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Program Report

Taxation

David F. Bradford and James M. Poterba

The 1980s were a decade of remarkable change in tax policy. The top marginal federal income tax rate declined from 70 percent to 33 percent, the tax burden on capital gains declined and then rose, and corporations received more generous depreciation allowances than ever before—but only for a few years. These gyrations complicated the tasks of individual and corporate tax filers but provided an unprecedented set of policy experiments for tax economists.

Researchers in the NBER's Program in Taxation have now begun to analyze how these tax reforms have affected household and corporate behavior. Guided in part by unanswered questions that arose during the debates on the 1986 Tax Reform Act (TRA86), they also have been conducting basic research on the incentive and distributional effects of tax policy. The areas of study include emerging issues in international taxation, state and local public finance, fiscal policy and national saving, and tax policy toward housing.

Taxes and Household Behavior

It has been four years since the enactment of TRA86, but initial evidence on how the act affects certain individual decisions is just emerging. Daniel R. Feenberg and Jonathan S. Skinner investigate the saving behavior of contributors to individual retirement accounts (IRAs) *before* 1986 to evaluate how subsequent restrictions in eligibility may have affected saving.[1] They interpret their findings as suggesting that IRAs encourage saving, although they note in a later paper

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This issue of the *Reporter* highlights the Bureau's Program in Taxation. Next, Alan B. Krueger describes his research into the roles federal, state, and local governments play in the U.S. labor market. After a biographical sketch, news of NBER conferences, the Conference Calendar, and other NBER news and reports, the *Reporter* concludes with short summaries of recent NBER Working Papers.

that the complexity of TRA86 makes it difficult to draw firm conclusions about its net effect on saving.[2]

Several papers have contributed to the rapidly growing literature on how capital gains tax rates affect tax revenues and investor behavior. Joel B. Slemrod presents evidence that higher rates discourage realizations, although not by enough to reduce revenues.[3] Paul J. Bolster, Andrew W. Mitrusi, and Lawrence B. Lindsey examine patterns of stock market trading after the passage of TRA86 but before the law took effect.[4]

[1] *D. R. Feenberg and J. S. Skinner, "Sources of IRA Saving," NBER Working Paper No. 2845, February 1989.*

[2] *D. R. Feenberg and J. S. Skinner, "The Impact of the 1986 Tax Reform Act on Personal Saving," NBER Working Paper No. 3257, February 1990.*

[3] *J. B. Slemrod, "A North-South Model of Taxation and Capital Flows," NBER Working Paper No. 3238, January 1990.*

[4] *P. J. Bolster, A. W. Mitrusi, and L. B. Lindsey, "Tax-Induced Trading: The Effect of the 1986 Tax Reform Act on Stock Market Activity," NBER Working Paper No. 2659, July 1988.*

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They find that there was more abnormal volume in stocks with large gains than in those with smaller gains. This confirms the view that investors were realizing gains in anticipation of higher tax rates on capital gains.

Charitable contributions by individuals also are sensitive to tax policy. Charles T. Clotfelter shows that there has been relatively little decline in overall charitable giving since 1986, but a pronounced decline in gifts of appreciated property, such as "the Old Masters," to museums and universities.[5]

In a distinct strand of research, less concerned with recent tax reforms, Ann Dryden Witte and colleagues have explored how tax rates and other parameters of the tax environment such as audit rates affect taxpayer compliance.[6] These papers support the emerging consensus that reductions in marginal tax rates reduce the degree of noncompliance.

Taxes and Corporate Behavior

The fluid tax environment of the 1980s has underscored the need to model expected changes in tax policy when evaluating investment and other incentives. Alan J. Auerbach and James R. Hines, Jr., extend the usual cost-of-capital framework to allow for time-varying tax policies, and to show that the transitory nature of some tax regimes has important effects on tax incentives.[7]

Roger H. Gordon and Jeffrey K. MacKie-Mason analyze the effects of the 1981 and 1986 reforms on incentives for partnership versus corporate organization of productive activities.[8] Myron S. Scholes and Mark A. Wolfson demonstrate that corporations can avoid the corporate tax effectively and face taxation as if they were partnerships, using various high-leverage financial strategies.[9]

In a sequence of papers modeling the competition of corporate and noncorporate firms, Jane G. Gravelle and Laurence J. Kotlikoff show that within-industry distortions of the corporate/noncorporte mix can generate welfare costs many times larger than the distor-

[5] *C. T. Clotfelter, "The Impact of Tax Reform on Charitable Giving: A 1989 Perspective," NBER Working Paper No. 3273, March 1990.*

[6] *K. J. Beron, H. V. Tauchen, and A. D. Witte, "A Structural Equation Model for Tax Compliance and Auditing," NBER Working Paper No. 2556, April 1988, and "Tax Compliance: An Investigation Using Individual TCMP Data," NBER Working Paper No. 3078, August 1989.*

[7] *A. J. Auerbach and J. R. Hines, Jr., "Investment Tax Incentives and Frequent Tax Reforms," NBER Reprint No. 1088, December 1988.*

[8] *R. H. Gordon and J. K. MacKie-Mason, "Effects of the Tax Reform Act of 1986 on Corporate Financial Policy and Organizational Form," NBER Working Paper No. 3222, January 1990.*

[9] *M. S. Scholes and M. A. Wolfson, "Converting Corporations to Partnerships Through Leverage: Theoretical and Practical Impediments," NBER Working Paper No. 3092, September 1989.*

tions in industry mix, which have been the subject of prior studies.[10]

The policy consensus during the mid-1980s for a "level playing field" that treats all assets identically, motivates studies of intangible capital, such as R and D or investment in market share. Don Fullerton and Andrew B. Lyon consider the tax system's distortions between tangible and intangible assets, a distinction largely neglected in the TRA86.[11] They show that by raising effective tax rates on some physical assets, the 1986 act increased the distortion between tangible and intangible assets.

Finally, one line of research concerns the role of average tax rates, which affect corporate cash flow, in influencing investment. Steven Fazzari, R. Glenn Hubbard, and Bruce C. Petersen demonstrate in a cross-section of U.S. firms that additional cash flow is associated with higher investment.[12] This view suggests that TRA86 might affect corporate investment other than through more-than-marginal tax rates on new projects. A related paper by Martin Feldstein emphasizes the need to impute corporate tax liabilities to individuals in computing the changing distribution of tax burdens across income classes.[13]

International Taxation

Many tax program researchers participated in a conference on "Tax Policy in the Global Economy," organized by Joel B. Slemrod and Assaf Razin.[14] The increasing integration of world capital markets, and the growth of multinational enterprises, sparked several research projects on the international dimensions of tax policy. Hines and Hubbard investigate financial flows within multinational firms, finding new evidence on the importance of deferred repatriation as a device for avoiding taxes.[15] Jean-Thomas Bernard and Robert J. Weiner analyze transfer pricing issues.[16] Joosung Jun presents new findings on how taxation affects incentives for investing abroad, and Slemrod examines the recent U.S. experience with inbound foreign direct investment.[17] He finds support for the view that raising corporate tax burdens in the United States can encourage investment by firms based in countries that employ worldwide taxation systems. Leslie E. Papke scrutinizes the experience with a withholding tax on interest payments to foreigners, finding that corporations reacted very strongly to the elimination of the tax in 1984.[18] Because of the ease with which the tax could be avoided before 1984, though, she concludes that the effect of repealing the tax on domestic revenue was negligible and that the experience provides little basis for predicting the effect of an unavoidable tax on interest paid to foreigners.

