, "Collective Bargaining and the Interindustry Wage Structure: International Evidence,"* Economica, *65 (November 1998), pp. 507–34; F.D. Blau and L.M. Kahn, "Do Cognitive Test Scores Explain Higher U.S. Wage Inequality?" NBER Working Paper No. 8210, April 2001; F.D. Blau and L.M. Kahn,* U.S. Labor Market Performance in International Perspective: The Role of Labor Market Institutions, *forthcoming from Russell Sage Foundation.*

[16] *F.D. Blau and L.M. Kahn, "Wage Structure and Gender Earnings Differentials: An International Comparison."* Economica, *63 (May 1996), pp. S29–S62; F.D. Blau and L.M. Kahn, "The Gender Earnings Gap: Some International Evidence," in* Differences and Changes in Wage Structures, *R.B. Freeman and L.F. Katz, eds. Chicago: University of Chicago Press, 1995; and F.D. Blau and L.M. Kahn, "Gender Differences in Pay."*

[17] *F.D. Blau and L.M. Kahn, "Understanding International Differences in the Gender Pay Gap," NBER Working Paper No. 8200, April 2001.*

Market-Based Environmental-Policy Instruments

Gilbert E. Metcalf*

The Clean Air Act Amendments of 1990 ushered in a new era in environmental policy, constructing a market in tradable permits for sulfur dioxide emissions at electric utilities in the United States. This law was a watershed in many ways because it was the first large-scale initiative in the United States to use a market-based instrument to manage pollution. Prior to 1990, discussion and analysis of market-based instruments (for example, cap-and-trade systems, environmental taxes, and subsidies to clean production) had been theoretical for the most part because the United States, and most other developed countries, relied primarily on command-and-control regulation to reduce pollution. Interest in market-based instruments has been heightened by concerns about global warming and the role of carbon emissions. The Kyoto Protocol calls for substantial reductions in carbon emissions, and carbon taxes have been seen as a possible instrument for achieving those targets.

My work over the past five years or so has been concerned with two aspects of market-based environmental instruments: design considerations for market-based instruments in the presence of pre-existing tax distortions and distributional implications of environmental-tax reforms.

Instrument Design in a Second-Best World

The increasing focus in the 1990s on the possibility of market-based instruments along with ongoing concerns about the magnitude of distortionary taxation both in the United States and in Europe, suggested the possibility of using environmental taxes to replace existing factor and commodity taxes. A conjecture dubbed the "Double-Dividend Hypothesis" made the valid point that environmental taxes have two benefits: they discourage environmental degradation and they raise revenue that could offset other distortionary taxes. While the conjecture as stated is certainly correct, its policy implications are not so clear-cut.[1] For example, what are its implications for optimal environmental-tax rates? In a world with no pre-existing taxes, the optimal tax rate on pollution is equal to marginal environmental damages. Because Pigou is credited with this result, the term Pigouvian tax rate is often used to characterize environmental taxes set equal to marginal environmental damages. According to one view, the double-dividend hypothesis implies that the optimal tax rate on pollution should exceed the Pigouvian tax rate. This was "proved" in partial-equilibrium models, so long as the environmental-tax revenue elasticity at the optimal rate was positive. In other words, these models suggested that a pollution tax should be higher than marginal environmental damages if that higher tax rate would raise revenue so that other distorting taxes could be lowered. Lans Bovenberg and Ruud de Mooij constructed a simple general-equilibrium model to show that this result was incorrect.[2] They note that an environmental tax, although beneficial from an environmental point of view, is still distortionary and could exacerbate pre-existing tax distortions. Imagine, for example, that the only other tax in effect is on wage income, thus causing the supply of labor to fall short of the efficient level. An environmental tax will raise product prices (or reduce factor incomes) so that the real wage falls, thus causing labor supply to fall further. More simply put, an increase in an environmental tax is analogous to an increase in the tax rate on wage income. Since there is already a deadweight loss in the labor market, any increase in taxes has a first-order effect on welfare. Lawrence H. Goulder, who quantifies this in a number of papers using a computable general equilibrium (CGE) model of the U.S. economy, finds, for example, that the optimal carbon tax, the proceeds of which are used to reduce personal income taxes, falls short of marginal environmental damages by 27 to 65 percent, depending on the magnitude of those damages.[3]

This focus on second-best tax rates is important for policy setting, but for purposes of considering the impact of pre-existing tax distortions on environmental quality, it can be misleading. The fact that the optimal pollution tax falls short of environmental quality in the presence of pre-existing taxes suggests that environmental quality also falls. In a recent paper, I show that this is not necessarily true.[4] I argue that in second-best analysis, one must distinguish between issues of "price" — the optimal tax rate — and "quantity" — the optimal level of environmental quality. Using a simple analytical general-equilibrium model, I show that an increase in required government revenue, financed through distortionary taxation, can lead to both a reduction in the optimal tax on pollution and an increase in environmental quality. Although the particu-

** Metcalf is a Research Associate in the NBER's Program on Public Economics and a professor of economics at Tufts University.*

lar finding is specific to the model in that paper, the more general finding is that one cannot infer the impact of increased revenue requirements on optimal environmental quality simply by looking at changes in optimal tax rates.

Revenue is central to the double-dividend hypothesis, and the role of environmental revenue-raising in a second-best world has been an important area of research. Two papers suggest the complexity of that relationship. Goulder and his co-authors make the important point that revenue raising per se is not sufficient to ensure an efficiency improvement in a world with pre-existing taxes.[5] If the environmental-tax revenues are returned to consumers in a lump sum, then there is no scope for reduction of other pre-existing distortionary taxes. An environmental tax on pollution with a lump sum rebate of proceeds has the same economic impact as a cap-and-trade system under which the tradable permits are given to economic agents at no cost. That policy was adopted as part of the sulfur dioxide trading system under the Clean Air Act Amendments of 1990. When environmental-tax proceeds are returned in a lump sum, there is no guarantee that the adoption of an environmental tax will enhance welfare.[6] Don Fullerton and I have shown that raising revenues in order to lower other distorting taxes is not necessary to achieve a welfare gain.[7] For example, imposing a small tax on a polluting input used in production and using the revenue to lower a pre-existing labor tax is equivalent to subsidizing clean inputs used in production through an increase in a pre-existing labor tax. In fact, for small taxes, there is a continuum of policies that might raise revenue, lose revenue, or involve no revenue at all, with identical impact on welfare. Because the focus on revenue can be misleading, we propose an alternative interpretation that associates the exacerbation of pre-existing tax distortions with policies that generate privately retained scarcity rents. The rents interpretation can be seen most easily in a cap-and-trade program such as the sulfur dioxide trading program just described. Caps on sulfur dioxide emissions serve as an entry barrier for electricity producers. The rents accruing from barriers to entry into this industry are capitalized into the price of tradable permits. If the permits go to the electric utility industry, then the scarcity rents remain in private hands. If, on the other hand, the government were to sell the permits to electric utilities (or to anyone else for that matter), the rents would accrue to government, and there would be no distortionary impact of a new, small environmental tax.[8] While the disposition of economic rents typically is viewed simply as a distributional matter, in a second-best world the disposition of economic rents has an impact on efficiency as well as on distribution. If the rents are left in private hands, the efficiency consequences can be large enough to cause a particular environmental policy to be welfare reducing; if the rents were appropriated by government, that same environmental policy would be welfare enhancing.

This research assumes that environmental policy instruments can be targeted precisely. In the real world, however, most environmental taxes are taxes on proxies for pollution.[9] Goulder examines the institutional barriers to precise environmental taxation and analyzes them using a partial-equilibrium model.[10] Fullerton, Inkee Hong, and I also use a general-equilibrium model with other pre-existing tax distortions to analyze the welfare losses from mistargeted instruments.[11] Within plausible parameters, we find that the welfare gain from an output tax designed to discourage pollution is less that half the gain from an emissions tax. Although our model is highly stylized, the welfare losses from mistargeting suggest that the ability to measure and tax emissions directly produces efficiency gains and thus improvements.

Distribution

Environmental and energy taxes typically are viewed as highly regressive. This perception has served as an important impediment to the use of market-based instruments in lieu of command-and-control regulation. But relatively recent work has questioned the regressive nature of those taxes. In a number of papers, James M. Poterba argues that consumption taxes are less regressive when measured over the lifetime rather than in terms of annual income. His point is certainly germane to gasoline taxes, which are passed forward to consumers in the form of higher gasoline prices.[12] In more recent work, I emphasize that although an environmental tax might be regressive (even on a lifetime basis), environmental-tax reform easily could be progressive.[13] What matters for distributional considerations is what tax the environmental tax replaces. So long as the original tax is more regressive than the environmental tax, the reform will be progressive. Finally, it is noteworthy that distributional considerations may arise in other contexts as well. For example, Europeans have long been concerned with unemployment, and recent research on environmental-tax policy focuses on the impact of environmental taxes on unemployment.[14] Bovenberg and Goulder analyze the impact of various carbon dioxide abatement policies on industry equity values.[15] They note that if a cap-and-trade system with tradable permits in carbon emissions were adopted, the cost of permits would be borne primarily by consumers, who would pay higher product prices. Thus, if government wished to hold corporate shareholders harmless should a cap-and-trade system be introduced, it would need only grandfather a small fraction of the permits. Stated differently, the grandfathering of sulfur dioxide emissions under the Clean Air Act Amendments of 1990 probably overcompensated electric utilities. However, measuring the degree of overcompensation is complicated by the fact that electric utilities had been subject to state regulation up until enactment of the law.

Other Environmental Issues

This report focuses primarily on market-based environmental instruments, but I'll briefly mention a number of other areas of active environmental research. Many of the papers I describe here were outgrowths of a joint NBER-Fondazione Eni Enrico Mattei (FEEM) conference on environmental policy. Carlo Carraro from FEEM and I organized that conference.[16] One area of NBER research focuses on the costs of complying with environmental regulations. To understand how changes in regulations affect firm behavior and costs, we consider variations in state pollution regulations, as well as the applicability of federal regulations (which depends on the overall quality of the environment in the area).[17] A number of NBER researchers have investigated the links between economic growth and pollution.[18] A more recent literature has begun to investigate how pollution problems (and their solutions) differ between developing versus developed countries. Policymakers must be very careful about exporting policy prescriptions designed for developed countries to developing countries.[19] Finally, there is an emerging literature on the role of information, both in voluntary environmental initiatives and in the design of research and development programs for pollution abatement.[20]

Conclusion

General-equilibrium modeling has provided a number of important insights about the interplay between environmental-tax policy and the pre-existing tax system. However, much remains to be done to improve our understanding of market-based environmental policies.

The following is an incomplete research agenda:

- The use of analytical and computable general-equilibrium models has been beneficial and has served to focus attention on key parameters. We need more empirical work with microdata to estimate those parameters. For example, one key parameter for measuring the welfare gains from better targeting of environmental instruments is the elasticity of substitution between pollution and other inputs in production. This elasticity potentially can be estimated from pollution abatement curves if there are sufficient microdata.
- Environmental policy aimed at combating global warming must take into account both international factor flows and the possibility of carbon leakage if international agreements do not include all major greenhouse-gas emitters. International trade models have considered many important trade-related issues that arise from such international agreements as the Kyoto Protocol. But more work at integrating tax and trade models would yield a large payoff.
- Carbon (and other greenhouse gas) emissions can persist in the atmosphere for many generations. Given that pollutants may be highly persistent over time, intergenerational considerations in climate policy also merit our attention.
- Optimal policy design cannot ignore political-economy considerations. We have only begun to study how to design environmental policies that take political constraints into consideration. The complexity of international climate negotiations, for example, implies the critical importance of this task.

---

[1] *D. Fullerton and G. E. Metcalf, "Environmental Taxes and the Double-Dividend Hypothesis: Did You Really Expect Something for Nothing?" NBER Working Paper No. 6199, September 1997, and* Chicago-Kent Law Review, *73 (1998), pp. 221-56.*

[2] *A. L. Bovenberg and R. de Mooij, "Environmental Levies and Distortionary Taxation,"* American Economic Review, *94 (1994), pp. 1085-9; and I. W. H. Parry, "Pollution Taxes and Revenue Recycling,"* Journal of Environmental Economics and Management, *29 (1995), pp. S64-S77.*

[3] *A. L. Bovenberg and L. H. Goulder, "Optimal Environmental Taxation in the Presence of Other Taxes: General Equilibrium Analyses," NBER Working Paper No. 4897, October 1994, and* American Economic Review, *86 (1996), pp. 985-1000.*

[4] *G. E. Metcalf, "Environmental Levies and Distortionary Taxation: Pigou, Taxation, and Pollution," NBER Working Paper No. 7917, September 2000, forthcoming in the* Journal of Public Economics.

[5] *L. H. Goulder, I. W. H. Parry, and D. Burtraw, "Revenue-Raising vs. Other Approaches to Environmental Protection: The Critical Significance of Pre-Existing Tax Distortions," NBER Working Paper No. 5641, June 1996, and* RAND Journal of Economics, *28 (1997), pp. 708-31.*

[6] *D. Fullerton and G. E. Metcalf, "Environmental Controls, Scarcity Rents, and Pre-Existing Distortions," NBER Working Paper No. 6091, July 1997, and* Journal of Public Economics, *80 (2001), pp. 249-67; and A. L. Bovenberg and L. H. Goulder, "Optimal Environmental Taxation in the Presence of Other Taxes: General Equilibrium Analyses."*

[7] *D. Fullerton and G. E. Metcalf, "Environmental Controls, Scarcity Rents, and Pre-Existing Distortions."*

[8] *This result holds under perfect competition. If the producer is a monopolist, the*

distortion persists with complete government appropriation of the scarcity rents from the environmental policy. See D. Fullerton and G. E. Metcalf. "Environmental Controls, Scarcity Rents, and Pre-Existing Distortions;" and D. Fullerton and G. E. Metcalf, "Cap and Trade Policies in the Presence of Monopoly and Distortionary Taxation," forthcoming as an NBER Working Paper.

[9] *For a description of the major environmental taxes in effect in the United States, see D. Fullerton, "Why Have Separate Environmental Taxes?" in* Tax Policy and the Economy, *vol. 10, J. M. Poterba, ed. Cambridge: MIT Press, 1996.*

[10] *A. Schmutzler and L. H. Goulder, "The Choice between Emission Taxes and Output Taxes under Imperfect Monitoring,"* Journal of Environmental Economics and Management, *32 (1997), pp. 51-64.*

[11] *D. Fullerton, I. Hong, and G. E. Metcalf, "A Tax on Output of the Polluting Industry Is Not a Tax on Pollution: The Importance of Hitting the Target," NBER Working Paper No. 7259, July 1999, and in* Behavioral and Distributional Effects of Environmental Policy, *C. Carraro and G. E. Metcalf, eds. Chicago: University of Chicago Press, 2001.*

[12] *J. M. Poterba, "Lifetime Incidence and the Distributional Burden of Excise Taxes," NBER Working Paper No. 2833, July 1989, and* American Economic Review, *79 (1989), pp. 325-30; J. M. Poterba, "Is the Gasoline Tax Regressive?" NBER Working Paper No. 3578, January 1991, and in* Tax Policy and the Economy, *vol. 5, J. M. Poterba, ed. Cambridge: MIT Press, 1991; and N. Bull, K. A. Hassett, and G. E. Metcalf, "Who Pays Broad-Based Energy Taxes? Computing Lifetime and Regional Incidence,"* Energy Journal, *15 (1994), pp. 145-64.*

[13] *G. E. Metcalf, "A Distributional Analysis of Green Tax Reforms," NBER Working Paper No. 6546, May 1998, and National Tax Journal, 52 (1999), pp. 655-81.*

[14] *M. Rauscher, "Factor Movements, Environmental Policy, and Double Dividends," in* Behavioral and Distributional Effects of Environmental Policy, *C. Carraro and G. E. Metcalf, eds. Chicago: University of Chicago Press, 2001.*

[15] *A. L. Bovenberg and L. Goulder, "Neutralizing the Adverse Industry Impacts of CO2 Abatement Policies: What Does It Cost?" NBER Working Paper No. 7654, April 2000, and in* Distributional and Behavioral Effects of Environmental Policy, *C. Carraro and G. E. Metcalf, eds. Chicago: University of Chicago Press, 2001.*

[16] *C. Carraro and G. E. Metcalf, eds.,* Distributional and Behavioral Effects of Environmental Policy. *Chicago: University of Chicago Press, 2001.*

[17] *R. A. Becker and J. V. Henderson, "Costs of Air Quality Regulation," NBER Working Paper No. 7308, August 1999, and in* Behavioral and Distributional Effects of Environmental Policy; *and A. Levinson, "An Industry-Adjusted Index of State Environmental Compliance Costs," NBER Working Paper No. 7297, August 1999, and in* Behavioral and Distributional Effects of Environmental Policy.

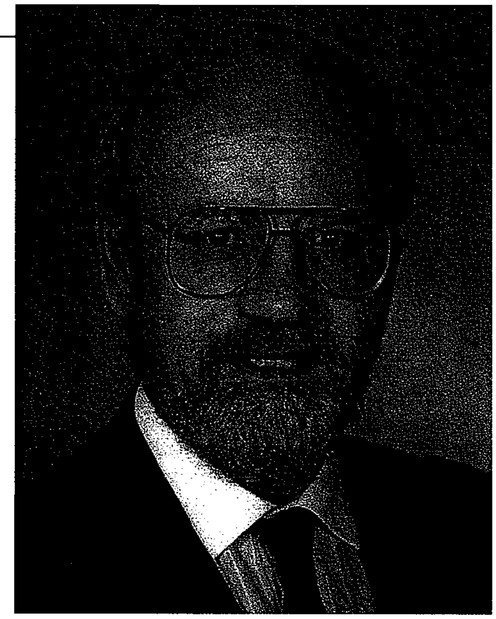
[18] *G. Grossman and A. Krueger, "Economic Growth and the Environment," NBER Working Paper No. 4634, February 1994, and in* Quarterly Journal of Economics, *110 (1995), pp. 353-77; and J. Andreoni and A. Levinson, "The Simple Analytics of the Environmental Kuznets Curve," NBER Working Paper No. 6739, September 1998, and in* Journal of Public Economics, *80 (2001), pp. 269-86; and D. F. Bradford, R. Schlieckert, and S. H. Shore, "The Environment Kuznets Curve: Exploring a Fresh Specification," NBER Working Paper No. 8001, November 2000.*

[19] *R. Jha and J. Whalley, "The Environmental Regime in Developing Countries," NBER Working Paper No. 7305, August 1999, and in* Behavioral and Distributional Effects of Environmental Policy.