State and Local Public Finance

Political pressures to trim the federal budget deficit have shifted a number of fiscal functions to state and local governments, generating new interest in both fiscal federalism and the operation of subnational governments. Papke considers tax competition in a federal system in an empirical exploration of the effect of interstate business tax differentials on the location of new firms.[19] Her econometric findings support the expected negative relationship between effective tax rates and new firm births (other things equal). However, it is not clear whether it is "profitable" for states to adopt tax incentives for this purpose. Robert P. Inman explores the determinants of tax and expenditure levels in a cross-section of U.S. cities.[20] In separate studies Douglas Holtz-Eakin and Harvey S. Rosen and Lindsey have examined the effect of deductibility and state–local taxation patterns, generally finding that deductibility encourages higher spending by subfederal governments

[10] *J. G. Gravelle and L. J. Kotlikoff, "The Incidence and Efficiency Costs of Corporate Taxation When Corporate and Noncorporate Firms Produce the Same Good," NBER Reprint No. 1270, September 1989, and "Does the Harberger Model Greatly Understate the Excess Burden of the Corporate Tax? Another Model Says Yes," NBER Working Paper No. 2742, October 1988.*

[11] *D. Fullerton and A. B. Lyon, "Tax Neutrality and Intangible Capital," NBER Reprint No. 1171, April 1989.*

[12] *S. Fazzari, R. G. Hubbard, and B. C. Petersen, "Financing Constraints and Corporate Investment," NBER Reprint No. 1069, November 1988, and "Investment, Financing Decisions, and Tax Policy," NBER Reprint No. 1193, May 1989.*

[13] *M. Feldstein, "Imputing Corporate Tax Liabilities to Individual Taxpayers," NBER Reprint No. 1060, October 1988.*

[14] *J. B. Slemrod and A. Razin, eds.,* Taxation in the Global Economy. *Chicago: University of Chicago Press, 1990.*

[15] *J. R. Hines, Jr. and R. G. Hubbard, "Coming Home to America: Dividend Repatriations by U.S. Multinationals," NBER Working Paper No. 2931, April 1989.*

[16] *J.-T. Bernard and R. J. Weiner, "Multinational Corporations, Transfer Prices, and Taxes: Evidence from the U.S. Petroleum Industry," NBER Working Paper No. 3013, June 1989.*

[17] *J. Jun, "Tax Policy and International Investment," NBER Working Paper No. 3048, July 1989, and "U.S. Tax Policy and Direct Investment Abroad," NBER Working Paper No. 3049, July 1989; and J. B. Slemrod, "The Impact of the Tax Reform Act of 1986 on Foreign Direct Investment to and from the United States," NBER Working Paper No. 3234, January 1990.*

[18] *L. E. Papke, "International Differences in Capital Taxation and Corporate Borrowing Behavior: Evidence from the U.S. Withholding Tax," NBER Working Paper No. 3129, September 1989.*

[19] *L. E. Papke, "Interstate Business Tax Differentials and New Firm Location: Evidence from Panel Data," NBER Working Paper No. 3184, November 1989.*

[20] *R. P. Inman, "The Local Decision to Tax: Evidence from Large U.S. Cities," NBER Working Paper No. 2921, April 1989.*

and implicitly suggesting that elimination of sales tax deductibility in 1986 may discourage state spending.[21]

In related work, Poterba analyzes the regressivity of traditional state-local excise taxes on gasoline, tobacco, and alcohol.[22] He argues that the regressivity of these taxes is overstated, because many low-income households have low incomes only temporarily.

Several pieces of tax legislation during the last decade affected the ability of state and local governments to borrow in the tax-exempt bond market. In two studies, Gilbert E. Metcalf shows that a variety of factors, including the perceived burdens associated with such finance and the durability of outlays, affect borrowing decisions.[23] Poterba investigates the importance of TRA86 in narrowing the yield spread between taxable and tax-exempt debt.[24] He shows that the shift to individual investors currently taking place could lower the yield spread even further. Robert Moffitt finds that another major piece of federal legislation has influenced state behavior in a way that economic theory would predict but that is typically neglected in policy discussion.[25] He concludes that a long-term decline in the real benefits provided under Aid to Families with Dependent Children (a program partially funded by states, which set the benefit levels) can be explained as a reaction to the growth of federally funded Food Stamp benefits. If correct, the implication would be that the Food Stamp program has provided budget relief to states, rather than additional support to poor households.

Fiscal Policy and National Saving

The influence of the government on national saving has been a matter of continuing interest to Bureau researchers. The aging of the "baby-boom generation" will affect the structure of government outlays. Several studies have paid particular attention to the likely effect of this demographic transition, which will exert an influence both through the economic effects of current transfer programs to the elderly, and via direct long-run consequences of an aging population. B. Douglas Bernheim explores the way households form expectations about their retirement dates and retirement income.[26] He finds a surprising degree of variance in household predictions of income and the actual outcome.

Auerbach, Kotlikoff, Robert P. Hagemann, and Giuseppe Nicoletti consider how the aging of populations in the United States and other OECD nations will affect wages and the capital-labor ratio.[27] In another paper, Auerbach and Kotlikoff examine the outlook for U.S. private saving, showing that with current age-specific saving rates, private saving should rise during the next decade.[28] Michael J. Boskin and Lawrence J. Lau present new econometric analysis of national saving, taking demographic structure into account.[29]

In other research on government and national saving, Poterba and Summers conclude that the recent U.S. experience casts doubt on the proposition that the timing of taxes does not affect national saving.[30] Boskin and colleagues have focused on questions of measurement, reappraising estimates of government capital formation.[31] Boskin and Bradford also are concerned with measurement, and they point out shortcomings in the national income accounts' estimates of national saving.[32] Kotlikoff has argued independently that traditional measures of government saving, which neglect the many nontax dimensions along which the

[21] *D. Holtz-Eakin and H. S. Rosen, "Federal Deductibility and Local Property Tax Rates," NBER Working Paper No. 2427, November 1987; and L. B. Lindsey, "Federal Deductibility of State and Local Taxes: A Test of Public Choice by Representative Governments," NBER Working Paper No. 2292, February 1987.*

[22] *J. M. Poterba, "Lifetime Incidence and the Distributional Burden of Excise Taxes," NBER Reprint No. 1226, July 1989.*

[23] *G. E. Metcalf, "Arbitrage and the Savings Behavior of State Governments," NBER Working Paper No. 3017, June 1989, and "Federal Taxation and the Supply of State Debt," NBER Working Paper No. 3255, February 1990.*

[24] *J. M. Poterba, "Tax Reform and the Market for Tax-Exempt Debt," NBER Reprint No. 1382, May 1990.*

[25] *R. Moffitt, "Has State Redistribution Policy Grown More Conservative?" NBER Working Paper No. 2516, February 1988.*

[26] *B. D. Bernheim, "How Do the Elderly Form Expectations? An Analysis of Responses to New Information," NBER Working Paper No. 2719, September 1988.*

[27] *A. J. Auerbach, L. J. Kotlikoff, R. P. Hagemann, and G. Nicoletti, "The Economic Dynamics of an Aging Population: The Case of Four OECD Countries," NBER Reprint No. 1268, September 1989.*

[28] *A. J. Auerbach and L. J. Kotlikoff, "Demographics, Fiscal Policy, and U.S. Saving in the 1980s and Beyond," NBER Working Paper No. 3150, October 1989.*

[29] *M. J. Boskin and L. J. Lau, "An Analysis of Postwar U.S. Consumption and Saving." Part I: "The Model and Aggregation," NBER Working Paper No. 2605, June 1988, and Part II: "Empirical Results," NBER Working Paper No. 2606, June 1988.*

[30] *J. M. Poterba and L. H. Summers, "Mean Reversions in Stock Prices," NBER Reprint No. 1233, July 1989.*

[31] *M. J. Boskin and W. G. Gale, "New Results on the Effects of Tax Policy on the International Location of Investment," NBER Reprint No. 961, January 1988; M. J. Boskin, "Concepts and Measures of Federal Deficits and Debt and Their Impact on Economic Activity," NBER Working Paper No. 2332, August 1987; and M. J. Boskin, M. S. Robinson, and A. M. Huber, "Government Saving, Capital Formation, and Wealth in the United States, 1947-85," NBER Working Paper No. 2352, August 1987.*

[32] *M. J. Boskin, "Issues in the Measurement and Interpretation of Saving and Wealth," NBER Working Paper No. 2633, June 1988; and H. J. Ault and D. F. Bradford, "Taxing International Income: An Analysis of the U.S. System and Its Economic Premises," NBER Working Paper No. 3056, August 1989.*

government affects intergenerational redistribution, provide a poor guide to actual fiscal policy.[33]

Data assembled by Bradford on national wealth at market value for four countries—the United States, the United Kingdom, Sweden, and Japan—display strikingly different paths.[34] In particular, Japan's rapid accumulation of wealth stands out. Fumio Hayashi, Takatoshi Ito, and Slemrod find that roughly one-third of the differential in saving rates between the United States and Japan can be attributed to the different institutional environment concerning housing finance and taxation, principally tax and financial policies, in the two nations.[35] John B.Shoven also concludes that Japanese tax policy favors corporate investment (when compared with U.S. tax policy), but that the recent income tax reforms in Japan have raised the effective tax rate on corporate capital.[36]

Taxes and Housing Markets

The Tax Reform Act of 1986 changed numerous features of the tax code with potentially important effects on both owner-occupied and rental housing markets. A number of studies, including those by James A. Follain, Patric H. Hendershott, and David C. Ling; Poterba; and James Berkovec and Fullerton assess the effects of recent tax changes on housing.[37] All suggest that the long-run effect of the recent tax reform should be an increase in real rents, although there is little consensus on the magnitude of this effect. Lawrence H. Goulder's paper, one of several presented at an NBER conference on "Residential Capital Formation," provides new estimates of the efficiency cost of differential taxation of housing and other assets.[38]

[33]*L. J. Kotlikoff, "From Deficit Delusion to the Fiscal Balance Rule: Looking for an Economically Meaningful Way to Assess Fiscal Policy," NBER Working Paper No. 2841, February 1989.*

[34]*D. F. Bradford, "What Is National Saving? Alternative Measures in Historical and International Context," NBER Working Paper No. 3341, April 1990.*

[35]*F. Hayashi, T. Ito, and J. B. Slemrod, "Housing Finance Imperfections, Taxation, and Private Saving: A Comparative Simulation Analysis of the United States and Japan," NBER Reprint No. 1112, February 1989.*

[36]*J. B. Shoven, "The Japanese Tax Reform and the Effective Rate of Tax on Japanese Corporate Investments," NBER Working Paper No. 2791, December 1988.*

[37]*J. R. Follain, P. H. Hendershott, and D. C. Ling, "Understanding the Real Estate Provisions of Tax Reform: Motivation and Impact," NBER Reprint No. 1010, June 1988; J. M. Poterba, "Taxation and Housing Markets: Preliminary Evidence on the Effects of Recent Tax Reforms," NBER Working Paper No. 3270, February 1990; and J. Berkovec and D. Fullerton, "The General Equilibrium Effects of Inflation on Housing Consumption and Investment," NBER Reprint No. 1248, August 1989.*

[38]*L. H. Goulder, "Tax Policy, Housing Prices, and Housing Investment," NBER Working Paper No. 2814, January 1989.*

Other Research Areas

Although Bureau researchers generally focus on analysis of empirical data, they also work on theory. For example, Mervyn A. King, working with Mark Robson, has shown that a plausible model in which the capital income tax rate varies stochastically may generate both cyclical fluctuations around a trend growth rate and changes in the trend growth rate itself, with the possibility of multiple steady-state equilibrium paths.[39] As the authors point out, history is meaningful in their model in that the level of technical knowledge depends upon the past path of output and in that the equilibrium growth rate itself depends upon historical realization of the random tax rate.

Louis Kaplow has continued his explorations of the efficiency consequences of an ethically charged question: the circumstances under which the government compensates those who are damaged by government action (such as by the construction of a highway or by changing the tax law).[40] Program newcomer Hans-Werner Sinn of the University of Munich has reconsidered the classic Harberger analysis of the distorting effect of the double taxation of dividends, concluding that the distortion is a transitory phenomenon.[41] Joseph E. Stiglitz and Richard J. Arnott show how moral hazard (the weakening effect of insurance on the incentives of the insured to take precautions against the insured-against risk) upsets the usual efficiency properties of competitive markets, arguing that the problem is a widespread source of market failure.[42]

Washington Involvement

The previous report on the tax program noted the central role of Charles E. McLure, Jr., and Don Fullerton, both recent Deputy Assistant Treasury Secretaries for Tax Policy, in the policy debates leading up to TRA86. The tax program has continued to be a leading source of Washington talent. Research Associate Michael J. Boskin currently chairs the President's Council of Economic Advisers and Faculty Research Fellow Douglas Holtz-Eakin is a senior staff economist there. Harvey S. Rosen is the Deputy Assistant Secretary for Tax Policy, Daniel R. Feenberg is visiting the Office of Tax Analysis, and Lawrence B. Lindsey is serving as Special Assistant to the President for Domestic Policy in the White House.

[39]*M. A. King and M. Robson, "Endogenous Growth and the Role of History," NBER Working Paper No. 3151, October 1989.*

[40]*L. Kaplow, "Government Relief for Risk Associated with Government Action," NBER Working Paper No. 3006, June 1989, and "Incentives and Government Relief for Risk," NBER Working Paper No. 3007, June 1989.*

[41]*H.-W. Sinn, "The Vanishing Harberger Triangle," NBER Working Paper No. 3225, January 1990.*

[42]*R. J. Arnott and J. E. Stiglitz, "The Welfare Economics of Moral Hazard," NBER Working Paper No. 3316, April 1990.*

Research Summary

Government and the Labor Market

Alan B. Krueger

Federal, state, and local governments play four major roles in the U.S. labor market. First, by providing public schools and compelling school attendance, they invest in human capital. Second, they provide a safety net for those who suffer misfortunes, whether from industrial accidents or through unemployment. Third, through civil rights legislation, union regulation, and laws regarding dismissal policy, the government regulates certain labor market transactions. Finally, the government directly employs nearly 20 percent of all workers, and thus is a significant force in the labor market. This summary focuses on the government's impact on the labor market in each of these roles.