[20] *Y. Katsoulacos, A. Ulph, and D. Ulph, "The Effects of Environmental Policy on the Performance of Environmental Research Joint Ventures," in* Behavioral and Distributional Effects of Environmental Policy; *and D. Siniscalco, S. Borghini, M. Fantini, and F. Ranghieri, "Environmental Information and Company Behavior," in* Behavioral and Distributional Effects of Environmental Policy.

❋

NBER Profile: *Michael J. Brennan*

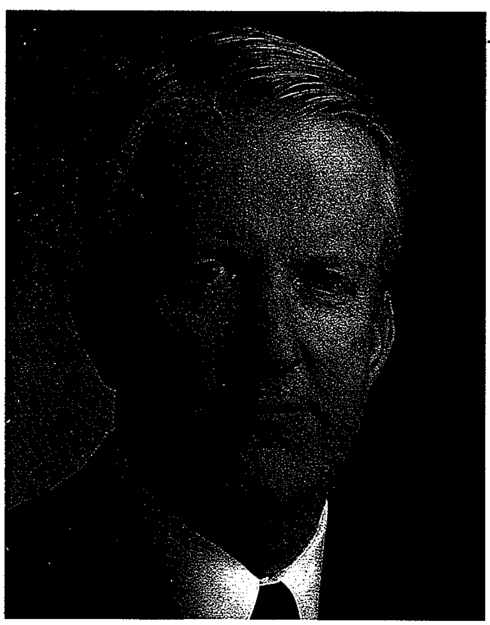


Michael J. Brennan, the Goldyne and Irwin Hearsh Chair in Money and Banking at UCLA's Anderson Graduate School of Management, was elected to the NBER's Board of Directors this spring to represent the University of California, Los Angeles. Brennan is a professor of finance at both the Anderson School and the London Business School. He holds a Ph.D. in business from MIT, an M.B.A. from the University of Pittsburgh, and Bachelor of Arts and Bachelor of Philosophy degrees from Oxford University.

Brennan taught at the University of British Columbia from 1970 to 1986, rising through the ranks from assistant professor to the Albert E. Hall Professor of Finance in 1979. In 1986 Brennan joined the Anderson School faculty. His research interests include asset pricing and the role of information in financial markets, dynamic portfolio theory, and market microstructure.

A former president of the American Finance Association, the Society for Financial Studies, and the Western Finance Association, Brennan has served as editor of the *Journal of Finance* and was the founding editor of the *Review of Financial Studies.* He has consulted extensively for corporations in Canada and the United States is a director of Smith Breeden Associates and of the Real Options Group.

Brennan is married to Patricia Hughes who is a professor of accounting at UCLA. They have three grown children and two grandchildren. His hobbies include biking, gardening, and reading, and making breakfast for the homeless in Santa Monica.



NBER Profile: *John S. Clarkeson*

John S. Clarkeson, Chairman of the Boston Consulting Group, Inc. (BCG), was elected to the NBER's Board of Directors this spring as an at-large member. Clarkeson, who received both his undergraduate degree and his M.B.A. from Harvard University, has been associated with BCG — an international general management consulting firm founded in 1963 — since 1966. He served as President and CEO from 1986 to 1997, and became Chairman in 1998.

Clarkeson is also a director of Cabot Corporation, Chairman of the U.S. Council of INSEAD, and a trustee of Wellesley College.

Conferences

The Economics of School Choice

An NBER Conference on "The Economics of School Choice," organized by Caroline M. Hoxby, Director of the NBER's Program on the Economics of Education, also of Harvard University, took place on February 22-24. The following papers and discussion made up the agenda:

Eric A. Hanushek, NBER and Stanford University, and **Steven G. Rivkin**, Amherst College, "Does Public School Competition Affect Teacher Quality?"
Discussant: Joseph Altonji, NBER and Northwestern University

Paul E. Peterson, **William G. Howell**, **Patrick J. Wolff**, and **David E. Campbell**, Harvard University, "School Vouchers: Results from Randomized Experiments"
Discussant: Derek Neal, NBER and University of Wisconsin

Thomas Nechyba, NBER and Duke University, "Introducing School Choice into Multi-District Public School Districts"
Discussant: Charles Manski, NBER and Northwestern University

Caroline M. Hoxby, "School Choice and School Productivity"
Discussant: John Chubb, Edison Schools

Raquel Fernandez, NBER and New York University, and **Richard Rogerson**, NBER and University of Pennsylvania, "Vouchers: A Dynamic Analysis"
Discussant: Ananth Seshadri, University of Wisconsin, Madison

David Figlio, NBER and University of Florida, and **Marianne Page**, University of California, Davis, "Can School Choice and School Accountability Successfully Coexist?"
Discussant: Helen Ladd, Duke University

Julie Berry Cullen, NBER and University of Michigan, and **Steven G. Rivkin**, "The Role of Special Education in School Choice"
Discussant: Richard Murnane, NBER and Harvard University

Dennis N. Epple, NBER and Carnegie Mellon University, and **Richard E. Romano**, University of Florida, "Neighborhood Schools, Choice, and the Distribution of Educational Benefits"
Discussant: Michael Kremer, NBER and Harvard University

Tom Kane, NBER and Harvard University; **Jane Hannaway**, The Urban Institute; and **Chester Finn**, The Fordham Foundation
Panel Discussion: The Uses and Abuses of Research on School Choice in the Policy Debate

Under most conceivable scenarios of expanded choice, even with private school vouchers, the public school system will still remain the majority supplier of schooling. Therefore, it is important to know what might happen to quality and outcomes in the remaining public schools. **Hanushek** and **Rivkin** first compare estimates of differences in average school quality in metropolitan areas across Texas to the amount of public school competition in each district. At least for the largest metropolitan areas, the degree of competition is related positively to performance of the public schools. Then they investigate the narrower impact of metropolitan area competition on teacher quality. Because teacher quality has been identified as one of the most important determinants of student outcomes, the effects of competition on hiring, retention, monitoring, and other personnel practices may be one of the most important aspects of any force toward improving public school quality. The results, while far from conclusive, suggest that competition raises teacher quality and improves the overall quality of education.

Based on three randomized experiments in New York City, Washington D.C., and Dayton, Ohio, **Peterson** and his co-authors find that African-American students attending private schools perform an average of 6 national percentile points higher on tests of reading and math achievement after two years than members of a control group remaining in public school. Parents of students in private schools report higher levels of satisfaction, fewer discipline problems, more communication with school, and more student homework than parents in the control group. Participating families are of low-income; the number of cases in each site varies between several hundred and two thousand.

Nechyba seeks to shed light on how school choice policies change the opportunities faced by different types of households and their children. His simulations are derived from a three-district model of low, middle, and high-income school districts (calibrated to New York data) with housing stocks that vary within and across districts. The advantage of this approach is that, rather than starting from an abstract and idealized public school system, it allows the analysis to proceed from a base model that replicates the actual stylized facts that emerge from the data, including public school systems with wide inter-district variations of school quality, communities with housing stocks similar to those observed in the data, and so on. The analysis with respect to school choice is extended in this paper by including consideration of potential school responses to increased competition and by deriving testable and policy implications.

Existing research on school choice has neglected school productivity, yet the effects of competition on productivity may be large enough to swamp any adverse effects that even the least lucky students experience under choice. In this paper, **Hoxby** shows that as recently as 1970, American public schools' productivity was at least 50 percent higher than it is today. She describes the economic theory that suggests that choice would improve productivity. She then presents empirical evidence on how choice affects school productivity and student achievement, focusing on the effect of recent reforms in Milwaukee, Michigan, and Arizona. Achievement and productivity in public schools increased strongly in response to significant competition from vouchers and charter schools.

Fernandez and **Rogerson** model family decisionmaking in order to analyze the short-run and long-run effects of various voucher programs. They assume that educational services are provided efficiently, and that parents cannot borrow against a child's future income in order to finance current expenditures on education. In this setting, vouchers have the potential to raise aggregate welfare by allowing poor families to increase their expenditures on education. The authors consider three different types of voucher programs. In the first, everyone receives a voucher of equal value; in the second, only individuals below a certain threshold income receive a voucher. In the third program, the size of the voucher depends on both parents' income and the amount of their private educational expenditures. The authors find that large gains can be realized through implementation of a voucher system. For example, aggregate income of the economy could be increased by more than 5 percent using moderate-sized vouchers.

Several proposals for school voucher systems, including the program currently in place in Florida, tie voucher eligibility to a school's performance on standardized examinations. **Figlio** and **Page** consider the question of whether integrating school choice within a system of school accountability is compatible with the goals underlying school choice programs. A traditional justification for vouchers is to provide schooling options for those whose choices are constrained. Using microdata from Florida, the authors find that when schools are assessed on the basis of average test performance, the students who are eligible for vouchers are overwhelmingly minority or low-income (though less so than if vouchers were directly targeted to low-income households). When value-added test score measures (for example, year-to-year changes in test scores within a group) are used to assess schools and determine voucher eligibility, voucher-eligible students are more representative of the general population. This is particularly true when schools are small. The authors conclude that tying school vouchers to a school accountability system will not serve the set of students for whom vouchers are intended as well as a school program that is separate from an accountability system.

Proponents of school choice claim that all students, both those who take advantage of choice and those who remain in their neighborhood schools, will benefit because schools will be forced to improve in response to competitive pressures. Others fear that only the most advantaged and informed students will opt out to better schools, leaving the more disadvantaged students isolated in the worst schools with declining resources. Among the students who may be left behind are special needs students. Students with disabilities are most costly to educate and therefore may encounter explicit or implicit barriers to attending choice schools. High concentrations of special needs students also may be a "push" factor for other students deciding on schooling options. **Cullen** and **Rivkin** explore how these forces operate under a variety of choice programs. The impact of expanded school choice on special education students and programs will depend on the interaction between the legal responsibilities of the institutions involved and the method of finance. The authors describe how these aspects of the special education landscape differ across public schools, charter schools, and private schools. They also review existing evidence on the relative participation of special needs students across choice systems and provide new evidence using student-level longitudinal data from both Texas and Chicago public schools. It appears that any effects of school choice on disabled students' opportunities will depend on the system. Thus, whether other disadvantaged groups are left behind by school choice also will depend critically on the details of the program.

School districts in the United States typically have multiple schools, cen tralized finance, and student assignment determined by neighborhood of residence. In many states, centralization is extending beyond the district level as states assume an increasing role in the finance of education. At the same time, movement toward increased pubic school choice, particularly in large urban districts, is growing rapidly. Models that focus on community-level differences in tax and expenditure policy as the driving force in determination of residential choice, school peer groups, and political outcomes are not adequate for analyzing multi-school districts and for understanding changing education policies. **Epple** and **Romano** develop a model of neighborhood formation and tax-expenditure policies in neighborhood school systems with centralized finance. In equilibrium, stratification across neighborhoods and their schools is likely to arise. The authors characterize the consequences of intra-district choice with and without frictions, including its effects on the allocation of students across schools, tax and expenditure levels, student achievement, and household welfare.

These papers will be published by the University of Chicago Press in an NBER conference volume. Its availability will be announced in a future issue of the NBER *Reporter.* They will also be available at "Books in Progress" on the NBER's website, **www.nber.org**

Innovation Policy and the Economy

The NBER's second annual Conference on Innovation Policy and the Economy, organized by Research Associates Adam Jaffe of Brandeis University, Joshua Lerner of Harvard Business School, and Faculty Research Fellow Scott Stern of MIT, took place in Washington on April 17. The following papers were discussed:

David S. Evans, National Economic Research Associates, and **Richard Schmalensee**, NBER and MIT, "Some Economic Aspects of Antitrust Analysis in New-Economy Industries"

Nancy Gallini, University of Toronto, and **Suzanne Scotchmer**, NBER and University of California, Berkeley, "Intellectual Property Rights: An Efficient Mechanism for Rewarding Innovation?"

Manuel Trajtenberg, NBER and Tel-Aviv University, "Government Support of Commercial R&D: Lessons from the Israeli Experience"

Timothy Bresnahan, NBER and Stanford University, "Prospects for an IT-Led Productivity Surge"

J. Bradford DeLong, NBER and University of California, Berkeley, "Do We Have a 'New' Macroeconomy?"

Competition in many important industries centers on investment in intellectual property. **Evans** and **Schmalensee** note that sound antitrust economic analysis of such industries involves explicit consideration of dynamic competition. Most leading firms in these dynamically competitive industries have considerable short-run market power, for instance, but may be vulnerable to drastic innovation. Similarly, conventional tests for predation cannot discriminate between practices that increase or decrease consumer welfare in winner-take-all industries. Finally, innovation in dynamically competitive industries often involves adding to the set of features a product provides or improving its existing features.

Intellectual property (IP) is not the American economy's only mechanism for rewarding R and D. Prizes and various types of contract research are also common. Given the controversies that swirl around policies regarding IP, in particular whether it is justified, **Gallini** and **Scotchmer** review the economic reasoning that supports patents (or other IP) over funding from general revenue. For those economic environments in which IP is justified, they review some of the arguments for why it is designed as it is, especially with regard to breadth of protection, and especially where innovation is cumulative. The patentee's ability to reorganize rights through licensing and other contractual arrangements should be taken into account in designing the property system, they conclude.

Israel's R and D policies have been highly responsive to changing circumstances, including instituting innovative programs such as a government- sponsored fund to jump start the venture capital market: the "Incubators" program, supporting generic projects conducted by consortia of firms and academic institutions. The Israeli high tech sector has grown remarkably fast since the mid-1980s, and government policies contributed significantly to its success. It seems that the key has been both the willingness of the government to take substantial risks in allocating resources, and flexibility and creativity in responding to rapidly changing needs. **Trajtenberg** reviews these policies and the challenges that confront them. He also lays out the more general issues and possible lessons for other countries that arise from the Israeli case: how many resources should be devoted to R and D? Is it better to target supply or demand in the market for R and D inputs? What types of support exist for R and D policies, and what is the effect of international spillovers?

Advances in information technology (IT) shift the invention-possibility frontier of the economy, permitting users of IT to invent new and sometimes highly valuable applications. IT is also general purpose technology, shared across a wide variety of uses. Therefore, new advances in IT can have an economy-wide impact which will be larger or smaller according to the degree of sharing. Finally, IT has the possibility of substantial network effects. Together, these three features of IT mean that advances in it can have very substantial effects on long-run growth. The pace of arrival of that growth varies across types of IT according to the value of the enabled applications, the difficulty of the enabled invention, the ease of sharing advances, and the mechanisms for turning network effects into a force for advance rather than for inertia. Analytical studies of earlier IT advances, together with a new model that **Bresnahan** introduces, suggests that there are two main patterns of the pace of uptake. Current IT advances connected to the Internet seem highly likely to set off both patterns.

DeLong notes that the IT revolution is the prime candidate for driving the acceleration in aggregate labor productivity growth in the 1990s, and the boom in IT investment promises to pay dividends in the form of accelerated aggregate labor productivity growth for at least a decade to come. It is also a credible candidate for driving the reduction in the natural rate of unemployment, the NAIRU. Finally, it may diminish the aggregate economy's vulnerability to inventory fluctuations, which for more than a century have been a principal driving force behind the business cycle.

These papers will appear in an annual volume published by the MIT Press. Its availability will be announced in a future issue of the *Reporter*. They can also be found at "Books in Progress" on the NBER's website.

Sixteenth Annual Conference on Macroeconomics

The NBER's Sixteenth Annual Conference on Macroeconomics took place in Cambridge on April 20–21. Ben S. Bernanke of NBER and Princeton University and Kenneth Rogoff of NBER and Harvard University served as organizers and put together this agenda:

Ben S. Bernanke and **Refet Gurkaynak**, Princeton University, "Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously"
Discussants: David Romer, NBER and University of California, Berkeley, and Francesco Caselli, NBER and Harvard University

Philip Lane, Trinity College Dublin, and **Gian Maria Milesi-Ferretti**, International Monetary Fund, "Perspectives on International Borrowing and Lending"
Discussants: Kristin Forbes, NBER and MIT, and Jeffrey Frankel, NBER and Harvard University

Robert Barsky, NBER and University of Michigan, and **Lutz Kilian**, University of Michigan, "A Monetary Explanation of the Great Stagflation of the 1970s" (NBER Working Paper No. 7547)
Discussants: Oliver Blanchard, NBER and MIT, and Alan Blinder, NBER and Princeton University

Marvin J. Barth III, Federal Reserve Board, and **Valerie Ramey**, NBER and University of California, San Diego, "The Cost Channel of Monetary Transmission" (NBER Working Paper No. 7675)
Discussants: Charles Evans, Federal Reserve Bank of Chicago, and Simon Gilchrist, NBER and Boston University

Xavier Gabaix, MIT, and **David Laibson**, NBER and Harvard University, "The 6D Bias and the Equity Premium Puzzle"
Discussants: Anthony Lynch, New York University, and Monika Piazzesi, University of California, Los Angeles

Tim Cogley, Arizona State University, and **Thomas Sargent**, NBER and Stanford University, "Evolving Post-World War II Inflation Dynamics"
Discussants: Christopher Sims, NBER and Princeton University, and James Stock, NBER and Harvard University

Is long-run economic growth exogenous? To address this question, **Bernanke** and **Gurkaynak** show that the empirical framework of Mankiw, Romer, and Weil (1992) can be extended to test any growth model that admits a balanced growth path. Their broad conclusion, based on model estimation and growth accounting, is that long-run growth is significantly correlated with behavioral variables such as savings rates and population growth rates, and that this correlation is not explained easily by models (such as the Ramsey model) in which growth is treated as the exogenous variable. Hence, future research should focus on models that exhibit endogenous growth.