Education

In economics, the human capital model assumes that education increases individuals' earnings by enhancing their skills. However, the literature on education shows that the pupil-to-teacher ratio, teachers' characteristics, and related factors seem to have little impact on student achievement as measured by a battery of standardized tests.[1] This result has led some to believe that additional school funding will yield few benefits for students; it also raises doubt about the role of education in enhancing skills.

David Card and I reexamine this issue by studying the impact of school quality on students' subsequent earnings. We use a sample of over one million workers drawn from the 1980 Census.[2] Contradicting the earlier work, we find that improvements in school quality (that is, class size, teacher pay, and term length) have a substantial effect on the economic return to education. For example, a decline in the pupil-teacher ratio from 30 to 25 increases the value of each year of education by 0.4 percentage points; a 10 percent increase in teacher pay increases the return to each year of education by 0.1 percentage points. Currently, Card and I are studing the contribution of school quality to the gap in earnings between black and white workers.

In a recent paper, Joshua D. Angrist and I examine the impact of compulsory schooling laws on educational achievement and earnings.[3] Although every developed country in the world has some form of compulsory school attendance requirement, little is known about the effect of this legislation.

In the United States, most states require students to attend school at least until they reach their 16th or 17th birthday. Because of school entrance policies, children born early in the year typically start school older than children born late in the year; consequently, they reach the compulsory schooling age sooner. In essence, the law compels students born early in the year to attend school for less time than students born late in the year.

If compulsory schooling laws work as they are designed to, then we should find that date of birth is related to years of schooling, with early-year births receiving less schooling than late-year births. Angrist and I find just such a pattern in the 40 years that we examine. On the other hand, we find that date of birth has no effect on the probability of graduating from college. Since college graduates are not constrained by compulsory schooling laws, this suggest that it is those laws, and not some age-related factor, that are responsible for the effect of date of birth on years of education.

Our estimates suggest that as many as 25 percent of potential dropouts remain in school because of compulsory schooling laws. But do these students who are compelled to attend school benefit at work from their extra years of schooling? We compare the earnings of individuals born in different months of the year, and infer that years of schooling attained in response to compulsory schooling laws indeed are rewarded in the labor market. Our estimates suggest that an additional year of high school results in about a 7 percent increase in earnings. This figure is very close to conventional estimates of the return to education.

Social Insurance

Government-mandated social insurance provides income to individuals who are unable to support themselves for some reason. My research in this area has focused mainly on the workers' compensation system—the oldest form of mandatory social insurance in the United States—and on the Social Security retirement program—the largest social insurance program in the United States.

Industrial accidents and illnesses pose a serious threat to the economic security of many workers. In 1988, nine in every 100 workers were the victims of work-related injuries or illnesses. Furthermore, work-related injuries and illnesses are responsible for 50 times as many lost workdays as strikes, and one-third

[1] *For a survey of this literature, see E. Hanushek, "The Economics of Schooling: Production and Efficiency in Public Schools,"* Journal of Economic Literature *24 (September 1986), pp. 1141–1177.*

[2] *D. Card and A. B. Krueger, "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States," NBER Working Paper No. 3358, May 1990.*

[3] *J. D. Angrist and A. B. Krueger, "Does Compulsory School Attendance Affect Schooling and Earnings?" Forthcoming as an NBER Working Paper.*

as many lost workdays as unemployment. Workers' compensation insurance, which provides cash payments and medical benefits to individuals who suffer work-related disabilities, is the main public policy for work injuries. In 1990 this program will pay out an estimated $30 billion to disabled workers, almost twice the amount paid out by unemployment insurance.

By providing wage replacement to injured workers, the workers' compensation program inadvertently may induce some workers to take fewer safety precautions, resulting in more injuries. Alternatively, more generous workers' compensation benefits may encourage some workers to report injuries that would go unreported otherwise. Finally, higher workers' compensation benefits, by raising the cost of work injuries to employers, may motivate employers to provide safer working conditions, and thus reduce the number of work injuries.

To gauge the relative importance of these effects, I estimate the impact of providing more generous workers' compensation benefits on the probability of receiving workers' compensation payments.[4] I find that a 10 percent increase in benefits is associated with a 6 percent increase in participation in the program. As a further check on the plausibility of this estimate, I use historical information on benefit increases from 1969-87 to forecast the workers' compensation recipiency rate in each of these years. I find that the sharp rise in workers' compensation recipients in the 1970s was caused largely by the increase in benefits that occurred in that time period.

In related work, I estimate the impact of workers' compensation benefits on the *duration* of workplace injuries.[5] Using administrative records on over 30,000 workers' compensation claims in Minnesota, I examine the effect of an increase in the minimum and maximum workers' compensation benefit on the duration of injuries. I find that the duration of injuries increases substantially when benefits increase, especially for minor injuries. In addition, employees appear to return to work faster if they work for self-insured firms. Because self-insured firms bear the full marginal cost of injuries, while privately insured firms are not perfectly experience rated, this finding suggests that firms influence the duration of their employees' injuries when they have a financial incentive to do so.

My research on Social Security has attempted to measure the effect of benefits on male labor supply. At least since World War II, male labor supply has declined precipitously. For example, in 1948 nearly half of all men aged 65 or older participated in the labor force; by 1988, this figure had dropped to 16 percent.

Steven Pischke and I examine the impact on labor supply of the abrupt reduction in Social Security wealth for the so-called "notch generation," born between 1917 and 1921.[6] We find that the labor supply of the notch generation, no matter how we measure it, continued to decrease after they experienced a substantial decline in their expected Social Security wealth. This suggests that increases in Social Security benefits that occurred in the postwar period had, at best, a moderate effect on the decline in male labor force participation.

Regulation of the Labor Market

A distinguishing feature of the U.S. labor market is that employers traditionally have been permitted to "dismiss their employees for a good cause, for no cause, or even for cause morally wrong." Every other developed country in the world requires employers to have a "just cause" for firing an employee. However, the common law right to fire workers at will in the United States has changed dramatically in recent years. Beginning in the 1980s, courts in more than half of the states allowed employees to sue their employers if they were fired for pursuing an action that was in the interest of public policy, or if their employer broke an implicit agreement. Some 20,000 cases brought by fired employees against their employers currently are pending in state courts. In addition, in 1987 Montana became the first state in the United States to pass a statute requiring just cause for firing an employee, and limiting the maximum damages an employer could be assessed for firing without just cause.

I consider the impact of changes in the common law regarding dismissals on the operation of the labor market and find that the evolving law is inefficient, expensive, slow, and highly unpredictable.[7] In response to these problems, political pressure has mounted for limited-liability, unjust-dismissal legislation, such as enacted in Montana. My research suggests that the evolution of dismissal regulation closely parallels the passage of workers' compensation laws at the turn of the century, which also are widely believed to be a response to court-initiated changes in liability law.

Government Employment

Because compensation in the public sector is determined by an administrative process that is largely insulated from normal market forces, there is considerable interest in comparing government and private sector pay structures. My work suggests that, especially for low-skilled workers, compensation in federal

[4] *A. B. Krueger, "Incentive Effects of Workers' Compensation Insurance,"* Journal of Public Economics *41 (February 1990), pp. 73-99. Also see A. B. Krueger and J. F. Burton, Jr., "The Employers' Costs of Workers' Compensation Insurance: Magnitudes, Determinants, and Public Policy,"* Review of Economics and Statistics *(May 1990).*

[5] *A. B. Krueger, "Workers' Compensation Insurance and the Duration of Workplace Injuries," NBER Working Paper No. 3253, February 1990.*

[6] *A. B. Krueger and S. Pischke, "The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation," Princeton University, Industrial Relations Section Working Paper No. 255, June 1989; presented at the NBER Universities Research Conference on Social Insurance, 1989.*

[7] *A. B. Krueger, "The Evolution of Unjust-Dismissal Legislation in the United States," NBER Working Paper No. 3127, September 1989.*

government service is more generous than in the private sector.[8] In part, the higher *average* wage paid by the federal government stems from regional rigidity in the government pay structure: federal workers with the same grade are paid the same wage, regardless of the level of local pay in their region of the country. On the other hand, state and local government workers are paid slightly less than comparable private sector workers. Moreover, all branches of government are slow to adjust to changes in the private labor market.

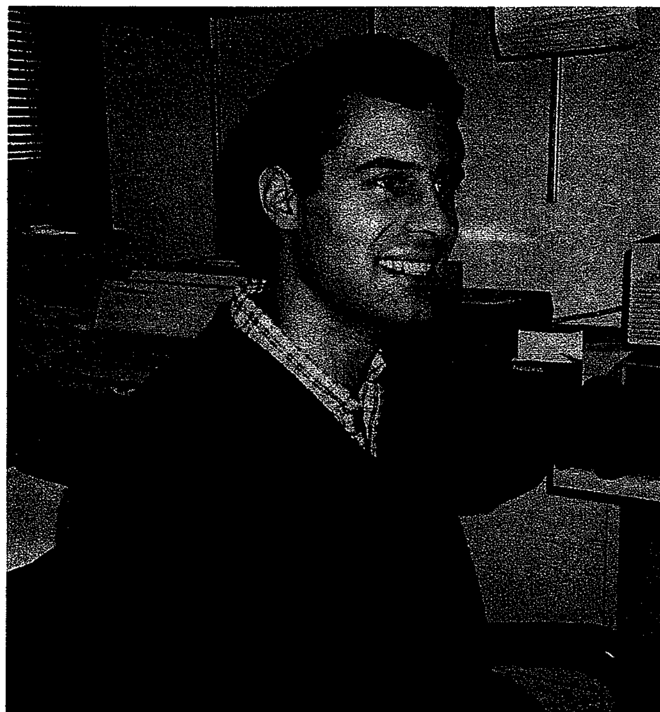
Twenty million American workers are veterans of the armed forces. Joshua Angrist and I estimate the effect of military service during World War II on the civilian earnings of veterans.[9] During the World War II era, almost 80 percent of men of the appropriate age served in the military. Those who did not serve were disqualified mainly for reasons of poor health or low mental aptitude. To overcome this selection problem, we use the fact that men born between 1925 and 1928 were called to service in chronological order of their birth. Our main conclusion is that serving in the military causes a modest reduction in subsequent civilian earnings of veterans.

[8]*A. B. Krueger, "The Determinants of Queues for Federal Jobs,"* Industrial and Labor Relations Review *41 (July 1988), pp. 567-581; and "Are Public Sector Workers Paid More Than Their Alternative Wage? Evidence from Longitudinal Data and Job Queues," in R. B. Freeman and C. Ichniowski, eds.,* When Public Sector Workers Unionize. *Chicago: University of Chicago Press, 1987, pp. 217-240.*

[9]*J. D. Angrist and A. B. Krueger, "Why Do World War II Veterans Earn More Than Nonveterans?" NBER Working Paper No. 2991, May 1989.*

NBER Profile

Alan B. Krueger



Alan B. Krueger, a 1989-90 NBER Olin Fellow, has been a member of the NBER's Program in Labor Studies since 1987. He is also an assistant professor of economics and public affairs at Princeton University, with a joint appointment in the economics department and Woodrow Wilson School.

Krueger received a B.S. in industrial and labor relations with honors from Cornell University in 1983, and a Ph.D. in economics from Harvard University in 1987. His research on wage determination, social insurance, human capital, and other subjects has been published in the NBER Working Paper series and in a number of professional journals and books.

Krueger and his wife, Lisa, live in Princeton, NJ, and are expecting their first child in October. His hobbies include tennis, basketball, and ham radio.

Conferences

Firm and Industry Dynamics

About 35 researchers met in Cambridge on February 23-24 to discuss firm and industry dynamics. Their agenda, planned by NBER associates Timothy F. Bresnahan of Stanford University, R. Glenn Hubbard of Columbia University, and Ariel Pakes of Yale University, and Steve J. Davis, University of Chicago, was:

John Sutton, London School of Economics, "Sunk Costs and Market Structure: An Exploratory Study"

R. Glenn Hubbard, and Anil Kashyap, Federal Reserve Board, "Internal Net Worth and the Investment Process: An Application to U.S. Agriculture"

Richard E. Ericson, NBER and Columbia University, and Ariel Pakes, "An Alternative Theory of Firm and Industry Dynamics"

Steve J. Davis, and John C. Haltiwanger, Jr., University of Maryland, "Gross Job Creation and Destruction: Microeconomic Evidence and Macroeconomic Fluctuations"

Lawrence F. Katz, NBER and Harvard University, and Kevin M. Murphy, NBER and University of Chicago, "Changes in Relative Wages in the United States, 1963–87: Supply and Demand Factors"

Timothy F. Bresnahan, and Daniel M. G. Raff, NBER and Harvard University, "Technological Heterogeneity, Adjustment Costs, and the Dynamics of Plant Shutdown Behavior: The American Motor Vehicle Industry in the Time of the Great Depression"

Robert S. Pindyck, NBER and MIT, "Inventories and the Short-Run Dynamics of Commodity Prices" (NBER Working Paper No. 3295)

Sutton sets out a new approach to the question: Do scale economies, advertising intensity, and other market characteristics affect the equilibrium structure of an industry? He uses data on 20 food and drink markets in each of six countries, assembled from market research reports and company interviews. The resulting matrix of 120 industry studies provides unusually detailed evidence on the strengths and limitations of his new approach.

Hubbard and Kashyap ask whether movements in internal finance can predict investment spending. They focus on the U.S. agricultural sector, which has experienced large fluctuations in net worth and in the profitability of investment. They find that movements in net equity positions contribute importantly to explaining investment. Also, the effect of changes in net worth on investment is significantly more important during deflationary periods than during "boom" periods. Hubbard and Kashyap's findings support a class of "internal funds" models of investment under asymmetric information.