International financial integration allows countries to become net creditors or net debtors with respect to the rest of the world. In this paper, **Lane** and **Milesi-Ferretti** show that a small set of fundamentals—shifts in relative output levels, the stock of public debt, and demographic factors—can do much to explain the evolution of net foreign asset positions. In addition, they highlight that "external wealth" plays a critical role in determining the behavior of the trade balance, through shifts in the desired net foreign asset position and the investment returns generated on the outstanding stock of net foreign assets. Finally, they provide some evidence that a "portfolio balance" effect exists: real interest rate differentials are related inversely to net foreign asset positions.

Barsky and **Kilian** argue that the major oil price increases of 1973-4 and 1979-80 were not nearly as essential a part of the causal mechanism generating stagflation as is often thought. They show that monetary expansions and contractions can explain stagflation without reference to supply shocks. Monetary fluctuations help to explain movements in the prices of oil and other commodities, including the surge in the prices of non-oil industrial commodities that preceded the 1973-4 oil price increase. These fluctuations also can account for the striking coincidence of major oil price increases and worsening stagflation. In contrast, there is no theoretical presumption that oil supply shocks are stagflationary. The authors show that oil supply shocks may quite plausibly lower the GDP deflator and that there is little independent evidence that oil supply shocks actually raised the deflator (as opposed to the CPI).

Barth and **Ramey** show that the "cost channel" may be an important part of the monetary transmission mechanism. First they highlight three puzzles that might be explained by a cost channel of monetary transmission. Then they provide evidence on the importance of working capital and argue why monetary contractions can affect output through a supply channel as well as the traditional demand-type channels. Next they investigate the effects across industries. Following a monetary contraction, many industries exhibit periods of falling output and *rising* price-wage ratios, consistent with a supply shock. These effects are noticeably more pronounced during the period before 1979.

If decision costs lead agents to update consumption every D periods, then high-frequency data will exhibit an anomalously low correlation between equity returns and consumption growth (Lynch 1996). **Gabaix** and **Laibson** analytically characterize the dynamic properties of an economy composed of consumers who have such delayed updating. In their setting, an econometrician using an Euler equation procedure would infer a coefficient of relative risk aversion biased up by a factor of $6D$. Hence with quarterly data, if agents adjust their consumption every $D = 4$ quarters, the imputed coefficient of relative risk aversion will be *24 times* greater than the true value. The neoclassical model with delayed adjustment explains the consumption behavior of shareholders. Once limited participation is taken into account, the model matches the high-frequency properties of aggregate consumption and equity returns.

These papers will be published by the MIT Press as *NBER Macroeconomics Annual*, Volume 16. They will also be available at "Books in Progress" on the NBER website, **www.nber.org**

Globalization in Historical Perspective

An NBER Conference on "Globalization in Historical Perspective," organized by Michael D. Bordo, NBER and Rutgers University, Alan M. Taylor, NBER and University of California, Davis, and Jeffrey G. Williamson, NBER and Harvard University, took place on May 4 and 5 in California. The following topics were discussed:

Ronald Findlay, Columbia University, and **Kevin O'Rourke**, NBER and Trinity College, Dublin, "Commodity Market Integration, 1500-2000"

Discussant: Douglas Irwin, NBER and Dartmouth College

Barry Chiswick, University of Illinois, Chicago, and **Timothy Hatton**, University of Essex, "International Migration and the Integration of Labor Markets"

Discussant: Riccardo Faini, International Monetary Fund

Maurice Obstfeld, NBER and University of California, Berkeley, and **Alan M. Taylor**, "Globalization and Capital Markets"

Discussant: Richard Portes, NBER and London Business School

J. Bradford DeLong, NBER and University of California, Berkeley, and **Steven Dowrick**, Australian National University, "Globalization and Convergence"

Discussant: Charles Jones, NBER and Stanford University

Peter H. Lindert, University of California, Davis, and **Jeffrey G. Williamson**, "Does Globalization Make the World More Unequal?"

Discussant: Lant Pritchett, Harvard University

Nicholas Crafts and **Anthony Venables**, London School of Economics, "Globalization and Geography: An Historical Perspective"

Discussant: Richard Baldwin, NBER and University of Geneva

Gregory Clark, University of California, Davis, and **Robert Feenstra**, NBER and University of California, Davis, "Technology in the Great Divergence"

Discussant: Joel Mokyr, Northwestern University

Peter L. Rousseau, NBER and Vanderbilt University, and **Richard E. Sylla**, NBER and New York University, "Financial Systems, Economic Growth, and Globalization"

Discussant: Charles Calomiris, NBER and Columbia University

Michael D. Bordo, and **Marc Flandreau**, Observatoire Francais des Conjonctures Economiques, "Core, Periphery, Exchange Rate Regimes, and Globalization"

Discussant: Anna Schwartz, NBER

Larry Neal, University of Illinois, Urbana-Champaign, and **Marc Weidenmier**, Claremont McKenna College, "The Global Economy in Crises: How the Gold Standard Absorbed Shocks, 1880-1914"

Discussant: Mark Taylor, University of Warwick

Barry Eichengreen, NBER and University of California, Berkeley, and **Harold James**, Princeton University, "Monetary and Financial Reform in Two Eras of Globalization (and in Between)"

Discussant: Peter Kenen, Princeton University

Round Table Discussion: Costs versus Benefits of Globalization

Chair: **Peter Kenen**; **Clive Crook**, *The Economist*; **Gerardo Della Paolera**, Universidad Torcuato di Tella; **Niall Ferguson**, Oxford University; **Anne O. Krueger**, NBER and Stanford University; and **Ronald Rogowski**, University of California, Los Angeles.

Findlay and **O'Rourke** discuss trends in international commodity market integration during the second half of the second millennium. Their focus is on intercontinental trade, because the emergence of large-scale trade between the continents has especially distinguished the centuries following the voyages of Da Gama and Columbus. For earlier centuries, they rely more on qualitative information regarding trade routes, and information about quantity in terms of the volumes of commodities actually traded. For later centuries, they switch to more systematic price-based evidence. Among the main themes of the paper is the growing number of goods traded between continents over time (from high value-added to bulk commodities) and substantial commodity market integration, driven by technology (in the late nineteenth century) and politics (in the late twentieth century). However, this trend toward integration was *not* monotonic: politics can reinforce or offset the impact of technology, and shocks such as wars and Great Depressions can have *long-run* effects (through politically induced hysteresis). Finally, the authors conclude that remarkably little is known about commodity market integration trends in the twentieth century.

Chiswick and **Hatton** describe the determinants and consequences of intercontinental migration. They begin with a review of the history of primarily trans-Atlantic migration to the New World over the last four centuries. The contract and coerced migration from Europe and Africa beginning in the eighteenth century gave way to an era of free European migration. The period of 1850 to 1913 was one of mass migration, primarily from Europe to North America and

Oceania. World wars, immigration restrictions, and the Great Depression resulted in low international migration from 1913 to 1945. After World War II, international migration increased sharply, but with changes in the nature of the flows, and under the constraints of immigration controls. Why this international migration? Important explanatory factors include: the relative wages in the origin and destination; the cost of international migration; the wealth to finance the investment; chain migration (kinship and information networks); and government imposed restrictions on the free flow of people. The authors find that the influence of gainers and losers from immigration on subsequent immigration policy was mediated by institutional change and by interest group politics.

Obstfeld and **Taylor** examine the development of international capital mobility since the start of the late nineteenth century's gold standard era. They document the vicissitudes in the international capital market over more than a century, explaining them in terms of the open-economy "trilemma" that policymakers face in choosing among open capital markets, domestic monetary targets, and the exchange rate regime. They then examine a wide array of new evidence, including data on gross asset stocks, interest-rate arbitrage, real interest differentials, and equity-return differentials. On all measures examined, the degree of international capital mobility appears to follow a rough U-shaped pattern: high before World War I, low in the Great Depression, and high today. While it is difficult to definitively settle the debate over whether global capital mobility is greater today than it was on the eve of World War I, and thus no such attempt is made in the paper, the authors find that world capital may have flowed more easily to the poorer countries before 1914 than it does today.

At the biggest picture level, the economic history of the twentieth century is dominated by three things: the tremendous explosion in technological knowledge, capital accumulation, and worker skills that have made the world today so much richer than the world of previous centuries; the rise in worldwide relative "divergence" as the industrialized core of the world economy has pulled away from the non-industrialized periphery; and the changing membership of the world economy's core, as the southern cone of South America emerges as the big relative loser while Pacific East Asia and southern Europe emerge as the big relative winners of the past century. **DeLong** and **Dowrick's** analysis of the growth performance of 106 countries between 1960 and 1980 confirms the findings of Sachs and Warner (1995) of convergence within the group of countries that was open to trade and capital flows. They are intrigued to find that the result is reversed when they examine growth performance between 1980 and 1988: openness still produces a growth premium, but it is more pronounced for the richer economies.

Virtually all of the observed rise in world income inequality over the last two centuries has been driven by widening gaps between nations, while almost none of it has been driven by widening gaps within nations. Meanwhile, the world economy has become much more globally integrated over the past two centuries. If correlation meant causation, then these facts would imply that globalization has raised inequality between nations, but it has had no clear effect on inequality within nations. **Lindert** and **Williamson** argue that the likely impact of globalization on world inequality has been very different from what these simple correlations suggest. Globalization probably mitigated rising inequality between participating nations. The nations that gained the most from globalization are those poor ones that changed their policies to exploit it, while the ones that gained the least did not, or were too isolated to do so. The effect of globalization on inequality within nations has gone both ways, but here too those who have lost the most from globalization typically have been the excluded non-participants. In any case, the net impact of globalization was far too small to explain the observed long-run rise in world inequality.

Most traditional analysis is based on economic models in which there are diminishing returns to most activities. **Crafts** and **Venables** propose in this paper that it is not possible to interpret several of the most important aspects of nineteenth century economic development in such a framework. One alternative framework is provided by models of "new trade theory" and "new economic geography" in which market imperfections at the micro level can give rise to increasing returns at a more aggregate level. The interaction between increasing and decreasing returns in these models depends crucially on spatial interactions, so changes in these interactions can have major effects. Globalization can trigger cumulative causation processes that cause uneven development to occur at a variety of different spatial levels: urban, regional, and international. The authors' objective in this paper is to apply this new approach to several aspects of the historical experience of globalization.

Clark and **Feenstra** examine the changes in per-capita income and productivity from 1700 to modern times, and show four things: 1) incomes per capita diverged more around the world after 1800 than before; 2) the source of this divergence was increasing differences in the efficiency of economies; 3) these differences in efficiency were not attributable to problems of poor countries in getting access to the new technologies of the Industrial Revolution; and 4) the pattern of trade between the poor and the rich economies from the late nineteenth century suggests that the problem of the poor economies was peculiarly a problem of employing labor effectively. This continues to be true today.

Rousseau and **Sylla** bring together two strands of the economic literature —on the finance growth nexus and capital market integration—and explore key issues surrounding each strand through both institutional/country histories and formal quantitative analysis. Historical accounts of the Dutch Republic, England, the United States, France, Germany, and Japan spanning three centuries demonstrate that in each case the emergence of a financial system jump-started modern economic growth. Using a cross-country panel of 17 countries covering 1850-1997, the authors uncover a robust correlation between financial factors and economic growth that is consistent with a leading role for finance. They show that these effects were strongest over the 80 years preceding the Great Depression. Then, by identifying roles for both finance and trade in the convergence of interest rates among the Atlantic economies in the prewar period, they show that countries with more sophisticated financial systems tended to engage in more trade and appeared to be better integrated with other economies. Their results suggest that both the growth and the increasing globalization of these economies depend on improvements in their financial systems.

Bordo and **Flandreau** focus on the different historical regime experiences of the core and the periphery. Before 1914, advanced countries adhered to gold while periphery countries either emulated the advanced countries or floated. Some peripheral countries were especially vulnerable to financial crises and debt default, in large part because of their extensive external debt obligations denominated in core country currencies. This left them with the difficult choice of floating but restricting external borrowing or devoting considerable resources to maintaining an extra hard peg. Today, while advanced countries can successfully float, emergers who are less financially mature and must borrow abroad in terms of advanced country currencies are afraid to float for the same reason as their nineteenth century forebearers. To obtain access to foreign capital, they may need a hard peg to the core country currencies. Thus the key distinction between core and periphery countries both then and now, emphasized in this paper, is financial maturity as evidenced in the ability to issue international securities denominated in domestic currency. Evidence from gravity equation across several regimes since 1880 suggests that exchange rate volatility was not a significant detriment to bilateral trade. While adhering to gold was associated with greater trade, this result seems to be explained by deeper institutional forces at work. Evidence from Feldstein-Horioka tests over the same span of history agrees with the "folk" wisdom that financial integration was high before 1914 just as it is today. But the evidence suggests that it was not the exchange rate regime that mattered but the presence of capital controls. Finally, the authors' empirical evidence for core and peripheral countries in 1880-1913 and today, based on traditional money demand regressions, suggests a strong link between financial depth and the exchange rate regime.

The first global financial market appeared in Europe with the near-universal adoption of the gold standard from 1880 to 1914. During this period, a number of financial crises struck at the various financial centers and reverberated through the system of fixed exchange rates to other centers. Nevertheless, the financial system remained intact and the European commitment to the gold standard actually strengthened throughout the period. **Neal** and **Weidenmier** analyze the shock absorption characteristics of the system with weekly data on exchange rates and short-term interest rates. The data capture the relative importance of price adjustments in the current account and the short-term capital account for each country during the successive crises. The authors conclude that gold inflation from 1897 to mid-1914 helped to sustain the stability of the system, while the deflationary period from 1880-1896 required countries to adjust short-term interest rates if they were to maintain credible commitment to the gold standard. Countries unable to do this had to abandon or forgo the standard during the deflationary period (Austria, Italy, Portugal, Spain), but were able to shadow it during the inflationary period after 1897 without formally committing, or by committing with protective safeguards. These cautionary commitments, by reducing competition for monetary gold, also helped sustain the gold standard's financial architecture.

Eichengreen and **James** review the history of international monetary and financial reform in the two eras of globalization, the late nineteenth century and the late twentieth century and in the period in between. That history is rich, varied, and difficult to summarize compactly. Therefore, the authors structure the narrative by organizing it around a specific hypothesis. That hypothesis is that a consensus on the need for monetary and financial reform is apt to develop when such reform is seen as essential for the defense of the global trading system. In most periods, the international monetary and financial system evolves in a gradual and decentralized manner, largely in response to market forces. The shift toward greater exchange rate flexibility and capital account convertibility since 1973 is the most recent and therefore the most obvious illustration of what is a more general point. Discontinuous reform at a more centralized level - that is, reforms agreed to and implemented by groups of governments - occurs only when problems in the monetary and financial system are seen as placing the global trading system at risk. Throughout the period considered, there has existed a deep and abiding faith in the advantages of trade for economic growth, the principal exception being the 1930s, when trade and prosperity came to be seen as at odds. Consequently, priority has been attached to reform in precisely those periods when monetary and financial problems are perceived as posing a threat to the global trading system and hence to growth and prosperity generally. In contrast, there has never existed a comparable consensus on the benefits of open international capital markets for stability, efficiency, and growth. It follows that disruptions to capital markets that do not also threaten the trading system have had less of a tendency to catalyze reform.

Finally, "A Round Table on the Costs and Benefits of Globalization" was chaired by **Peter Kenen** of Princeton University. **Clive Crook** considered the possibility that the process of globalization would be reversed because of a popular fear of economic insecurity, falling real wages among the unskilled, and the incorrect perception that poverty in the Third World would be worsened. **Gerardo Della Paolera** considered globalization from the perspective of transition countries like his own (Argentina). He raised the question of whether the perceived benefits of furthering the process exceeded the costs for countries like Argentina. **Niall Ferguson** considered the "big think" issues of political globalization, empires, wars, and the democratization in the context of the long sweep of world history. **Anne Krueger** discussed the connection between globalization and economic policy in developing countries. **Ronald Rogowski** concluded the panel by assessing directly the costs and benefits. He argued that globalization was likely to continue in the advanced countries because median voters are net winners but that policies to compensate the losers will continue to be important.

These papers and discussions will be published by the University of Chicago Press in an NBER Conference Volume. Its availability will be announced in a future issue of the NBER Reporter. In advance of publication, these papers are at "Books in Progress" on the NBER's web site.

Labor in the Global Economy

An NBER-Universities Research Conference on "Labor in the Global Economy" took place in Cambridge on May 11 and 12. Labor Studies Program Director Richard Freeman, NBER and Harvard University, was the organizer. Eli Berman, NBER and Boston University, and Morris M. Kleiner, NBER and University of Minnesota, were moderators. The program was:

Andrew B. Bernard, NBER and Dartmouth College; **J. Bradford Jensen**, University of Maryland; and **Peter K. Schott**, Yale University, "Factor Price Equality and the Economies of the United States" (NBER Working Paper No. 8068)
Discussant: Eli Berman

Dae-Il Kim, Seoul National University, and **Peter Mieszkowski**, Rice University, "The Effects of International Trade on Wage Inequality in the United States"
Discussants: Bernardo S. Blum, University of California, Los Angeles, and Eli Berman

Linda Goldberg and **Joseph Tracy**, Federal Reserve Bank of New York, "Exchange Rates and Wages" (NBER Working Paper No. 8137)
Discussant: Lori Kletzer, University of California, Santa Cruz

James P. Smith, **Duncan Thomas**, **Elizabeth Frankenberg**, **Kathleen Beagle**, and **Graciela Teruel**, RAND, "Wages, Employment, and Economic Shocks: Evidence from Indonesia"
Discussants: David E. Bloom, NBER and Harvard University, and John R. Harris, Boston University

Belton M. Fleisher and **Xiaojun Wang**, Ohio State University, "Skill Differentials, Returns to Schooling, and Market Segmentation in a Transition Economy: The Case of Mainland China"
Discussant: Gary H. Jefferson, Brandeis University

Chang-Tai Hsieh, Princeton University, and **Keong T. Woo**, KPMG "The Impact of Outsourcing to China on Hong Kong's Labor Market"
Discussant: Jeffrey H. Bergstrand, University of Notre Dame

Ju-Ho Lee, Korea Development Institute; **Young-Kye Moh**, Ohio State University; and **Dae Il Kim**, Seoul National University, "Do Unions Inhibit Labor Flexibility? Lessons from Korea"
Discussant: David L. Lindauer, Wellesley College

Andrew M. Warner, Harvard University, "International Wage Determination and Globalization"
Discussants: Malcolm Cohen, University of Michigan, and Peter Gottschalk, Boston College

Gary Fields, **Paul Cichello**, **David Newhouse**, and **Samuel Frieje**, Cornell University; and **Marta Menendez**, DELTA, "A Four Country Story: Household Income Dynamics in Indonesia, South Africa, Spain, and Venezuela"
Discussants: Peter Gottschalk and John R. Harris

Morris M. Kleiner and **Hwikwon Ham**, University of Minnesota, "Do Industrial Relations Institutions Affect Economic Efficiency?: International and U.S. State-Level Evidence"
Discussant: Takao Kato, Colgate University

Bernard, **Jensen**, and **Schott** consider the role of international trade in shaping the product mix and relative wages for regions within the United States. They ask whether all the regions in the United States face the same relative factor prices. Using data from 1972-92, they conclude that all regions do not face the same relative factor prices; rather, there are at least three distinct factor price cones. Sorting regions into cones with similar relative factor prices, the authors find that industry mix varies systematically across the groups. Regions that switch cones over time have more churning of industries.

Kim and **Mieszkowski** develop several simple general equilibrium models to analyze the effects of increased international trade on the growth of income inequality that occurred in the United States during the 1970s and 1980s. They conclude that the expansion of trade has decreased the real wage of unskilled labor by between 1 and 3 percent, a relatively small amount. To obtain this estimate, they develop a new measure of skill based on information found in the Directory of Occupational Titles. This skill index and data from the Occupational Employment Survey and Input-Output Information are used to calculate three factor shares for two tradeable and two non-tradeable sectors.

Understanding the effects of exchange rate fluctuations across the population is important for increasingly globalized economies. Previous studies using industry aggregate data found that industry wages are significantly more responsive than industry employment to exchange rate changes. **Goldberg** and **Tracy** offer an explanation for this paradoxical finding. Using Current Population Survey data for 1976 through 1998, they show that the main mechanism for exchange rate effects on wages occurs through job turnover; this has strong consequences for the wages of workers undergoing such job transitions. By contrast, workers who remain with the same employer experience little if any wage impacts from exchange rate shocks. In addition, the least educated workers–who also have the most frequent job changes–shoulder the largest adjustments to exchange rates.

After more than a quarter century of sustained economic growth, Indonesia was struck in the late 1990s by a large and unanticipated crisis. Real GDP declined by about 12 percent in 1998. Using 13 years of annual labor force data in conjunction with two waves of a household panel, the Indonesia Family Life Survey (IFLS), **Smith** and his co-authors examine the impact of the crisis on labor market outcomes. Aggregate employment has remained remarkably robust, although there has been significant switching within sectors. The drama of the crisis lies in real hourly earnings, which collapsed by around 40 percent in one year for urban workers, both male and female, in the market sector or self-employed. Declines of the same magnitude occurred for females in the rural sector and rural males working for a wage. In stark contrast, real hourly earnings of self-employed males in rural areas remained essentially stable. Given that these workers account for about one quarter of the male work force in Indonesia, any conclusions about the effects of the crisis that focus only on the market wage sector substantially overstate the magnitude of the crisis. The authors estimate that declines in real household incomes are about half the magnitude of the declines in individual hourly earnings, indicating that households have adopted an array of strategies to mitigate the effects of the crisis.

Fleisher and **Wang** address the puzzle of persistent low private returns to schooling in China's transition to a market economy. They find that both urban and rural enterprises overpay production workers relative to a profit-maximizing standard and that underpayment is far more extreme for skilled workers. This relatively large "exploitation" of skilled workers explains, in a proximate sense, the low private return to schooling. The circumstances of factor payments in rural enterprises are further complicated by the existence of unexploited scale economies which preclude paying all inputs the value of their marginal products. Both production and technical/managerial workers in rural collectives act as *de facto* residual claimants; that is, the gap between their production value and their pay is related positively to estimated economies of scale. The authors attribute the existence of unexploited scale economies and the residual underpayment of labor to segmented product and factor markets and to constraints on funds that can be invested.

After decades of autarky, China opened its economy to foreign investors in the late 1970s and early 1980s. **Hsieh** and **Woo** examine the impact of the resulting outsourcing of production from Hong Kong to China on Hong Kong's labor market. They show that the relative demand for skilled workers in Hong Kong increased sharply at exactly the same time that outsourcing to China began to increase in the early 1980s. Rapid skill upgrading within detailed industries in the manufacturing sector accounts for most of the growth in the relative demand for skilled workers, but plays a much less important role in the non-manufacturing sector. Using several measures of outsourcing to China, the authors show that the rate of skill upgrading has been greater in industries with a greater degree of outsourcing to China. These measures of outsourcing account for 45 to 60 percent of the shift in the relative demand for skilled workers.

Lee, **Moh**, and **Kim** examine whether and to what extent unions inhibit labor flexibility in Korean manufacturing. In Korea there was an abrupt incidence of active unionism unleashed in 1987. The authors show that the short-run employment adjustment (one to six months) and hours adjustment (one month) of regular manufacturing workers decreased in the post-1987 period as compared to the pre-1987 period. However, negative union effects on employment adjustment were limited to male, production, and regular workers; Korean employers responded through increased employment of daily workers (workers with employment contracts shorter than one month) and aged workers (55 or older) and also through the higher flexibility of female workers. Furthermore, a significant part of the decrease in employment flexibility (for instance, 35 percent of the decrease in one month output elasticity of employment) is attributable to labor market changes: a tighter labor market with fewer young workers made separation more procyclical.

Warner examines international wage determination using data on wages and salaries for the year 1998. Across countries, wage levels are correlated strongly with local GDP per worker, but the strength of the relationship depends on the extent of foreign language knowledge of managers and varies by occupation. Holding constant GDP per worker, wages also are correlated with the intensity of local competition, and lower wages with minimum wage rules. Across companies, holding constant national differences, wage levels are correlated with: export orientation and multinational status, but the latter only in poorer countries; size of company worldwide, but not domestically; recent revenue growth, but not recent profit performance; E-mail use; and economic sector. Global forces impinge on wages though a number of channels but generally have stronger impacts on executive salaries than on wages in lower-paying occupations.

Fields and his co-authors use panel data to analyze household income mobility in both monetary and welfare terms in four different economies: Indonesia, Spain, South Africa, and Venezuela. They confirm that during the 1990s households in all four countries experienced large income changes, and they examine the characteristics and events of households that are associated with upward and downward income mobility.

Kleiner and **Ham** examine the impact of national levels of unionization, strikes, bargaining structure, public policies toward labor, and collective bargaining within the firm and nation on a country's foreign direct investment (FDI). As an additional test of the impact of labor market institutions and state labor market policies, they examine its effect on the economic growth of U.S. states. Initially they model the decisions of firms, and then nations, as they decide their trade-offs of social equity and economic efficiency. Using data from 20 OECD nations from 1985 through 1995, and from U.S. states for 1990 to 1999, they show that higher levels of industrial relations institutions are usually associated with lower levels of FDI and slower economic growth for U.S. states. However, within the context of industrial relations policies, their results do not necessarily suggest that a nation or state would be better off trading social equity for higher levels of economic efficiency.

The Economics of Aging

The NBER's Program on Aging, directed by David A. Wise of NBER and Harvard University, held its most recent in a series of conferences on May 17–20. The following papers, which will be published by the University of Chicago Press in an NBER Conference Volume, were presented:

James M. Poterba, NBER and MIT; **Steven F. Venti**, NBER and Dartmouth College; and **David A. Wise**, "The Transition to Personal Accounts and Increasing Retirement Wealth: Macro and Micro Evidence"
Discussant: Sylvester Scheiber, Watson Wyatt Worldwide

James J. Choi and **David Laibson**, NBER and Harvard University; **Brigitte Madrian**, NBER and University of Chicago; and **Andrew Metrick**, University of Pennsylvania, "For Better or Worse: Default Effects and 401(k) Savings Behavior"
Discussant: James M. Poterba

Jeffrey R. Brown, NBER and Harvard University, and **Scott J. Weisbenner**, University of Illinois, "Is a Bird in the Hand Worth More Than a Bird in the Bush? Intergenerational Transfers and Savings Behavior"
Discussant: Alan J. Auerbach, NBER and University of California at Berkeley

James Banks and **Richard Blundell**, University College London, and **James P. Smith**, RAND Corporation, "Wealth Portfolios in the UK and the US"
Discussant: John B. Shoven, NBER and Stanford University

Steven F. Venti and **David A. Wise**, "Aging and Housing Equity: Another Look"
Discussant: Jonathan S. Skinner, NBER and Dartmouth College

Michael D. Hurd, NBER and RAND Corporation; **Daniel L. McFadden**, NBER and University of California at Berkeley; **Angela Merrill**, Mathematica; and **Tiago Ribiero**, University of California at Berkeley, "Healthy, Wealthy, and Wise: The Evidence from AHEAD Wave 3"
Discussant: John P. Rust, NBER and Yale University

David M. Cutler, NBER and Harvard University, and **Ellen Meara**, Harvard University, "Changes in the Age Distribution of Mortality Over the 20th Century"
Discussant: David Meltzer, NBER and University of Chicago

Victor R. Fuchs and **Mark B. McClellan**, NBER and Stanford University, "Area Differences in Utilization of Medical Care and Mortality Among U.S. Elderly"
Discussant: Joseph P. Newhouse, NBER and Harvard University

Anne Case, NBER and Princeton University, "Does Money Protect Health Status? Evidence from South African Pensions"
Discussant: Robert T. Jensen, NBER and Harvard University

Robert T. Jensen, "Socioeconomic Status, Nutrition, and Health Among the Elderly"
Discussant: David M. Cutler

Angus S. Deaton and **Christina Paxson**, NBER and Princeton University, "Mortality, Income, and Income Inequality among British and American Cohorts"
Discussant: James Banks

Poterba, **Venti**, and **Wise** use both macro and micro data to describe the change in retirement assets and in retirement savings that is attributable to the shift over the last two decades from employer-managed defined benefit (DB) pensions to retirement plans that are largely managed and controlled by employees. They pay particular attention to the possible substitution of pensions assets in one plan for assets in another plan, especially the substitution of 401(k) assets for DB assets. The macro data show that between 1975 and 1999 assets to support retirement increased about five-fold relative to wage and salary income, suggesting large increases in the wealth of future retirees. Retirement plan contributions, as well as favorable rates of return in the 1990s, explain the large increase in retirement plan assets. The micro data show no evidence that the accumulation of 401(k) assets has been offset by a reduction in DB assets. Because annual saving is much greater under 401(k) than under DB plans, and because of the market return advantage of 401(k) plans, assets at retirement typically would be much higher under a 401(k) plan than under a DB plan. In addition, a large fraction of 401(k) enrollees retained DB coverage, further increasing their retirement saving.

In the last several years, dozens of employers have automatically enrolled new employees in the company 401(k) plan. **Choi**, **Laibson**, **Madrian**, and **Metrick** analyze three years of 401(k) data from two firms that have experimented with automatic enrollment. They find that automatic enrollment has a dramatic effect on retirement savings behavior. Under automatic enrollment, 401(k) participation rates exceed 85 percent. In addition, 80 percent of all participants initially accept both the default savings rate (2 or 3 percent for these two companies) and the default investment fund (stable value or money market). Even after three years, over half of participants continue to contribute at the default rate and invest their contributions in the default fund. Automatic enrollment thus encourages participation, but appears to anchor participants to a low default savings rate and in a conservative default investment vehicle. Higher participation raises average wealth accumulation, but low savings rates and conservative investments undercut accumulation. In this sample, the two effects are roughly offsetting. However, automatic enrollment has a large impact on the *distribution* of 401(k) balances. Under automatic enrollment, few employees have low (that is, zero) balances, because most employees are anchored at the default choices.

Brown and **Weisbenner** provide new evidence on the decomposition of aggregate household wealth into life-cycle and transfer wealth. Using the 1998 Survey of Consumer Finances, they find that transfer wealth accounts for approximately one-fifth to one-quarter of aggregate wealth, suggesting a larger role for life-cycle savings than some previous estimates. Despite the smaller aggregate level of transfer wealth, its concentration among a small number of households suggests that it can still have an important effect on the savings decisions of recipients. One estimate suggests that past receipts of transfer wealth reduce life-cycle savings by as much as dollar-for-dollar, while expected future transfers do not produce such a crowd-out effect.

Banks, **Blundell**, and **Smith** document and attempt to explain differences between the United States and United Kingdom household wealth distributions, emphasizing the quite different portfolios held in stock and housing equities in the two countries. They show that, as a proportion of total wealth, British households hold relatively small amounts of financial assets - including equities in stock - compared to their American counterparts. In contrast, British households appear to move into home ownership at relatively young ages; consequently, a large fraction of their household wealth is concentrated in housing. Moreover, important changes have been taking place in both countries in their housing and equity markets. Especially in Britain, there have been some fundamental changes in national policies that have been aimed at encouraging wider rates of home ownership and greater participation in the equity market. Institutional differences between the countries imply much younger homebuyers in the United Kingdom than in the United States. The authors argue that the higher housing price volatility in the United Kingdom combined with much younger entry into home ownership there helps to explain the relatively small participation of young British householders in the stock market. It is important to acknowledge the dual role in housing—providing both wealth and consumption services—in understanding differences in wealth accumulation between the United States and the United Kingdom. As a result, institutional differences, particularly in housing markets, that affect the demand and supply of housing services, turn out to be important in generating portfolio differences between the two countries.

Aside from Social Security and, for some, employer-provided pensions, housing equity is the principle asset of a large fraction of older Americans. Many retired persons have essentially no financial assets to support retirement consumption. Nonetheless, **Venti** and **Wise** find that housing equity is typically not withdrawn to support non-housing consumption during retirement. In fact, in the absence of the death of a spouse or entry of a family member into a nursing home, families are unlikely to discontinue home ownership. Even in the event of these precipitating shocks, giving up a home is the exception and not the rule. Families that move and purchase a new home tend to increase home equity. However, income-poor and house-rich families are more likely to reduce equity when they move, while house-poor and income-rich households are more likely to increase housing equity. On balance, households that move and buy a new home substantially increase housing equity. Venti and Wise conclude that home equity is typically not liquidated to support general non-housing consumption needs as households age.

Hurd, **McFadden**, **Merrill**, and **Ribiero** use the Asset and Health Dynamics of the Oldest Old (AHEAD) Panel to test for the absence of causal links from socio-economic status (SES) to innovations in health or mortality, and from health conditions to innovations in wealth. They conclude that there is no causal link from SES to mortality or to the incidence of sudden onset health conditions (accidents and, probably, acute conditions), but there is an association of SES with the incidence of gradual onset health conditions (mental conditions and, probably, degenerative and chronic conditions), either because of causal links or persistent unobserved behavioral or genetic factors that have a common influence on both SES and innovations in health. The authors conclude that there is no causal link from health status to innovations in wealth.

Since 1960, reductions in mortality have been associated with two new factors: the conquest of cardiovascular disease in the elderly, and the prevention of death attributable to low birth weight infants. While it is not entirely clear what factors account for the reduction in cardiovascular disease mortality, the traditional roles of nutrition, public health, and antibiotics are certainly less important than factors related to individual behavior, such as smoking and diet and high tech medical equipment. **Cutler** and **Meara** term this change the "medicalization" of death: increasingly, reductions in mortality are attributed to medical care and not to social or environmental improvements. The medicalization of death does not imply that medicine is the only factor influencing mortality. For several important causes of death, improvements in income and social programs have had and continue to have a large impact on mortality. For example, Medicare probably has a direct impact on mortality by increasing elderly access to medical care, but it also may have important effects on income since it reduces out-of-pocket spending by the elderly for medical care. Social Security and civil rights programs also may be important in better health. The authors quantify the role of medicine, income, social programs, and other factors in improved mortality in the last half century, but they show examples of where each is important, as a first step in this research process.

Fuchs and **McClellan** examine 314 U.S. areas for differences in medical care utilization and mortality among whites ages 65-84 in 1990. The seven regions and five groups are based on population size. The authors find that cross-area variation in utilization is strongly related to variation in mortality. For total utilization, the elasticity ranges between 0.51 and 0.82 (standard errors are about 0.10) after controlling for region, population size of area, education, income, and income inequality. These are lower-bound estimates; the true coefficients would be larger to the extent that there is a negative relationship running from utilization of care to mortality. The elasticities are especially large for medical admissions, and especially small for physicians' diagnostic services and treatments. Also noteworthy is the extent to which the well-known propensity for higher utilization in Florida appears even larger after controlling for socioeconomic variables and mortality. The coefficient for Florida is, on average, over 50 percent (9 percentage points) higher when the other variables are considered. A third result worthy of comment is the much higher utilization in areas of over 500,000 population relative to all other areas. The average differential is about 8 percent. Among the other areas there is no strong pattern related to population size. The authors find no support for the hypothesis that mortality and income inequality are positively related. The coefficient for inequality is actually negative and significantly different from zero. Nor do they find a relationship between mortality and population size. They do find a very large negative coefficient for Florida: this region has by far the lowest mortality of any region regardless of whether or not other variables are controlled for.

Case quantifies the impact on health status of a large, exogenous increase in income—that associated with the South African state old age pension. Elderly Black and Coloured men and women who did not anticipate receiving large pensions in their lifetimes, and who did not pay into a pension system, are currently receiving more than twice the median Black income per capita. These elderly men and women generally live in large (three or four or five generation) households, and this paper documents the effects of the pension on the pensioners, on other adult members of their households, and on the children who live with them. Case finds, in households that pool income, that the pension protects the health of all household members, working in part to protect the nutritional status of household members, in part to improve living conditions, and in part to reduce the stress under which the adult household members negotiate day-to-day life. The health effects of delivering cash provide a benchmark against which other health-related interventions can be evaluated.