Ericson and Pakes analyze a model in which firms decide to enter or exit an industry, and how much to invest. The outcome of firm investments in R and D is uncertain. Ericson and Pakes's model allows them to analyze industrywide responses to government policies.

Davis and Haltiwanger use a dataset on 160,000 manufacturing establishments to calculate rates of gross job creation, gross job destruction, and their sum: gross job reallocation. Their analysis of the joint dynamics of job creation, job destruction, and unemployment supports the view that allocative disturbances were a major driving force behind movements in job creation, job destruction, and unemployment in the United States manufacturing sector from 1972–86.

Katz and Murphy examine changes in the structure of wages in the United States from 1963–87. They find that: 1) wage differentials by education and experience expanded substantially throughout the period; 2) earnings inequality increased dramatically within narrowly defined education-experience-gender groups in the 1970s and the 1980s; and 3) male-female wage differentials narrowed significantly in the 1980s after remaining relatively stagnant in the 1960s and 1970s. Fluctuations in the rate of growth of the relative *supply* of college graduates, combined with stable growth in *demand* for college graduates, explain movements in education differentials from 1963–87. Katz and Murphy conclude that rapid secular growth in the relative demand for more-educated and "more-skilled" workers (arising from shifts in product demand, skill-biased technological change, and shifts in the international division of labor) is a key component of any consistent explanation of changes in the wage structure and rising inequality over the last 25 years.

Bresnahan and Raff study the American motor vehicle industry in the Great Depression. They focus on the determination of price, cost, and employment at the plant level, and on the decision not to operate the plant. They find that plants using newer, mass-production techniques adjusted their labor forces more rapidly to demand shocks; partly as a result, these plants had substantially lower average avoidable cost at the bottom of the business cycle. In the short run, 35 percent of the enormous decline in employment from 1929–33 was caused by plants that shut down. The long-run implication of the shakeout was the formation of the concentrated automobile oligopoly that was to dominate supply in the United States for 40 years.

Pindyck examines the behavior of inventories, and their role in the short-run dynamics of commodity production and price. He also asks whether fluctuations in spot and futures prices can be explained by rigidities in production and desired inventory holdings. Competitive producers of a storable commodity react to stochastic price fluctuations by balancing costs of changing production with costs of changing inventory holdings. To determine these costs, Pindyck models the short-run dynamics of production, sales, and storage for copper, heating oil, and lumber. Assuming optimizing behavior, he measures adjustment costs, costs of producing, and costs of drawing down inventories, and then examines the implications of these costs for inventory behavior, and for the behavior of spot and futures prices.

Annual Conference on Macroeconomics

More than 80 economists attended the NBER's Fifth Annual Conference on Macroeconomics in Cambridge on March 9–10. Research Associates Olivier J. Blanchard of MIT and Stanley Fischer of MIT and the World Bank organized the program:

Giuseppe Bertola, Princeton University, and Ricardo J. Caballero, Columbia University, "Optimization, Aggregation, and Dynamics under Kinky Adjustment Costs"

Discussants: Andrew Caplin, NBER and Columbia University, and Robert E. Hall, NBER and Stanford University

Gur Ofer, Hebrew University, "Macroeconomic Implications of Reform in the Soviet Union"

Discussants: Abram Bergson and Martin L. Weitzman, Harvard University

Francesco Giavazzi, NBER and University of Bologna, and Marco Pagano, University of Naples and Centre for Economic Policy Research, "Can Severe Fiscal Contractions Be Expansionary? Tales of Three Small European Countries"

Discussants: Allan Drazen, NBER, Princeton University, and Tel Aviv University, and Martin Feldstein, NBER and Harvard University

Steve J. Davis, Stanford University, and John C. Haltiwanger, Jr., University of Maryland, "Job Creation, Job Destruction: Microevidence and Macroimplications"

Discussants: Katharine G. Abraham, NBER and University of Maryland, and Robert Townsend, University of Chicago

Mark Bils, NBER, University of Chicago, and Stanford University, "Wage and Employment Patterns in Long-Term Contracts When Labor Is Quasi-Fixed"

Discussants: Andrew J. Oswald, Dartmouth College, and Gary D. Hansen, NBER and University of California at Los Angeles

Robert J. Barro, NBER and Harvard University, and Xavier Sala-i-Martin, Harvard University, "World Real Interest Rates" (NBER Working Paper No. 3317)

Discussants: William C. Brainard, Yale University, and Robert E. Lucas, Jr., NBER and University of Chicago

Bertola and Caballero study economic periods when inaction alternates with sudden and possibly large macroeconomic adjustments. They argue that such adjustment policies are realistic for car purchases, price adjustments, and business investments, and arise naturally when even very small adjustments have a real cost. Typically, aggregate dynamics are smoother than individual adjustment policies. The extent to which macroeconomic time series reflect microeconomic inaction depends on the degree of coordination across individual units. Bertola and Caballero find that these adjustment costs can explain the behavior of U.S. durable consumption purchases.

The Soviet Union entered the era of economic reform with very low economic reserves and large deficiencies of both economic and social infrastructures. Early and partial decentralization failed to produce a supply response; instead, through monetary and credit expansion and rising wages, the degree of disequilibrium increased, especially in consumer markets. Also, since 1985, the state budget deficit has risen and exceeded 10 percent of GNP in 1989. This was the outcome of pressures to raise expenditures, an inadequate tax system, the temporary nature of some major revenue sources, and the lack of appreciation of the importance of a balanced budget. Ofer suggests that economic reform could be achieved with a onetime major change in the level and structure of prices accompanied by the elimination of subsidies. in addition, the "monetary overhang" could be absorbed by the sale (or lease) of housing, land, and enterprises to the public. Only after the macro imbalance has been eliminated will the Soviets be able to change the structure of property rights.

A fiscal consolidation may cause real aggregate demand to contract. But if the private sector reads the consolidation as a signal that the share of government spending in GDP is being reduced permanently, then households will revise their estimate of their permanent income upward and will raise current and planned consumption. Giavazzi and Pagano ask how often the contractionary effect of a fiscal consolidation outweighs this expansionary expectational effect. They draw on the European exercise in fiscal tightening of the 1980s and focus, in particular, on its two most extreme cases —Denmark and Ireland. They find that at least in the experience of these two countries, the expectations view appears to prevail.

Davis and Haltiwanger use a dataset with approximately 860,000 annual observations and 3.4 million quarterly observations on 160,000 manufacturing establishments to calculate rates of gross job creation, gross job destruction, and their sum, gross job reallocation. They find tremendous heterogeneity in establishment-level employment changes that varies significantly over time countercyclically. Both aggregate and allocative disturbances can create fluctuations in job creation, job destruction, and unemployment. Indeed, allocative disturbances were a major source of job creation, job destruction, and unemployment in the U.S. manufacturing sector from 1972 to 1986.