Jensen applies data from a nationally representative household-level survey to explore the relationship between health and socioeconomic status (SES) for the elderly in Russia. His objectives are to explore the basic relationship and to present evidence from a variety of measures of health status, including measurements of blood pressure, weight and height conducted by trained enumerators, as well as nutrient intake, derived from 24- and 48-hour food intake diaries. Therefore, he need not rely exclusively on self-reports of health status, where response choices may have different interpretations for different people (as in self-reported overall health status), or where there may be problems of differential reporting by SES (for example, because of differential knowledge or awareness of health conditions). He uses the data to show that the relationship between health and SES in Russia can't be adequately described by simple statements such as: the poor are less healthy than the rich. On net, the rich are healthier than the poor in some overall sense, but there are important ways in which the rich face greater health risks. Jensen also focuses on one particular mechanism, nutrition, through which SES may affect health. In particular, there are important micronutrients beyond calories that are important for good health, especially for the elderly. And the intake of these nutrients may be sensitive to income, as the lowest cost staple foods in most countries (for example, bread and rice) may yield sufficient "bulk" or calories, but (unless fortified) may have low levels of vitamins, minerals, and proteins. On the other hand, these foods tend to be low in fat, cholesterol, and sodium, compared to foods which may be more expensive and eaten in larger quantities by the rich, such as meat. Therefore, it is quite possible that nutrition plays a role in the relationship between health and SES, even in countries where calorie malnutrition is scarce and obesity is widespread.

In earlier work, **Deaton** and **Paxson** investigated the relationship between mortality, income, and income inequality in the United States. This paper extends their analysis to Britain. They first compare British and U.S. mortality experience over time in relation to the evolution of incomes and income inequality. They find that there is no simple relationship between income, income inequality, and the decline in mortality. Instead, the most plausible account of the data is that mortality declines are driven by technological advances. They then replicate their earlier work on U.S. birth cohorts using British data and find that, once they account for time trends, neither income nor income inequality are related to mortality.

Frontiers in Health Policy Research

The NBER's fifth annual conference on "Frontiers in Health Policy Research," organized by Alan M. Garber, took place on June 7 in Bethesda, Maryland. The program was:

Jeanette Chung, University of Chicago, and **David Meltzer**, NBER and University of Chicago, "Effects of Competition under Prospective Payment on Hospital Costs among High and Low Cost Admissions: Evidence from California, 1982-1993" (NBER Working Paper No. 8069)

John Cawley and **Catherine McLaughlin**, University of Michigan, and **Michael Chernew**, NBER and University of Michigan, "HMO Participation in Medicare Managed Care"

Frank R. Lichtenberg, NBER and Columbia University, "The Effect of Medicare on Health Care Utilization and Outcomes"

Mark Pauly, NBER and University of Pennsylvania, and **Bradley Herring**, University of Pennsylvania, "Cutting Taxes for Insuring: Options and Effects of Tax Credits for Health Insurance" and "Expanding Coverage Via Tax Credits: Trade-Offs and Outcomes"

Frank A. Sloan, NBER and Duke University, "Hospital Ownership Conversion: Defining the Appropriate Public Oversight Role"

Meltzer and **Chung** use data from California in 1983 and 1993 on hospital charges and cost-to-charge ratios to examine the effects of competition on costs. They consider both high and low cost admissions and their costs before and after the establishment of the Medicare Prospective Payment System (PPS). Comparing persons above and below age 65, they find that competition is associated with increased costs in both age groups before PPS, but decreased costs afterwards. This is especially true among those over age 65 with the highest costs. The authors conclude that the combination of competition and prospective payment systems may result in incentives to selectively reduce spending among the most expensive patients. This implies the need to carefully monitor outcomes for the sickest patients under prospective payment systems in competitive environments.

Many health maintenance organizations (HMOs) have exited the market for Medicare managed care; since 1998 the number of participating plans has fallen from 346 to 174. **Cawley**,

Chernew, and **McLaughlin** study how the equilibrium number of HMOs participating in Medicare managed care markets varies with the Health Care Financing Administration (HCFA) capitation payment. They have data from virtually every county in the continental United States, plus the District of Columbia, from 1993-2001. The authors find that in 2001, only 12.3 percent of counties in the 48 contiguous states received a HCFA payment greater than what the authors estimate is necessary to support a single HMO in the Medicare managed market. HCFA particularly appears to underestimate the payment necessary to HMOs in rural and sparsely populated areas. In order to support a single HMO in half of the U.S. counties in the year 2001, HCFA would have to pay \$799.24 per average enrollee per month in the median county, the authors estimate. The high payments necessary to support HMO participation in rural counties suggest that in many U.S. counties it may not be possible to achieve both of the goals of the Medicare managed care program: to offer an attractive alternative to fee-for-service Medicare and to save money.

What impact does Medicare have on the health of the United States population? **Lichtenberg's** goal is to obtain precise estimates of medical utilization and outcomes, by age, for those close to age 65. Using information obtained from medical providers (hospitals and doctors) pooled over a number of years, he finds that utilization of ambulatory care and, to a much smaller extent, inpatient care, increases suddenly and significantly at age 65. This is presumably because of Medicare eligibility. The number of physician visits in which at least one drug is prescribed also jumps up at age 65. Reaching age 65 also has a strong positive impact on the consumption of hospital services, but most of this impact appears to be the result of postponement of hospitalization in the prior two years. Does this increase in utilization lead to an improvement in outcomes - a reduction in morbidity and mortality - relative to what one would expect given the trends in outcomes prior to age 65? Yes, Lichtenberg finds. The Medicare-induced increase in health care utilization leads to a reduction in days spent in bed of about 13 percent and to slower growth in the probability of death after age 65. Physician visits also appear to have a negative effect on the male death rate. Data on age-specific death probabilities every 10 years back to 1900–both before and after Medicare was enacted–provide an alternative way to test for the effect of Medicare on longevity. The data support the hypothesis that Medicare has increased the survival rate of the elderly by about 13 percent.

What options are available in the design of refundable tax credits for health insurance purchases? What are the effects of different options, and how should they be evaluated? **Pauley** and **Herring** compare three alternative types of tax credit schemes: fixed dollar credits toward the purchase of a benchmark basic plan; proportional credits toward the purchase of a benchmark plan; and fixed dollar credits which can be used for the purchase of any plan with a premium at least as large as the credit. They show that it is inappropriate to evaluate alternative credit designs primarily on their effect on the number of uninsured persons. Credits claimed by people who were already insured can have very beneficial equity and efficiency effects. Using two new modeling techniques, the authors show that credits will have very little effect until they exceed a certain threshold. Above that level, credits which cover on average about half of the premium of a benchmark policy may substantially reduce the number of uninsured, especially if they take the fixed-dollar form. These new estimates illustrate the tradeoffs in program design. The remaining key questions are what value consumers place on avoiding charity or bad debt care and what value policymakers place on increasing the level of coverage of different types of formerly uninsured persons.

In their second paper, Pauly and Herring discuss various options for using refundable tax credits to reduce the number of uninsured persons. The effect of tax credits on the number of uninsured depends on the form of the credit scheme adopted. Moreover, since large subsidies for private insurance directed to low-income persons have never been implemented, there is considerable uncertainty about the effects of various tax credit proposals. The authors find that small credits will do little to reduce the number of uninsured but that credits covering about half of the premium for a benchmark policy might have a significant effect, especially if they take a fixed-dollar form and can be used for policies with few restrictions. Finally, Pauly and Herring discuss the issues surrounding the "costs" of these credits schemes, and the policy issues raised by the uncertainty of the effects.

Sloan reviews recent empirical evidence on the effects of hospital ownership conversions on the quality of care and the provision of public goods, such as uncompensated care. He presents new results on these topics based on hospital discharge data from the Healthcare Cost and Utilization Project's (HCUP) Nationwide Inpatient Sample. His analysis reveals that conversions from government or private non-profit to for-profit ownership had no effect on in-hospital mortality, but rates of pneumonia and complications increase following conversion to for-profit status. Other research, discussed in the paper, has found increased mortality rates at one year following admission for patients admitted to hospitals that had converted to for-profit ownership. There was no effect of such conversions on the propensity to admit uninsured or Medicaid patients. Overall, the evidence suggests a role for public scrutiny of ownership conversions prior to the occurrence of such transactions.

These papers will be published by the MIT Press in an annual conference volume. They are also available at "Books in Progress" on the NBER's website under the title *Frontiers in Health Policy Research*, Volume 5.

International Seminar on Macroeconomics

The NBER's 24th Annual International Seminar on Macroeconomics, organized by Jeffrey A. Frankel, NBER and Harvard University, and Francesco Giavazzi, NBER and Bocconi University, was held on June 8–9 at University College Dublin (Ireland). The following papers were discussed:

Anne Sibert, Birkbeck College, "Monetary Policy with Uncertain Central Bank Preferences"
Discussants: Mervyn King, NBER and Bank of England, and Lars Svensson, NBER and Stockholm University

Aart Kraay, World Bank, and **Jaume Ventura**, NBER and MIT, "The Role of Trade in International Transmission of Business Cycles"
Discussants: Antonio Fatas, INSEAD, and James Stock, NBER and Harvard University

Eduardo Loyo, Harvard University, "Imaginary Money"
Discussants: Zvi Eckstein, Tel Aviv University, and Frank Smets, European Central Bank

Raquel Fernandez, NBER and New York University, "Education, Segregation, and Marital Sorting: Theory and an Application to U.K. Data"
Discussants: Alberto Alesina, NBER and Harvard University, and Gianluca Violante, University College London

Romain Wacziarg, Stanford University, "Structural Convergence"
Discussants: Tito Boeri, Universita Bocconi, and Peter Neary, University College Dublin

Rodney Thom and **Brendan Walsh**, University College Dublin, "The Effect of a Common Currency on Trade: Ireland Before and After the Sterling Link"
Discussants: William A. Branson, NBER and Princeton University, and Andrew Rose, NBER and University of California at Berkeley

Susanto Basu, NBER and University of Michigan, and **John Fernald**, Federal Reserve Bank of Chicago, "Aggregate Productivity and Aggregate Technology"
Discussants: Robert J. Gordon, NBER and Northwestern University, and Jean Imbs, London Business School

Philip Lane, Trinity College Dublin, and **Gian Maria Milesi-Ferretti**, International Monetary Fund, "External Wealth, the Trade Balance, and the Real Exchange Rate"
Discussants: Barry Eichengreen, NBER and University of California at Berkeley, and Richard Portes, NBER and London Business School

Sibert analyzes the effect of unobservable central bank preferences on the actions of the central bank and on inflation. In her basic model, central bankers serve two terms. The weight that they place on output, relative to inflation, is their private information (that is, unobservable). The model shows that all but the most dovish central bankers inflate less they otherwise would in their first period in office in order to differentiate themselves from less conservative central bankers. Surprisingly, in that first period central banks also respond more to shocks than they otherwise would. Central banks may socialize central bankers, making them more conservative over time. An extension of Sibert's basic model allows central bankers' preferences to change randomly over time. If policymakers tend to become more conservative, this causes them to inflate more in their first term. Thus, the private information need not lead to lower inflation in the first period of office than in the second. A further extension of her model allows for policymakers to serve three periods in office. If the probability of a change in preferences is small, then all but the most conservative central bankers inflate less in the first period than in the second.

In industrial countries, the service sector accounts for more than two-thirds of GDP, yet trade in service accounts for only 20 percent of international trade. To a large extent this bias in trade flows reflects both technological and policy-induced barriers to trade in services that are expected to decline substantially in the next decade or two. What will be the effects of such an increase in service trade on risk sharing? **Kraay** and **Ventura** develop a stylized model of international trade and risk sharing. Since countries have different factor abundance and industries have different factor intensities, there is an incentive to trade in goods and services in order to exploit the country's comparative advantage. Because countries experience imperfectly correlated shocks to their factor productivity, there is also an incentive to trade in assets to diversify or share country risk. The authors interpret a reduction in the technological and policy barriers to trade in services as an increase in the ability to perform the first type of trade. They then explore the consequences of this reduction in barriers for the second type of trade.

Loyo considers price setting in pure units of account, linked to the means of payment through managed parities. If prices are sticky in the units in which they are set, then changes to parity may facilitate equilibrium adjustment of relative prices. Loyo derives the optimal choice of unit of account by each price setter, and the optimal parity policy. He then computes the gains for a simple calibrated economy from having multiple units of account.

Fernandez presents a model of the

intergenerational transmission of education and marital sorting. Parents matter, both because of their household income and because parental human capital determines the expected value of a child's disutility from making an effort to become skilled. She shows that in the steady state an increase in segregation has potentially ambiguous effects on the fraction of individuals who become skilled, and hence on marital sorting, the personal and household income distribution, and welfare. Then, using U.K. statistics and results obtained previously for the United States, she finds that segregation is likely to have a smaller negative impact in the United Kingdom than in the United States because of the fertility and education transmission process.

Wacziarg establishes the existence of structural convergence: country pairs that converge in terms of per capita income also tend to converge in terms of their sectoral similarity, as measured by the bilateral correlation of their sectoral labor shares. This is a robust feature of the data at various levels of sectoral disaggregation and data coverage. He sheds light on some explanations for structural similarity, chiefly trade related determinants. Convergence in factor endowments accounts for approximately one-third of the extent of structural convergence. Wacziarg argues that the existence of structural convergence has important implications for our understanding of business cycles transmission, of long-run development patterns, and of the dynamics of specialization.

Thom and **Walsh** use the introduction of an exchange rate between Ireland and the United Kingdom in 1979 as a natural experiment to shed light on the effects of a common currency on the volume of international trade. They find that the change of exchange rate regime had no significant effect on the pattern of Irish trade. This finding casts doubt on the belief that the European Economic and Monetary Union will have a major effect on the pattern of trade between participating countries.

Aggregate productivity and aggregate technology are meaningful but distinct concepts. **Basu** and **Fernald** show that a slightly-modified Solow productivity residual measures changes in economic welfare, even when productivity and technology differ because of distortions, such as imperfect competition. Their results imply that aggregate data can be used to measure changes in welfare, even when disaggregated data are needed to measure technical change. They then present a general accounting framework that identifies several new non-technological gaps between productivity and technology, gaps reflecting imperfections and frictions in output and factor markets. They find that these gaps are important. The evidence suggests that the usual focus on one-sector models misses a rich class of important propagation mechanisms that are present only in multi-sector models.

Lane and **Milesi-Ferretti** examine the link between the net foreign asset position, the trade balance, and the real exchange rate. In particular, they decompose the impact of a country's net foreign asset position ("external wealth") on its long-run real exchange rate into two mechanisms: the relation between external wealth and the trade balance; and, holding fixed other determinants, the negative relation between the trade balance and the real exchange rate. They also show that the relative price of nontradables is an important channel linking the trade balance and the real exchange rate.

These papers will be published in a special issue of the *European Economic Review.* Many of them are also available at "Books in Progress" on the NBER's website.

NBER Conference in Beijing

The fourth annual NBER-CCER Conference, jointly sponsored by the National Bureau of Economic Research and the China Center for Economic Research at Beijing University, took place in Beijing on June 22-24. The topics for the conference, which focused on China's economy, were: an overview of the Chinese economy; taxes and debt; development of the financial sector; public finance; trade and exchange rates; corporate governance; social security; and banks.

In addition to these presentations and discussions, a tour of the Legend Computers factory rounded out the three-day program. U.S. participants at this year's conference were: NBER President Martin Feldstein and Professor Shang-Jin Wei, both of Harvard University and the U.S. conference organizers; and NBER Research Associates Alan J. Auerbach, University of California, Berkeley; Charles Calomiris, Columbia University; Roger H. Gordon, University of California, San Diego; and Kathryn Dominguez and James R. Hines, University of Michigan. Also presenting a paper at the conference was Michelle White, University of California, San Diego.

The entire conference program with links to other related information is available on the NBER's web site at www.nber.org/china.

Bureau News

Hoxby to Head Education Program

NBER Faculty Research Fellow Caroline Hoxby, a professor of economics at Harvard University, is the first Director of the NBER's new Program on the Economics of Education. She received her A.B. in Economics from Harvard in 1988, an M.Phil. in Economics from the University of Oxford in 1990, and a Ph.D. in Economics from MIT in 1994.

Hoxby has written on the effects of class size on student achievement, issues surrounding school finance, the effects of immigrants on affirmative action in American college education, and the industrial organization of the market for higher education in the United States. She has also worked on a nation-wide charter school evaluation project.

More NBER Researchers Head to Washington

NBER Research Associate Anne O. Krueger, a professor of economics at Stanford University, has been named First Deputy Managing Director of the International Monetary Fund. Krueger served as Chief Economist of the World Bank in the Reagan Administration. She succeeds NBER Research Associate Stanley Fischer, former head of MIT's Economics Department, who has held the position for the past seven years.

NBER Research Associate Kenneth S. Rogoff, a professor of economics at Harvard University, will succeed NBER Research Associate Michael Mussa as the International Monetary Fund's chief economist. Rogoff worked at the IMF in the early 1980s; he also has worked in the International Finance Division of the Federal Reserve Board of Governors.

NBER Faculty Research Fellow Kent Smetters, an assistant professor of insurance and risk management at The Wharton School, University of Pennsylvania, heads to Washington soon to become Deputy Assistant Secretary for Economics at the U.S. Department of Treasury. Smetters, who had been a visiting faculty member at Stanford University during the past academic year, was an economist with the Congressional Budget Office from 1995 to 1998.

Moskow Replaces Cooper as Board Vice Chair

NBER Director Kathleen B. Cooper, who had been serving as the Board's Vice Chairman, has been confirmed as Undersecretary of Commerce for Economic Affairs. Director-at-large Michael H. Moskow, President of the Federal Reserve Bank of Chicago, will succeed Cooper as Vice Chair.

Cooper was most recently chief economist and manager of the economics and energy division of Exxon Mobil Corporation in Irving, Texas. Before joining Exxon, she was executive vice president and chief economist at Security Pacific Bank. Cooper received her undergraduate and masters degrees from the University of Texas and her Ph.D. from the University of Colorado.

Moskow had been teaching at Northwestern's Kellogg School of Management just prior to becoming President of the Chicago Fed in 1994. He began his career teaching economics and management, served in a number of senior government positions from 1969 to 1977, then joined the private sector where he held a number of senior management positions for more than a decade.

Moskow received his undergraduate degree from Lafayette College and his Ph.D. from the University of Pennsylvania.