Bils presents evidence of predictable patterns in wages and employment under labor contracts in U.S. manufacturing. Wage growth is concentrated at the beginning of contracts, and employment on average grows fastest in the first year of contracts. Bils finds that wages should decline during contracts, because unions use long-term contracts to commit to lower wage rates in future periods in order to increase employment demand today. While employment increases during contracts, these increases are small both because of the costs of adjusting employment and because firms have an incentive to reduce employment at the end of contracts to reduce wage rates in subsequent bargains.

Barro and Sala-i-Martin estimate GDP-weighted world averages of the expected short-term real interest rate and the investment ratio for 1959–88. They find that an increase of one percentage point in the expected real interest rate raises the desired saving rate by one-third of a percentage point. Fluctuations in world stock returns and oil prices explain why average expected real interest rates were low in 1974–9 and high in 1981–6. Their model also explains the fall in real rates

in 1987–8 and the subsequent upturn in 1989. The fitted relationship forecasts an increase in the world average of real interest rates to 5.6 percent in 1990, nearly a full percentage point above the highest value attained in the entire prior sample, 1958–89. Barro and Sala-i-Martin also find that each country's expected real interest rate primarily depends on world factors, rather than own-country factors, thereby suggesting a good deal of integration of world capital and goods markets.

The papers from this conference will constitute *NBER Macroeconomics Annual 1990*, edited by Olivier J. Blanchard and Stanley Fischer, and published by the MIT Press. Its availability will be noted in a future issue of the *NBER Reporter.*

InterAmerican Seminar on Economics

The NBER's Third Annual InterAmerican Seminar on Economics, cosponsored by the Pontifica Universidad Católica do Rio de Janeiro (PUC), was held in Brazil on March 15–17. NBER Research Associate Sebastian Edwards, University of California at Los Angeles, and Edmar L. Bacha, PUC, organized the following program:

Klaus Schmidt-Hebbel and Vittorio Corbo, World Bank, "Fiscal Policies and Saving in Latin America"
Discussant: Rudiger Dornbusch, NBER and MIT

Dionisio Carneiro and Rogerio Werneck, PUC, "Fiscal Adjustment and Growth in Brazil"
Discussant: Alfredo Canavese, Di Tella, Buenos Aires, and International Monetary Fund

Roundtable Discussion: "Public Sector Reform in Latin America"
Discussants: Mario I. Blejer and Alfred Canavese, International Monetary Fund; Rudiger Dornbusch; Sebastian Edwards; and Angel Palerm Viqueira, Bank of Mexico

José-Guilherme Almeida dos Reis, IBGE and INPES/IPEA, and Ricardo Paes-de-Barros, Yale University and INPES/IPEA, "Wage Inequality and the Distribution of Education: A Study of the Evolution of Regional Differences in Inequality in Metropolitan Brazil"
Discussant: Juan Luis Londono, Harvard University

Mario I. Blejer and Ke-Young Chu, International Monetary Fund, "Fiscal Policy, Labor Markets, and the Poor"
Discussant: Louise Fox, World Bank

Osvaldo Larranga, ILADES-Georgetown and Universidad de Concepción, and Jorge Marshall, ILADES-Georgetown, "Fiscal Adjustment and Income Distribution"
Discussant: José Marcio Camargo, PUC

Juan Luis Londono, "Kuznetsian Tales with Attention to Human Capital: Catching Up, Accumulation Modes, and Sharp Movements of Income Distribution in Colombia"
Discussant: Edmar L. Bacha

Graciela Kaminsky, University of California at San Diego, and Guillermo A. Calvo, University of Pennsylvania and International Monetary Fund, "Debt Relief and Debt Rescheduling: The Optimal-Contract Approach"
Discussant: Sergio Werlang, Vargas Foundation

Paul R. Krugman, NBER and MIT, "Macroeconomics of the Debtor Countries: A Framework and Some Puzzles"
Discussant: Mario H. Simonsen, Vargas Foundation

Eliana A. Cardoso, NBER and Tufts University, and Ann Helwege, Tufts University, "Land Reform in Latin America: Can Brazil Learn from Bolivia, Mexico, and Peru?"
Discussant: Sebastian Edwards

Angel Palerm Viqueira, "Market Structure and Price Flexibility"
Discussant: Persio Arida, Consultant, São Paulo

Carola Pessino, Duke University, "Sequential Migration Theory and Evidence from Peru"
Discussant: Ricardo Paes-de-Barros

Schmidt-Hebbel and Corbo find that fiscal policies that raise public sector saving are highly effective in raising national saving in Latin America. Other public policies that could affect private saving via real interest rates, inflation, and broad money holdings play only a secondary role as compared with increases in public saving.

Carneiro and Werneck examine the consequences of different types of fiscal policy for growth of the Brazilian economy. Both public investment and public financing of private investment have been important to Brazil's past growth and probably will remain important determinants of future growth. Carneiro and Werneck conclude that restoring high GDP growth rates requires a cut in the government's budget deficit. The pattern of the required fiscal adjustment—which involves changes in both fiscal effort and in the public sector's borrowing requirement—depends on the degree of complementarity between public and private investment. For a given increase in the fiscal effort, the higher the complementarity, the less public financing of private investment is needed.

Almeida Dos Reis and Paes-de-Barros investigate the relationship between education and wage inequality by using information from household surveys on the nine largest Brazilian metropolitan areas. They find that educational inequality explains almost 50 percent of wage inequality in metropolitan Brazil. However, differences in wage inequality among cities in the Northeast and in the South are explained by higher returns to education in the Northeast.

Blejer and Chu analyze the impact of fiscal adjust-

ment on income distribution and the poor or "ultrapoor." Since the extremely low levels of income and social services received by the ultrapoor may result in inadequate nutrition, poor health, and living conditions that effectively reduce their productivity below potential, effective labor supply and aggregate output may be reduced. Blejer and Chu argue that severe poverty may create a vicious cycle, amplified by fiscal adjustments. One possible way to break this vicious cycle is by targeting government social programs on the ultrapoor.

Larranga and Marshall evaluate the welfare effects of fiscal adjustment following an increase in the external payments of the publicly held external debt. They highlight three channels by which the adjustment policy affects the welfare of private agents. The first is related to who finances the increase in the external transfer; the second is related to the impact of the adjustment policy on growth and future income; and the third is related to the redistribution of income between private-sector agents through fiscal mechanisms.

Simon Kuznets speculated on the existence of a U-shaped relationship between income inequality and economic development. Londono finds that inequality in Colombia from 1938–88 followed this pattern. There were extreme quantitative movements along the swing, and the variance of income distribution was unusually large. Londono suggests that shifts in the supply of and demand for human capital may explain the relationship between structural change and income inequality.

Kaminsky and Calvo examine loan contracts between debtor countries and syndicated banks and ask whether the "implicit" contract clauses might account for the possibility of debt reduction. Using data from Argentina, Brazil, and Mexico, they conclude that the output performance in the 1980s was so dismal, and so improbable (from the 1970s perspective), that the small interest rate premium in their debt obligations may account for a relatively large debt reduction in the 1980s.