International Trade and Investment

The NBER's Program on International Trade and Investment met in Cambridge on March 16 and 17. James Harrigan, Federal Reserve Bank of New York, organized this program:

Robert Feenstra, NBER and University of California, Davis, and **Gordon Hanson**, NBER and University of Michigan, "Global Production and Rising Inequality: A Survey of Trade and Wages"

James Harrigan, "Comparative Advantage: Do the Data Obey the Law?"

Donald Davis and **David E. Weinstein**, NBER and Columbia University, "The Factor Content of Trade"

Robert E. Lipsey, NBER and Queen's College, "Foreign Direct Investment and the Operations of Multinational Firms"

James Markusen, NBER and University of Colorado, and Keith E. Maskus, University of Colorado, "Multinationals"

Henry Overman, **Stephen Redding**, and **Anthony J. Venables**, London School of Economics, "Trade and Geography: A Survey of Empirics"

James R. Tybout, NBER and Pennsylvania State University, "Plant and Firm-Level Evidence on 'New' Trade Theories"

Bruce Blonigen, University of Oregon, and **Thomas Prusa**, NBER and Rutgers University, "Antidumping"

Kishore Gawande, University of New Mexico, and **Pravin Krishna**, Brown University, "The Political Economy of Trade Policy"

Feenstra and **Hanson** argue that trade in intermediate inputs, or "outsourcing," is a potentially important explanation for the increase in the wage gap between skilled and unskilled workers in the United States and elsewhere. They show that trade in inputs has much the same impact on labor demand as does skill-biased technical change: both will shift demand away from low-skilled activities, while raising relative demand and wages of the higher skilled. Thus, distinguishing whether the change in wages is caused by international trade or technological change is fundamentally an empirical rather than a theoretical question. The authors review three empirical methods that have been used to estimate the effects of the outsourcing and technological change on wages, and summarize the evidence for the United States and other countries.

The theory of comparative advantage predicts that countries export goods that would have lower relative prices in the absence of trade. **Harrigan** reviews recent empirical research on this prediction. Much of this work focuses on output specialization rather than trade, arguing that most of the interest in the comparative advantage theory comes from the production side alone. Starting with the multidimensional generalization of the standard Heckscher-Ohlin model, authors have considered amendments that include unequal numbers of goods and factors, Ricardian technological differences, and multiple patterns of specialization. All of these refinements matter in explaining the sources of comparative advantage, and Harrgian concludes that considerable progress has been made in understanding the causes of specialization.

Davis and **Weinstein** examine the literature on the factor content of trade. They argue that understanding the factor content of trade is critical to understanding whether our models of general equilibrium "hang together." The last fifteen years have seen wide swings in trade economists' views of models of the factor content of trade. The authors do not want to suggest that all issues about the factor content of trade are settled; future work needs to gather better and more extensive datasets, to more carefully consider the role of traded intermediates, cross-country differences in demand, the role of trade costs, and so on. But the progress made in the last fifteen years surely holds promise that this will continue to be a fertile area for research, they conclude.

Lipsey reviews the changes that have taken place in the concept and measurement of foreign direct investment (FDI) and the differences between what is measured in balance-of-payments stocks and flows of FDI and what is implied by theories of FDI motivations and activities. Measured stocks of FDI are fairly well correlated with the activity of multinationals across countries, but hardly related at all to the distribution of activity among industries or among industries and countries. Thus, stocks of FDI give a misleading picture of what multinationals are doing in their host countries. Early studies for the United States, Sweden, and the United Kingdom all conclude that there was either no relationship between overseas production and parent firm or home country exports or a positive relationship. In recent years there have been similar studies of the effects of overseas production for Japan and several European countries, with basically the same conclusions. Similarly, there seems to be little relation between overseas production and parent or home country aggregate employment. In U.S. counties, greater foreign production is associated with lower home employment per unit of output, or lower labor intensity in home production, but in Swedish and Japanese firms, higher overseas production means more labor per unit of output at home. Within their host countries, the affiliates of foreign firms sometimes introduced entirely new industries and new bases for comparative advantage in exports. Affiliates almost universally appear to pay higher wages than the corresponding host country firms and have higher productivity levels. They also pay higher wages than domestically-owned firms of the same size and other characteristics. In the few cases where characteristics of workers can be examined, foreign-owned firms pay higher wages for what appear to be equivalent workers, a higher price for labor than domestic firms.

Beginning in the early 1980s, theoretical analyses incorporated the multinational firm into the microeconomic, general-equilibrium theory of international trade. Recent advances indicate how vertical and horizontal multinationals arise endogenously as determined by country characteristics, including relative size and relative endowment differences, and trade and investment costs. Results also characterize the relationship between foreign affiliate production and international trade in good and services. **Markusen** and **Maskus** survey some of this recent work, and note the testable predictions generated in the theory. They go on to examine empirical results that relate foreign affiliate production to country characteristics and trade/investment cost factors. Finally, they review findings from analyses of the pattern of substitutability or complementarity between trade and foreign production.

Overman, Redding and **Venables** survey the empirical literature relating trade flows, factor prices, and the international location of production to economic geography. First they present a general theoretical model which incorporates key mechanisms from theoretical research on new economic geography while remaining sufficiently general to provide the basis for empirical work. In the presence of transport costs and with intermediate inputs in production, access to markets and suppliers are important determinants of firm profitability. In general equilibrium, production location decisions will be determined by a combination of the considerations emphasized by traditional trade theory (factor endowments and exogenous technology differences) together with market and supplier access. The remainder of the survey is structured around the model's implications for international trade, the variation in factor prices across geographic space, and production structure. Increased distance raises trade costs with an elasticity between 0.2 and 0.3 and reduces trade volumes with an elasticity between –0.9 and –1.5. Access to markets and sources of supply plays a statistically significant and quantitatively important role in explaining variation in factor prices within and between countries. Access to foreign markets alone explains some 35 percent of the cross-country variation in per capita income. There is a positive relationship between market access and wages across U.S. counties which is robust to controlling for unobserved heterogeneity, human capital, demography, and exogenous amenities. Models of imperfect competition and increasing returns to scale imply a home market or magnification effect, whereby increases in expenditure on a good lead to a more than proportionate increase in production. Home market effects arise in a number of key manufacturing sectors.

By relaxing the assumption of perfect competition, the "new" trade theory has generated a rich body of predictions concerning the effects of commercial policy on price-cost mark-ups, firm sizes, exports, productivity, and profitability among domestic producers. **Tybout** critically assesses the plant-and firm-level evidence on these linkages. He finds first that mark-ups generally fall with import competition, but it is not clear whether this reflects the elimination of market power or the creation of negative economic profits. Second, import-competing firms cut back their production levels when foreign competition intensifies, at least in the short run. This suggests that sunk entry or exit costs are important in most sectors. Third, trade rationalizes production in the sense that markets for the most efficient plants are expanded, but large import-competing firms tend simultaneously to contract. Fourth, exposure to foreign competition often improves intra-plant efficiency. Fifth, firms that engage in international activities tend to be larger, more productive, and supply higher quality products. However, the literature is mixed on whether the activities caused these characteristics or vice versa. Finally, the short-run and long-run effects of commercial policy on exports and market structure can be quite different. Both types of response depend upon initial conditions, sunk entry costs, and the extent of firm heterogeneity.

Blonigen and **Prusa** review the growing literature on the effects of antidumping (AD), a trade policy that has emerged as the most serious impediment to international trade. They show that AD was a rarely used trade law until the mid-1970s. Over the past 25 years countries have increasingly turned to AD in order to offer protection to import-competing industries. Antidumping is a trade policy where the filing decision, the legal determination, and the protective impact are all endogenous. AD can facilitate collusion and can distort market prices even if cases are never filed. Also, the trade impact of macroeconomic shocks, such as exchange rate movements and GNP fluctuations, is complicated by the presence of AD law. The authors discuss the factors that appear to be most important for the determination of injury and also what influences whether domestic and foreign parties participate in the AD investigation process. Finally they assess the market effect of AD protection. AD duties affect both the trade from subject countries and the imports from non-subject countries. Antidumping duties also encourage foreign firms to invest in protected domestic markets. Blonigen and Prusa discuss how the assessment of AD duties complicates the pass-through behavior of sanctioned firms.

Despite a relative consensus on the merits of free trade, trade between nations has never been free. In recent decades, an impressive literature has attempted to answer the question of why this is so. The primary explanation that has been offered is that trade policies are not set by those who seek to maximize economic efficiency; rather, they are set in political contexts where the private incentives of the policymakers differ from aggregate welfare maximization. This study of "endogenous" trade policy determination, which explicitly accounts for the political circumstances under which policy is set, forms the core of the so-called "political economy" of trade literature. **Gawande** and **Krishna** attempt to survey its empirical ambitions and accomplishments to date. The early literature mostly involved the examination of correlations between trade policies and various political and economic factors that had been conjectured to be relevant in determining trade policy. This literature often was criticized for employing econometric specifications whose link with the theory that motivated them was tenuous. Later, the empirical literature moved in a somewhat "structural" direction, establishing a much tighter link with the theory than has been traditional in this field. The authors discuss and contrast the early empirical work in this area with more recent approaches, focusing on the unresolved issues and puzzles highlighted in the recent work.

Well-Being of Children

The NBER's Program on the Well-Being of Children, directed by Jonathan Gruber of MIT, met in Cambridge on April 5. The following papers were discussed:

Bruce Sacerdote, NBER and Dartmouth College, "The Nature and Nurture of Economic Outcomes" (NBER Working Paper No. 7949)

David N. Figlio, NBER and University of Florida, and **Maurice E. Lucas**, Alachua County School Board, "Do High Grading Standards Affect Students' Performance?" (NBER Working Paper No. 7985)

Paul J. Gertler, NBER and University of California, Berkeley and **Simone Boyce**, University of California, Berkeley, "An Experiment in Incentive-Based Welfare: The Impact of PROGRESA on Health in Mexico"

Raghabendra Chattopadhyay, India Institute of Management, and **Esther Duflo**, NBER and MIT, "Women's Leadership and Policy Decisions: Evidence From a Nationwide Randomized Experiment in India"

Joseph G. Altonji and **Christopher R. Taber**, NBER and Northwestern University, and **Todd E. Elder**, Northwestern University, "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools" (NBER Working Paper No. 7831)

Anne Case and **Christina Paxson**, NBER and Princeton University, and **Darren Lubotsky**, Princeton University, "Economic Status and Health in Childhood: The Origins of the Gradient"

Sacerdote uses data on adopted children to examine the treatment effects of family environment on childrens' educational and labor market outcomes. He uses four datasets containing information on adopted children, their adoptive parents, and their biological parents. In at least two of the four, the mechanism for assigning children to adoptive parents is fairly random and does not match children to adoptive parents based on health, race, or ability. Sacerdote finds that adoptive parents' education and income have a modest impact on child test scores but a large impact on college attendance, marital status, and earnings. In contrast with other work on IQ scores, he does not find that the influence of adoptive parents declines with child age.

Figlio and **Lucas** explore the effects of high grading standards on student test performance in elementary school. This paper provides the first empirical evidence on the effects of grading standards, measured at the teacher level. Using an exceptionally rich set of data including every third, fourth, and fifth grader in a large school district over four years, the authors match students' gains in test scores and their disciplinary problems to teacher-level grading standards. In models that control for student-level fixed effects, there is substantial evidence that higher grading standards benefit students. But these effects are not uniform: high-achieving students apparently benefit most from high standards when they are in a relatively low-achieving class; low-achieving students benefit most from high standards when they are in a relatively high-achieving class.

Gertler and **Boyce** investigate the impact on health outcomes of a unique anti-poverty program in Mexico: PROGRESA, which combines a traditional cash transfer program with financial incentives for families to invest in human capital of children (health, education, and nutrition). In order to receive the cash transfer, household members must participate in a series of preventive health and nutrition activities including prenatal care, nutrition monitoring and supplementation programs, preventive check ups, and health education programs. The authors find that the program significantly increased use of public health clinics for preventive care. The program also lowered the number of inpatient hospitalizations and visits to private providers, which suggests that PROGRESA lowered the incidence of severe illness. Also, there is significant improvement in the health of both children and adults. Specifically, treatment children have a 15 percent lower incidence of illness, are 1-3 percent taller, about 3.5 percent heavier, and have about a 28 percent lower incidence of anemia. Adults had far fewer days of difficulty with daily activities because of illness, the number of days in bed, and days incapacitated. Adults also reported a significant increase in the number of kilometers they were able to walk without getting tired.

Chattopadhyay and **Duflo** use the policy of political reservation for women adopted in India to study the impact of women's leadership on policy decisions. In 1998, one third of the positions of chief of the Village Councils of India were randomly selected to be reserved for women: in reserved village councils, only women could be candidates for the position of head. The Village Councils are responsible for the provision of many local public goods in rural areas. Using a dataset on 165 Village Councils, the authors compare the type of public goods provided in reserved versus unreserved Village Councils. They show that women invest more in infrastructure that is directly relevant for rural women (water, fuel, and roads), while men invest more in education. The participation of women in the policymaking process is higher in reserved Village Councils, but there is no evidence of any difference between the level of efficiency and corruption of women and men.

Altonji, **Elder**, and **Taber** measure the effect of attendance in a Catholic high school on educational attainment and test scores. They develop certain new estimation methods and a way to assess selectivity bias. They use their methods to estimate the effect of attending a Catholic high school on a variety of outcomes. Their main conclusion is that Catholic high schools substantially increase the probability of graduating from high school and, more tentatively, college attendance. They do not find much evidence for an effect on test scores.

Case, **Lubotsky**, and **Paxson** assess the mechanisms that run from income to health by focusing on children. Generally children in the United States do not contribute to the family income, and the correlation between poor health in childhood and low family income therefore cannot be explained by lower earnings of children (although it should be noted that ill children could reduce parental labor supply). By focusing on children, the authors eliminate the channel that runs from health to resources. Using a variety of cross-sectional and panel datasets for the United States from the mid-1980s to 1997, the authors find that the gradient observed in adulthood is present for children from their first year to age 17. Moreover, the gradient of health with respect to income becomes steeper with age. Small but significant differences among 5-year-olds become more pronounced for 10-year-olds, and larger still for 15-year-olds. In addition, the response of health to chronic illnesses is one important mechanism through which income affects the health status of children. Not only are poor children significantly more likely to suffer from asthma (for example) but, among children with asthma, health status is more seriously compromised for poor children than for rich ones. The authors' panel data estimates are consistent with a model in which the effects of low long-run average income are cumulative over a child's life.

Public Economics

The NBER's Program on Public Economics, directed by James M. Poterba of MIT, met in Cambridge on April 6. The following four papers were presented and discussed:

Leora Friedberg, NBER and University of Virginia, and **Anthony Webb**, University of California, San Diego, "The Impact of 401(k) Plans on Retirement"

Discussant: Andrew Samwick, NBER and Dartmouth College

Mark H. Lang and **Edward L. Maydew**, University of North Carolina, and **Douglas A. Schackleford**, NBER and University of North Carolina, "Bringing Down the Other Berlin Wall: Germany's Repeal of the Corporate Capital Gains Tax"

Discussant: William M. Gentry, NBER and Columbia University

Douglas Holtz-Eakin, NBER and Syracuse University, and **Donald Marples**, Syracuse University, "Distortion Costs of Taxing Wealth Accumulation: Income versus Estate Taxes" (NBER Working Paper No. 8261)

Discussant: William Gale, Brookings Institution

B. Douglas Bernheim and **Antonio Rangel**, NBER and Stanford University, and **Luis Rayo**, Stanford University, "A Theory of Legislative Policymaking, Part 1: Basic Institutions"

Discussant: Stephen Coate, NBER and Cornell University

In 1993, nearly 40 million people were covered by a 401(k) plan, up from about 7 million in 1983. Previous research showed that the spread of defined benefit plans with sharp age-related incentives, first discouraging and later encouraging retirement, contributed to the early retirement trend of past decades. Defined contribution plans differ along several dimensions, especially in their smooth rate of pension wealth accrual. **Friedberg** and **Webb** use data from the Health and Retirement Study to show that retirement patterns have begun to change as defined contribution plans have spread. Their estimates indicate that the financial incentives in defined benefit pensions lead people to retire almost two years earlier on average, compared to people with defined contribution plans.

Faced with pressure from increased global competition and capital mobility, Germany's government made a surprise announcement in December 1999 that it would repeal the long-standing capital gains tax on sales of corporate cross-holdings. The repeal was hailed as a revolutionary step toward breaking up Germany's complex web of cross-ownership. When the changes become effective in 2002, Germany will move from having one of the most punitive taxes on corporate capital gains to having the smallest among major industrial countries. **Lang**, **Maydew**, and **Shackleford** use Germany as a natural experiment to study the extent to which taxes present a barrier to the efficient acquisition and divestiture of stakes in other firms. In particular, they examine the stock market response by German firms to the announcement that capital gains taxes on inter-company holdings would be eliminated. They find a positive association between a firm's abnormal stock returns and the extent of its cross-holdings, consistent with taxes acting as a barrier to efficient allocation of ownership and investment. However, the reaction is limited to the largest banks and insurers and their extensive minority holdings in industrial firms, suggesting that taxes are not the binding constraint preventing most firms from divesting their cross-holdings.

Holtz-Eakin and **Marples** develop a framework for computing the deadweight loss of a revenue-neutral switch from an estate tax to a capital income tax. They focus on the potential lifetime behavioral responses in anticipation of paying the estate tax. They conclude that eliminating the estate tax and replacing its revenue with that from a capital income tax likely will enhance economic efficiency. Specifically, they estimate that the mean decrease in deadweight loss is $.018 per dollar of wealth. However, their estimates are based on data that do not contain the "super rich" who are most deeply affected by the estate tax.

Bernheim, **Rangel**, and **Rayo** propose and explore a general framework for modeling legislative institutions. Their analysis reveals a surprisingly robust tendency for a natural class of legislative institutions to produce high concentrations of political power. For the simplest institutions they consider, the authors identify surprisingly weak conditions under which the legislator with the last opportunity to make a proposal is effectively a dictator. Moreover, this outcome is more likely to arise when more legislators have opportunities to make proposals. Thus, seemingly democratic (inclusive) reforms can have the perverse effect of further concentrating political power. Super-majority requirements do little to overcome the dictatorial power of the final proposer. When the rules of the legislature permit members to bring deliberations to a close through collective action, the power of the last proposer may evaporate.

However, the particular outcome depends on the details of the closure rules. When legislators are not permitted to bundle policy proposals with closure motions, one can obtain almost anything from inaction to a universalistic outcome, depending on the initial status quo.

Corporate Finance

Members and guests of the NBER's Program on Corporate Finance met in Cambridge on April 20. Program Director Raghuram G. Rajan chose the following papers for discussion:

Raymond Fisman, Columbia University, and **R. Glenn Hubbard**, NBER and Columbia University, "Endowments, Governance, and the Nonprofit Form"

Tobias J. Moskowitz and **Annette Vissing-Jorgensen**, University of Chicago, "The Private Equity Premium Puzzle"

Julie Wulf, University of Pennsylvania, "Do CEO's of Target Firms Trade Power for Premium? Evidence From 'Mergers of Equals'"

Alberto Bisin, New York University, and **Anriano A. Rampini**, Northwestern University, "Exclusive Contracts and the Institution of Bankruptcy"

Andrei Shleifer, NBER and Harvard University, and **Robert W. Vishny**, NBER and University of Chicago, "Stock Market Driven Acquisitions"

Owen A. Lamont, NBER and University of Chicago, and **Christopher Polk**, Northwestern University, "Does Diversification Destroy Value? Evidence from Industry Shocks"

Mark J. Roe, Harvard University, "The Quality of Corporate Law Argument and its Limits"

Simon Johnson, NBER and MIT, and **Todd Mitton**, Brigham Young University, "Who Gains from Capital Controls? Evidence from Malaysia"

Nicola Cetorelli, Federal Reserve Bank of Chicago, "Does Bank Concentration Lead to Concentration in Industrial Sectors?"

In for-profit enterprises, shareholders are the residual bearers of risk. By contrast, because nonprofits have no residual claimants, something else must absorb financial shocks to the organization. Nonprofit managers often describe the endowment, or fund balance, as serving this function. In this paper, **Fisman** and **Hubbard** examine the role of the endowment as a precautionary savings device for nonprofit organizations. They find very strong evidence in support of the role of the endowment in allowing for smoothing of program expenditures. However, providing managers with a large discretionary fund raises significant concerns regarding the governance of the organization. The authors are also concerned with free cash flow in for-profit enterprises when shareholders do not carefully monitor the behavior of managers, and about the possibility of expropriation of discretionary funds by nonprofit managers. Taking advantage of differences in nonprofit oversight across states in the United States, the authors show that organizations in poor governance states, relative to strong governance states: have managerial compensation that is more highly correlated with inflows of donations; derive a smaller percentage of their revenues from donations; and save a smaller proportion of current donations for future expenditures. This provides some evidence of governance problems in the nonprofit form, and suggests an important role for oversight for overcoming these difficulties.

Moskowitz and **Vissing-Jorgensen** document that investment in private equity is extremely concentrated. Yet despite the very poor diversification of entrepreneurs' portfolios, the returns to private equity are similar to the returns on public equity. Given the large premium required by investors in public equity, it is puzzling why households willingly invest substantial amounts in a single privately held firm with a far worse risk-return tradeoff. The authors examine various explanations and conclude that private nonpecuniary benefits of control must be large and/or entrepreneurs must greatly overestimate their probability of success in order to explain the observed concentration of wealth in private equity.

Wulf studies abnormal returns in a sample of "mergers of equals" transactions in which the two firms are approximately equal in post-merger shareholdings and board representation. Mergers of equals (MOEs) are friendly mergers generally characterized by extensive pre-merger negotiations between firms with comparable bargaining positions resulting in both lower target premiums and greater shared control (board and management) between target and acquiring firms. On average, acquirer shareholders capture more of the gains in MOEs measured by event returns, while target shareholders capture less, in comparison to a matched sample of transactions with unequal board representation ("mergers of non-equals" or MONEs). However, the value created by MOEs measured by combined event returns is not significantly different than the matched sample. Moreover, both the value created and target shareholders' capture of the gains are related systematically to variables representing control fights in the merged firm. The evidence suggests that target CEOs with stronger bargaining positions and incentives negotiate shared control in the merged firm in exchange for lower target shareholder premiums.

Bisin and **Rampini** suggest a motivation for the institution of bankruptcy: whenever exclusive contracts cannot be enforced ex ante, for example a bank cannot monitor whether the borrower enters into contracts with other creditors, bankruptcy enables the enforcement of exclusivity ex post, and hence relaxes the incentive constraints. In general, though, while a bankruptcy institution improves on non-exclusive contractual relationships, it is not a perfect substitute for ex ante exclusivity.

Shleifer and **Vishny** present a model of mergers and acquisitions based on stock market misvaluations of the combining firms. The model explains who acquires whom, whether the medium of payment is cash or stock, what the valuation consequences of mergers are, and why there are merger waves. Some of the key predictions of the model are: 1) acquisitions are disproportionately for stock when market valuations are high, and for cash when they are low; 2) targets in cash acquisitions earn low returns prior to the acquisitions, whereas bidders in stock acquisitions earn high returns; 3) long-run returns to bidders in stock acquisitions are likely to be negative, while those to bidders in cash acquisitions are likely to be positive; 4) despite negative long-run returns, acquisitions for stock serve the interest of long-run shareholders of the bidder; 5) diversification strategies serve the interest of bidding shareholders even when they earn negative announcement returns; 6) such diversifying acquisitions are likely to be for stock; 7) management resistance to cash tender offers is often in the interest of shareholders; and 8) acquisition targets are likely to have managers and shareholders with relatively shorter horizons than the bidders.

Lamont and **Polk** examine changes in the within-firm dispersion of industry investment, or "diversity." They find that exogenous changes in diversity, caused by changes in industry investment, are related negatively to firm value. Thus diversification destroys value, consistent with the inefficient internal capital markets hypothesis. Measurement error does not cause this finding. Also, exogenous changes in industry cash flow diversity are related negatively to firm value.

Roe notes that strong theory has emerged in recent years that the quality of corporate law determines whether securities markets will arise, whether ownership will separate from control, and whether the modern corporation will prosper. Ownership cannot readily separate from control when managerial agency costs are especially high. Further, the business judgment rule, under which judges do not second-guess managerial mistakes, puts the full panoply of agency costs – such as over-expansion, overinvestment, and reluctance to take on profitable but uncomfortable risks – beyond any direct legal inquiry. The consequence is that even if corporate law as usually conceived is "perfect," it eliminates self-dealing, not managerial mistakes. But managers can lose for shareholders as much, or more, than they can steal from them, and law controls only the second cost, not the first. If the risk of managerial error varies widely from nation to nation, or from firm-to-firm, then ownership structure should vary equally widely, even if conventional corporate law tightly protects shareholders. There is also good reason, and some new data, consistent with this analysis: by measurement, several nations have fine enough corporate law; distant stockholders are well-protected from controlling stockholder and managerial thievery, but uncontrolled agency costs seem to be especially high in those very nations.

The stock prices of politically connected Malaysian firms fell disproportionately in the early stages of the Asian financial crisis but rose more than the market once capital controls were imposed in September 1998. Capital controls primarily benefited well-connected firms without access to international capital markets. These results hold for both financial and non-financial firms separately and are robust to controlling for firm size, sector, profitability, pre-crisis growth, and whether a firm is favored because it is officially Bumiputera (with ethnic Malay ownership over 50 percent). **Johnson** and **Mitton's** findings are consistent with the view that capital controls provide a screen behind which politicians can support particular firms.

Cetorelli explores the effect of banking market structure on the market structure of industrial sectors. She asks whether concentration in the banking market promotes the formation of industries constituted by a few, large firms, or rather, whether it facilitates the continuous entry of new firms, thus maintaining unconcentrated market structures across industries. From a sample of 35 manufacturing industries in 17 OECD countries, and adopting a methodology that allows controlling for other determinants of industry market structure common across industries or across countries, Cetorelli finds that bank concentration enhances industries' market concentration, especially in sectors highly dependent on external finance. That effect is weaker however in countries characterized by higher overall financial development.

Monetary Economics

The NBER's Program on Monetary Economics, directed by Ben S. Bernanke of Princeton University, met in Cambridge on April 27. The following papers were discussed:

George W. Evans, University of Oregon, and **Seppo Honkapohja**, University of Helsinki, "Expectations and the Stability Problem for Optimal Monetary Policies"

Discussant: Bennett McCallum, NBER and Carnegie-Mellon University

Eric T. Swanson, Federal Reserve Board, "Optimal Nonlinear Policy: Signal Extraction with a Non-Normal Prior"

Discussant: Noah Williams, University of Chicago

Susan Athey, NBER and MIT; **Andrew Atkeson**, NBER and University of California, Los Angeles; and **Patrick J. Kehoe**, NBER and University of Minnesota, "On the Optimality of Transparent Monetary Policy"

Discussant: Jon Faust, Federal Reserve Board

Robert J. Barro, NBER and Harvard University, and **Sivana Tenreyro**, Harvard University, "Closed and Open Economy Models of Business Cycles with Marked Up and Sticky Prices" (NBER Working Paper No. 8043)

Discussant: Mark Bils, NBER and University of Rochester

Christopher Otrok, University of Virginia; **B. Ravikumar**, Pennsylvania State University; and **Charles H. Whiteman**, University of Iowa, "Habit Formation: A Resolution of the Equity Premium Puzzle?"

Discussant: John C. Heaton, NBER and University of Chicago

Susanto Basu and **Miles S. Kimball**, NBER and University of Michigan, "Long-Run Labor Supply and the Elasticity of the Intertemporal Substitution for Consumption"

Discussant: Robert E. Hall, NBER and Stanford University

A fundamentals-based monetary policy rule, which would be optimal without commitment when private agents have perfectly rational expectations, is unstable if these agents in fact follow standard adaptive learning rules. This problem can be overcome if private expectations are observed and suitably incorporated into the policymaker's optimal rule. These strong results extend to the case in which there is simultaneous learning by the policymaker and the private agents. **Evans** and **Honkapohja** show the importance of conditioning policy appropriately, not just on fundamentals, but also directly on observed household and firm expectations.

Swanson offers a possible theoretical explanation for the Federal Reserve's relatively laissez-faire attitude toward historically low unemployment in the late 1990s. In models of optimal monetary policy under uncertainty, assumptions must be made about the structure of the economy and policymakers' beliefs about unobserved and uncertain variables, such as the natural rate of unemployment. Previous studies in the literature have made the simplifying assumption that these beliefs have a normal (Gaussian) distribution. Swanson relaxes this assumption to accommodate beliefs that are more diffuse (uncertain) in a region around the mean. He argues that this is a more plausible model given the possibility of structural change that many argued was occurring in the economy around that time. Swanson demonstrates that it becomes optimal for policymakers to be more open-minded and set interest rates more cautiously in response to observable indicators, such as unemployment, while at the same time becoming increasingly more aggressive at the margin. This model appears to match well statements by Federal Reserve officials, and the historical behavior of the Fed, in the late 1990s.

Athey, **Atkeson**, and **Kehoe** analyze the optimal design of monetary rules. They suppose that there is an agreed upon social welfare function which depends on the randomly fluctuating state of the economy and that the monetary authority has private information about that state. They further suppose that the government can constrain the policies of the monetary authority by legislating a rule. Surprisingly, the authors show that for a wide variety of circumstances the optimal rule gives the monetary authority no flexibility. This rule can be interpreted as a strict inflation targeting rule where the target is a prespecified function of publicly observed data. In this sense, optimal monetary policy is transparent.

Shifts in the extent of competition, which affect markup ratios, are possible sources of aggregate business fluctuations. Markups are countercyclical, and booms are times at which the economy operates more efficiently. **Barro** and **Tenreyro** begin with a real model in which markup ratios correspond to the prices of differentiated intermediate inputs relative to the price of undifferentiated final product. If the nominal prices of the differentiated goods are relatively sticky, then unexpected inflation reduces the relative price of intermediates and thereby mimics the output effects from an increase in competition. In an open economy, domestic output is stimulated by reductions in the relative price of foreign intermediates and, therefore, by unexpected inflation abroad. The various versions of the model imply that the relative prices of less competitive goods move countercyclically. The authors find support for this hypothesis from price data of four-digit manufacturing industries.

Otrok, **Ravikumar**, and **Whiteman** explore how the introduction of habit preferences into the simple intertemporal consumption-based capital asset pricing model "solves" the equity premium and risk-free rate puzzles. While agents with time-separable preferences care only about the overall volatility of consumption, the authors show that agents with habit preferences care not only about overall volatility, but also about the temporal distribution of that volatility. Specifically, habit agents are much more averse to high-frequency fluctuations than to low-frequency fluctuations. In fact, the size of the equity premium in the habit model is determined by a relatively insignificant amount of high-frequency volatility in the U.S. consumption. Further, the model's premium and returns are very sensitive to changes in characteristics of the stochastic process for consumption, changes that have been dramatic during the twentieth century. The model also carries counterfactual implications the equally dramatic changes in the equity premium and risk-free rate observed over the last hundred years.

According to **Basu** and **Kimball**, the fact that permanent increases in the real wage have very little effect on labor supply implies a parameter restriction in the consumption Euler equation augmented by predictable movements in the quantity of labor. This parameter restriction is confirmed with aggregate U.S. data. The implied estimate of the elasticity of intertemporal substitution is around .35, and is significantly different from zero. This estimate is robust to different instrument sets and normalizations. After accounting for the effects of predictable movements in the labor implied by the restriction, there is no remaining evidence in aggregate U.S. data of excess sensitivity of consumption to current income.

Higher Education

The NBER's Working Group on Higher Education, directed by Charles T. Clotfelter of Duke University, met in Cambridge on May 10 to discuss these papers:

Charles T. Clotfelter and **Jacob L. Vigdor**, Duke University, "Retaking the SAT"

Discussant: Christopher Avery, Harvard University

A. Abigail Payne, University of Illinois, "The Impact of State Governance Structures on Research Productivity at Public Universities"

Discussant: Michael Rothschild, NBER and Princeton University

Orley C. Ashenfelter, NBER and Princeton University, and **David Card**, NBER and University of California, Berkeley, "How Did the Elimination of Mandatory Retirement Affect Faculty Retirement?"

Discussant: Ronald G. Ehrenberg, NBER and Cornell University

Peter Arcidiacono, Duke University, "Affirmative Action in Higher Education: How do Admission and Financial Aid Rules Affect Future Earnings?"

Discussant: Jill Constantine, Williams College

Sarah Turner, University of Virginia, and **John Bound**, NBER and University of Michigan, "Closing the Gap or Widening the Divide: The Effects of the G.I. Bill and World War II on the Educational Outcomes of Black Americans"

Discussant: Susan Dynarski, NBER and MIT

Jennifer Ma, TIAA-CREF Institute, "The Differential Impact of College Cost on the Enrollment of Students from the Different Socioeconomic Backgrounds"

Discussant: Bruce Sacerdote, NBER and Dartmouth College

Clotfelter and **Vigdor** analyze a college applicant's decision to retake the SAT. Nationwide, roughly half the college applicants take the test more than once; among applicants to selective institutions, the frequency of retaking is significantly higher. This analysis uses data on applicants to three selective universities and a numerical simulation in which the process of receiving draws from a distribution of possible test scores is likened to an optimal search problem. The authors show that the most common test score ranking policy, which focuses on the highest of all submitted scores, provides large incentives to retake the test, since applicants always expect to receive positive benefits upon retaking. Current policy places certain applicants at a disadvantage: those with high costs of taking the test, low values attached to college admission, or "pessimistic" prior beliefs regarding their own ability. These disadvantaged applicants are disproportionately likely to come from low-income African-American families.

Payne examines the role of state

governing boards on research productivity at public universities in the United States. Using a panel dataset that covers 1982 to 1998, she explores the relationship between research funding and research activities for three types of governance structures: centralized governing board; a coordinating board with some regulatory authority; and a decentralized coordinating board or planning agency. This paper demonstrates, on average, that fewer articles are published and there are fewer citations per article published with an additional dollar of research funding at universities in states with a highly centralized state governing board. The highest level of productivity with respect to publications is seen at universities in states with a coordinating board with regulatory authority over program approval and some oversight of universities' budgets. Additional research funding increases citations per article at these universities, on average, by between 1.5 and two times the amount for universities in states with a decentralized governance structure. These results suggest that while centralized oversight reduces productivity, decentralization may not be the solution.

Ashenfelter and **Card** use information on retirement flows from 1986-96 for older faculty at a large sample of four-year colleges and universities to measure the effect of the elimination of mandatory retirement. Comparisons of retirement rates before and after 1994, when most institutions were forced to stop mandatory retirement, suggest that the abolition of compulsory retirement led to a dramatic drop in retirement rates at ages 70 and 71. Comparisons of retirement rates in the early 1990s between schools that were still enforcing mandatory retirement and those that were forced to stop by state laws lead to the same conclusion. In the era of mandatory retirement, fewer than 10 percent of 70-year-old faculty were still teaching two years later. After the elimination of mandatory retirement, this fraction has risen to 50 percent. These findings suggest that most U.S. colleges and universities will experience a significant rise in the fraction of older faculty in the coming years.

Arcidiacono addresses how changing the admission and financial aid rules at colleges can affect future earnings. He estimates a model that includes decisions by individuals about where to submit applications, which school to attend, and what field to study, as well as decisions by schools as to which students to accept and how much financial aid to offer. Throughout, individuals have rational expectations and maximize the present value of lifetime utility, recognizing the dependence of future utility on choices made today. By estimating the whole process, it is possible to see how the decision-making behavior, and the corresponding future earnings associated with these decisions, would be affected by changing the admission and financial aid rules.

Turner and **Bound** ask whether black Americans responded similarly to white men to the G.I. Bill and World War II. There are good reasons to believe that the effects of the G.I. Bill may have differed for black Americans because of differential returns to education in the labor market and differences in opportunities at educational institutions, with men in the South facing explicit segregation in educational institutions. The question of whether black veterans from segregated and unsegregated parts of the country demonstrated similar educational adjustments is significant for the overall evaluation of the G.I. Bill and for the contemporary policy debate on the effectiveness of federally sponsored aid to education. The empirical evidence suggests that World War II and the availability of G.I. benefits had a substantial and positive impact on the educational attainment of those likely to have access to colleges and universities outside the South. However, for those black veterans more likely to be limited to the South in their collegiate choices, the G.I. Bill had little effect on educational outcomes, resulting in the exacerbation of the economic and educational differences between blacks and whites.

While numerous studies have estimated the impact of college cost on enrollment rates, very few have used the duration of enrollment or completed schooling as an outcome measure. **Ma** examines the impact of public in-state tuition cost and state grant aid on the enrollment rates and duration of enrollment, paying particular attention to the differential impact of cost on students from different income and race groups. Her results suggest that public in-state two-year tuition has a strong impact on enrollment rates while public in-state four-year tuition generally has a negligible impact on enrollment rates. Further, the enrollment rates of low-income and middle-income students are more sensitive to public two-year tuition costs than the enrollment rates of high-income students. The enrollment rate of black students is more sensitive to tuition cost than that of white and Hispanic students. Further, the enrollment rates of middle-income students and Hispanic students appear to be the most sensitive to state grant aid. Results from enrollment duration models suggest that tuition cost and financial aid in general have a small or negligible impact on the duration of enrollment. This is consistent with the argument that there is a barrier to college entry. Once students cross that barrier, tuition does not seem to matter much to completed schooling.

Market Microstructure

Members of the NBER's Working Group on Market Microstructure met in Cambridge on May 11. Organizers Bruce Lehmann, University of California, San Diego; Andrew Lo, NBER and MIT; Matthew Spiegel, Yale University; and Avanidhar Subramanyam, University of California, Los Angeles, chose these papers to discuss:

Amber Anand and **Daniel G. Weaver**, Baruch College, "The Value of the Specialist: Empirical Evidence from the CBOE"

Discussant: Kumar Venkataraman, Southern Methodist University

Alex Boulatov and **Dirk Hackbarth**, University of California, Berkeley, "A Model of Liquidity Risk in Dynamic Economies"

Discussant: Harry Mamaysky, MIT

Malay K. Dey, University of Massachusetts, Amherst, and **B. Radhakrishna**, University of Minnesota, "Institutional Trading, Trading Volume, and Spread"

Discussant: Jennifer Koski, University of Washington

Mark Coppejans, Duke University; Ian Domowitz, Pennsylvania State University; and **Ananth Madhavan**, ITG, Inc., "Liquidity in an Automated Auction"

Discussant: Chester Spatt, Carnegie-Mellon University

Pankaj Jain, Indiana University, "Institutional Design and Liquidity on Stock Exchanges"

Discussant: Venkatesh Panchapagesan, Washington University

Amy K. Edwards, Securities and Exchange Commission, and **Jeffrey H. Harris**, University of Notre Dame, "Stepping Ahead of the Book"

Discussant: Simon Gervais, University of Pennsylvania

Using proprietary data and an event unique in the history of financial markets, **Anand** and **Weaver** study the value that a specialist system adds vis-à-vis a multiple market maker system. Specifically, they analyze the "natural experiment" of the institution of a specialist system for equity options on the Chicago Board Options Exchange (CBOE) in the second half of 1999. The literature predicts a decrease in spreads and an increase in depth attributable to the change to a specialist system on the CBOE; their findings support these hypotheses. The changes are more pronounced for lower volume securities and smaller trades. There is also limited evidence that the market share of the CBOE increases in the period after the option class moves on to the specialist system, suggesting increased competitiveness for the CBOE. The authors also analyze the implications of the move arising from single listing of certain options and the lack of a national market system for options during the sample period.

Boulatov and **Hackbarth** analyze a continuous auction model of liquidity risk in asset markets with symmetrically informed agents. Buyers and sellers maximize their expected payoffs in the presence of liquidity shocks when they participate in an auction where different sellers have different reservation prices. The heterogeneous initial distribution of reservation prices across the agents may originate from different prior expectations of bargaining outcomes. The authors endogenously derive bargaining shares and optimal expected holding periods for markets with homogeneous and heterogeneous sellers where bidders encounter a tradeoff between the winners' curse and choosing to deal with higher reservation price sellers. For buyers and sellers solving a dynamic programming problem, the authors derive a set of partial differential equations for the optimal trading strategies of both types of agents. They then analyze how the optimal bargaining strategies lead to the steady-state equilibrium and show that this equilibrium is characterized by equal expected payoffs across the agents with different priors. After linearizing around the equilibrium, they perform a stability analysis and provide a closed-form solution for competing buyers and sellers. The optimal holding period in this case occurs because of the option of "early trading" when trading takes place before the equilibrium is established. In particular, this real option entails a tradeoff between selling to a distressed buyer versus the liquidity risk resulting from immediate disposal of the asset under unfavorable terms.

Besides its academic interest, the effect of institutional trading on the bid-ask spread is of interest to regulators and market makers. It is often (casually) argued that greater institutional participation results in increased volatility in the market. On the other hand, some argue that greater liquidity trading by institutions reduces spread. There is no direct empirical evidence and little theoretical knowledge to suggest a convincing relationship between institutional trading and spread. In this paper, **Dey** and **Radhakrishna** present some evidence on the nature and effect of institutional trading on spreads. They argue that institutional trading is not completely information driven; part of it is liquidity trading in nature. The authors find that information induced institutional trading increases the adverse selection component. However, large volume (liquidity) trading reduces the order processing costs. The net effect of institutional trading on spread is consistently negative. Moreover, institutional buys have differential information from sells. Institutional trades per se reduce spreads, but only sells increase the adverse selection component. Both effective and relative spreads impound the differential nature of institutional buys and sells.

The use of automated auctions to trade equities, derivatives, bonds, and foreign exchange has increased dramatically in recent years. Trading in automated auctions occurs through an electronic limit order book without the need for dealers. Automated auctions offer advantages of speed and simplicity, but depend on public limit orders for liquidity. To the extent that liquidity varies over time, it affects trading costs, volatility, and induces strategic behavior by traders. Time variation in liquidity is also of considerable importance because liquidity affects expected returns. **Coppejans**, **Domowitz**, and **Madhavan** use data from an automated futures market to analyze the dynamic relationship between market liquidity, returns, and volatility. They find that there is wide intertemporal variation in aggregate market liquidity, measured by the depth of the limit order book at a point in time. Discretionary traders trade in high liquidity periods, reinforcing the concentration of volume and liquidity at certain points in time. These results are consistent with models where liquidity is a factor in expected returns, but also suggest more complicated dynamics consonant with supply and demand imbalances in the market. While increases in liquidity substantially reduce volatility, volatility shocks reduce liquidity over the short run, impairing price efficiency. These effects dissipate quickly, however, and their magnitudes are small, indicating a high degree of market resiliency.

Jain analyzes the impact of various institutional features of stock exchanges on their performance in a unified framework. He assembles the institutional design features including organizational structure, trading mechanism, trade-execution system, transparency, degree of market fragmentation, age, and ownership for 51 major exchanges around the world. For these exchanges, representing over 90 percent of the world's market capitalization, their institutional features are linked with various performance measures, namely quoted bid-ask spreads, effective spreads, realized spreads, volatility, and trading turnover. Jain uses a simultaneous-system-of-equations model to explain linkages between the different measures of performance. He finds that hybrid systems have lower spreads and volatility than pure limit order systems, which in turn have lower spreads and volatility than pure dealership systems. Stock exchanges with bid-ask spreads have narrower tick sizes, competitive market makers, electronic limit order books, automatic execution of trades, centralized trading, and enforcement of insider trading laws. These results do not support theories that predict better liquidity for a monopolistic specialist system, or an electronic open limit order book with no dealers. Spreads are directly related to return volatility but inversely related to market capitalization on a global basis. The analysis has important policy implications for security lawmakers implementing fairness and transparency, companies seeking global listings, investors forming trading strategies, and stock exchanges altering their institutional design to increase competitiveness.

Stepping-ahead occurs when specialists trade at prices incrementally better than the best prices in the limit order book. Stepping ahead benefits market orders that receive a better price but it delays or prevents limit order executions. **Edwards** and **Harris** find that limit orders incur higher costs when the specialist steps ahead. As U.S. markets trade in decimals, market orders receive less price improvement, and the cost of stepping ahead decreases. Smaller ticks magnify the agency problems between specialists and the limit orders they represent. Specialists rarely step ahead of limit orders (less than 2 percent of the time), but they step ahead more often after the tick size changes from $1/8 to $1/16. The cost to individual limit orders is actually lower with smaller ticks, but since specialists step ahead more often, aggregate limit order costs have risen. More importantly, the price improvement benefit to market orders falls significantly. Market orders benefit on net with a $1/8 tick but this benefit is eliminated with $1/16 ticks.

Behavioral Finance

The NBER's Working Group on Behavioral Finance, organized by Robert J. Shiller, NBER and Yale University, and Richard H. Thaler, NBER and University of Chicago, met in Chicago on May 25. The following papers were discussed:

Dilip J. Abreu and **Markus K. Brunnermeier**, Princeton University, "Bubbles and Crashes"

Discussant: Ming Huang, Stanford University

Shlomo Benartzi, University of California at Los Angeles, and **Richard H. Thaler**, "How Much is Investor Autonomy Worth?"

Discussant: Andrew Metrick, NBER and University of Pennsylvania

Randolph B. Cohen, Harvard University, and **Paul A. Gompers** and **Tuomo O. Vuolteenaho**, NBER and Harvard University, "Who Underreacts to Cash-Flow News? Evidence from Trading Between Individuals and Institutions"

Discussant: Kent Womack, NBER and Dartmouth College

Kent D. Daniel, NBER and Northwestern University, and **Sheridan Titman**, NBER and University of Texas, "Market Reactions to Tangible and Intangible Information"

Discussant: Nicholas C. Barberis, NBER and University of Chicago

Jeffrey Pontiff, University of Washington, and **Michael J. Schill**, University of California at Riverside, "Long-Run Seasoned Equity Offering Returns: Data Snooping, Model Misspecification, or Mispricing? A Costly Arbitrage Approach"

Discussant: William N. Goetzmann, NBER and Yale University

Wesley S. Chan, MIT, "Stock Price Reactions to New and No News: Drift and Reversal After Headlines"

Discussant: Jay Ritter, University of Florida

Abreu and **Brunnermeier** present a model in which an asset bubble can persist despite the presence of rational arbitrageurs. The resilience of the bubble stems from the inability of arbitrageurs to coordinate their selling strategies temporarily. This *synchronization* problem, together with the individual incentive *to time the market*, results in the persistence of bubbles over a substantial period of time. The model provides a natural setting in which public events, by enabling synchronization, can have a disproportionate effect relative to their intrinsic informational content.

There is a worldwide trend towards increasing autonomy among investors; investors increasingly are able to pick their own portfolios. But how good a job are they doing? **Bernartzi** and **Thaler** present individuals who are saving for retirement with information about the distribution of outcomes they could expect from the portfolios they picked and also about the median portfolio selected by their peers. A majority of these survey participants actually prefer the median portfolio to the one they picked for themselves. Furthermore, a majority of investors who preferred to form their own portfolio rather than to accept one that was picked for them by a professional investment manager also preferred the distribution of returns implied by the suggested portfolio to the one they had selected on their own. The authors investigate various alternatives to these findings and offer some evidence to support the view that some of the results are attributable to the fact that investors do not have well-defined preferences.

A large body of literature suggests that firm-level stock prices "underreact" to news about future cash flows. **Cohen, Gompers,** and **Vuolteenaho** examine the joint behavior of returns, cash-flow news, and trading between individuals and institutions. They find that institutions buy shares from individuals in response to good cash-flow news, thus exploiting the underreaction phenomenon. Institutions are not simply following price momentum strategies: when price goes up in the absence of positive cash-flow news, institutions sell shares to individuals. The response of institutional ownership to cash-flow news is weaker for small stocks. Since small stocks also exhibit the strongest underreaction patterns, this finding is consistent with institutions facing exogenous constraints in trading small stocks.

Previous empirical studies suggest a negative relationship between fundamental performance over the past 3-5 years and future returns: distressed firms outperform more profitable firms. In fact, **Daniel** and **Titman** show that, after controlling for past stock returns, firms with higher past fundamental returns actually *outperform* weaker firms. These results are consistent with investors reacting appropriately to *tangible* information (that is, information that can be extracted from financial statements), but overreacting to *intangible* information. The authors explain these observations with a simple model based on the behavioral finding that investors are more overconfident about their ability to interpret intangible information than tangible information. Finally, Daniel and Titman reconcile their results with previous studies and show that firms which grow through share issuance experience low future returns, while firms that grow through increased profitability do not.

Pontiff and **Schill** use a new

approach and assess the behavior of returns after seasoned equity offerings. They recognize that sophisticated investors are motivated to correct mispricing, although the magnitude of that activity is influenced by the costs of arbitrage. Their evidence supports the contention that firms that conduct seasoned equity offerings are overpriced. This implies that because mispricing associated with seasoned equity offerings is persistent in the long run, holding costs play an important role but transaction costs do not. In fact, holding costs dominate the size effect that is documented in earlier research.

Chan examines returns to a subset of stocks after public news about them is released. He compares them to other stocks with similar monthly returns, but no identifiable public news. There is a major difference between return patterns for the two sets. The evidence suggests post-news drift, which supports the idea that investors underreact to information. This underreaction is strongest after bad news. Chan also finds some evidence of reversal after extreme price movements unaccompanied by public news. The patterns exist even after Chan excludes earnings announcements, controls for potential risk exposure, and makes other adjustments. However, they appear to apply mainly to smaller stocks. Chan also finds that trading frictions, such as short-sale constraints, may play a role in the post-bad-news drift pattern.

Bureau Books

Two Annual NBER Volumes now available from the MIT Press

Frontiers in Health Policy Research, Volume 4, edited by Alan M. Garber, and *Tax Policy and the Economy*, Volume 15, edited by James M. Poterba, are now available from the MIT Press. Both volumes present papers delivered at annual NBER conferences in Washington, D.C. The topics are timely and newsworthy, and the papers are written in a style that is accessible to policymakers and the interested public, as well as academic economists.

This volume of *Frontiers in Health Policy Research* includes papers on the costs and consequences of smoking, the market for long-term care, medical procedures at the end of life, and price indexes for the treatment of depression. Garber, the volume's editor, directs the NBER's Program of Research on Health Care and is a professor of economics at Stanford University.

This volume of *Tax Policy and the Economy* includes such topics as child benefits in the U.S. tax code, export incentives and the income tax, the effect of income and payroll taxes on families and on small firms, and an investment-based reform for Social Security. Poterba, the editor, directs the NBER's Program of Research on Public Economics and is a professor of economics at MIT.

Each volume costs $24.00 (paperback) and can be ordered directly from the MIT Press at 5 Cambridge Center, Cambridge, MA 02142; or by phone to 617-625-8569 or 1-800-356-0343; or by email to mitpress-orders@mit.edu.

The MIT Press also has a web site: **http://mitpress.mit.edu/.**

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

Medical Care Output and Productivity

Medical Care Output and Productivity, edited by David M. Cutler and Ernst R. Berndt, is now available from the University of Chicago Press for $80.00.

This NBER conference volume takes aim at the problem of how to measure the productivity of the medical care service industry. Much of this analysis focuses on the capacity to measure the value of technological change and other health care innovations. A key finding suggests that growth in health care spending has coincided with an increase in products and services that together reduce mortality rates and promote additional health gains. When appropriately adjusted for such quality improvements, health care prices actually may have fallen.

Cutler is a Research Associate of the National Bureau of Economic Research and a professor of economics at Harvard University. Berndt is Director of the NBER's Program on Productivity and a professor of applied economics at MIT's Sloan School of Management.

Prudential Supervision: What Works and What Doesn't

Prudential Supervision: What Works and What Doesn't, edited by Frederic S. Mishkin, is available from the University of Chicago Press for $50.00. This NBER Conference Report contains eight papers, seven commentaries, and seven discussion summaries developed from material presented at a conference in January 2000.

Prudential supervision guards against excessive risk taking, moral hazard, and corruption, using government regulation and monitoring to ensure the soundness of the banking system and, by extension, the economy at large. The contributors focus on fundamental issues and key pragmatic concerns; they foresee a continued movement beyond simple regulatory rules and toward a more active evaluation and supervision of risk management practices.

Mishkin is the Alfred Lerner Professor of Banking and Financial Institutions at the Graduate School of Business at Columbia University and a research associate of the NBER. He is also a former director of research and executive vice president of the Federal Reserve Bank of New York.

Regional and Global Capital Flows: Macroeconomic Causes and Consequences

Regional and Global Capital Flows: Macroeconomic Causes and Consequences, edited by Takatoshi Ito and Anne O. Krueger, is available from the University of Chicago Press for $75.00. This tenth volume in the NBER-East Asia Seminar on Economics series contains an introduction, ten papers, and twenty comments developed from material presented at an NBER conference. Contributors address different types of capital flows — bank lending, bonds, direct foreign investment — and the implications of each for economic performance. With its particular focus on the Asian financial crisis, this work presents a new model for policymakers everywhere in thinking about the role of private capital flows.

Ito is a professor in the Institute of Economic Research at Hitotsubashi University, Tokyo, and a research associate of the NBER. Krueger is the Herald L. and Caroline L. Ritch Professor of Economics at Stanford University and a research associate of the NBER.

New Developments in Productivity Analysis

New Developments in Productivity Analysis, edited by Charles R. Hulten, Edwin R. Dean, and Michael J. Harper, is available from the University of Chicago Press for $83.00. This volume in the NBER Studies in Income and Wealth series contains an introduction, fifteen papers, ten comments, and one authors' reply developed from material presented at a conference in Silver Spring, Maryland. The contributed papers re-examine fundamental questions of productivity measurement technique. For example, one paper presents an overview of the Bureau of Labor Statistics's measurement program; another discusses productivity comparisons in the service sector; and two of the chapters look at productivity in the coal industry and the agricultural sector, respectively.

Hulten is Chair of the NBER's Conference on Income and Wealth and a professor of economics at the University of Maryland. Dean is an adjunct professor of economics at George Washington University. Harper is chief of the Division of Productivity Research at the Bureau of Labor Statistics.