The debt crisis forced debtor countries to transfer resources to creditors and resulted in a drastic deterioration of economic performance on the part of those countries: sharp declines in output relative to past growth; very high inflation, much lower investment and real wages; and high real interest rates and exchange rates. Krugman formalizes the standard view of why this deterioration happened: the need to transfer resources caused a worsening of the output–inflation trade-off, while the fiscal impact of the crisis increased the need for seigniorage. However, while this story fits qualitatively, it does not work well quantitatively. Krugman suggests that an internal redistribution of income, driven by capital flight, may have played an equally crucial role.

Cardoso and Helwege study land reform and income distribution in Peru, Mexico, and Bolivia, and try to extract lessons for Brazil. They document the unequal distribution of land in Brazil and discuss market failures, political economy, and implementation problems of land reform. They then examine the importance of individual property versus collective holdings. They find that, at least from a political perspective, the land reform programs in Bolivia and Mexico have been a success. Second, land distribution tends to favor the relatively better off among the poor. Third, the success of land reform is related closely to the implementation of accompanying policies, such as technical assistance and farm credit programs.

Viqueira uses disaggregated Mexican price data for 1940–84 to show that prices of perishable goods, homogeneous goods, and goods in less concentrated industries are adjusted more frequently than prices of durable or differentiated goods, or goods in oligopolistic industries. Price adjustments in the low-frequency group have small deviations with respect to accumulated trend inflation since the previous price change. Variability of relative prices for goods with low frequency of price adjustment appears to be no higher than for high-frequency prices. Prices with low frequency of adjustment tend to smooth over procyclical variations in the rate of inflation. However, their reaction to large nominal shocks, such as devaluations, appears to be stronger and faster than the response in flexible price markets.

Pessino studies the migration decision under imperfect information. Using survey data for Peru, she finds that migrants from less-developed areas of the country tend to be more educated than nonmigrants. Return migrants tend to be less educated than those who stay. Moreover, those who move from Lima and other urban centers usually are returning to their homes in the countryside.

Also attending the conference were: Edward Amadeo, José-Marcio Camargo, Maria-Silvia Bastos Marquez, Marina Figueira de Mello, and Edwardo Modiano, PUC-Rio de Janeiro; and Elena Landau, CNI-Rio de Janeiro.

The conference proceedings will be published in a forthcoming issue of the *Journal of Development Economics*.

Empirical Studies of Commercial Policy

An NBER conference on "Empirical Studies of Commercial Policy" was held in Cambridge on March 16–17. The program, organized by Research Associate Robert E. Baldwin, University of Wisconsin at Madison, was:

James E. Anderson, Boston College, "The Coefficient of Trade Utilization: The Cheese Case"
Discussants: Satya Das, Indiana University, and John Chipman, University of Minnesota

Thomas Prusa, State University of New York at Stony Brook, "The Selection of Antidumping Cases for ITC Determination"

Discussant: Robert Stern, University of Michigan

Robert W. Staiger, NBER and Stanford University, and Guido Tabellini, NBER and University of California at Los Angeles, "Rules versus Discretion in Trade Policy: An Empirical Analysis" (NBER Working Paper No. 2658)

Discussants: Richard H. Clarida, NBER and Columbia University, and Michael Moore, George Washington University

K. C. Fung, University of California at Santa Cruz and Stanford University, "Characteristics of Japanese Industrial Groups and Their Potential Impact on U.S.-Japan Trade"

Discussants: Richard E. Baldwin, NBER and Columbia University, and Robert Z. Lawrence, Brookings Institution

Stefanie Lenway and Douglas Schuler, University of Minnesota, "The Determinants of Corporate Political Involvement in Trade Protection: The Case of the Steel Industry"

Discussants: Timothy McKeown, University of North Carolina, and Wendy Takacs, NBER and University of Maryland at Baltimore

Bee Aw Roberts, Pennsylvania State University, "Estimating the Effect of Quantitative Restrictions in Imperfectly Competitive Markets"

Discussants: J. David Richardson, NBER and University of Wisconsin at Madison, and Keith Maskus, University of Colorado

Elias Dinopoulos, University of Florida, and Mordechai E. Kreinin, Michigan State University, "The U.S. VER on Machine Tools: Causes and Effects"

Discussants: Kala Krishna, NBER and Harvard University, and Thomas Bayard, Institute for International Economics

Barry J. Eichengreen, NBER and University of California at Berkeley, and Lawrence H. Goulder, NBER and Stanford University, "The Impact of Permanent and Temporary Surcharges on the U.S. Trade Deficit"

Discussants: David Tarr, World Bank, and Drusilla Brown, Tufts University

Mark J. Roberts, Pennsylvania State University, and James R. Tybout, Georgetown University, "Rationalization and Trade Exposure in Developing Countries"

Discussants: Peter Petri, Brandeis University, and Robert E. Lipsey, NBER and Queens College

Jaime De Melo, World Bank, and David Roland-Holst, U.S. International Trade Commission and Mills College, "Industrial Organization and Trade Liberalization: Evidence from Korea"

Discussants: Dani Rodrik, NBER and Harvard University, and Marie C. Thursby, NBER and Purdue University

Anderson develops a new index of trade distortion and applies it to cheese import policy from 1964–79. His index shows that the average effective quota loosened by an average annual rate of 11 percent. The conventional measure, a trade-weighted average of tariff equivalents, *rises* by an average of 4 percent per year. Most significantly, the two measures show opposite movements in restrictiveness in eight of the 15 years. Using Anderson's measure, recent quota reform is equivalent to a 90 percent increase in the average quota, which in turn is about 25 percent of the increase implied by a return to free trade.

In 1980–8, approximately 400 antidumping petitions were filed with the U.S. Department of Commerce, but nearly one-third of them were withdrawn. Prusa finds that political variables, such as congressional representation and industry size, are the key determinants of the withdrawal decision. To receive trade protection under antidumping laws, industries must show that they have been injured by imports as well as showing that imports were sold below cost. Prusa finds that the government's decision on whether a firm was injured by imports is not influenced by political or economic variables.

Staiger and Tabellini test empirically for evidence that government tariff-setting depends on the degree of policymakers' discretion. The authors study government tariff choices under two distinct environments: 1) tariffs set under the Escape Clause (Section 201 of the U.S. Trade Act of 1974), in which the U.S. government has wide discretion in setting tariff levels; and 2) the Tokyo Round of GATT negotiations, in which U.S. choices are limited by multilateral bargaining. Staiger and Tabellini find that the degree of policy discretion has a measurable impact on trade policy decisions.

Fung finds that the intensity of group affiliation by industry in part determines the U.S.-Japan industry trade balance. There are three types of Japanese business groups: those with prewar Zaibatsu connections; those that center around main banks; and those that center around prime manufacturers. These groups still constitute an important part of the Japanese economy. Intragroup bank financing is declining, but the relationship between manufacturer and supplier is becoming more important.

Lenway and Schuler investigate the relationship between the level of a firm's political investment in trade protection and the distribution of benefits from trade protection in the steel industry from 1976–84. They find that firms with the largest market share make the largest political investments in trade protection. However, these firms do not benefit from trade protection any more than less politically active steel firms. Lenway and Schuler also conclude that minimills, the most efficient U.S. producers, are made worse off from the imposition of trade protection in the steel industry.

Roberts studies noncompetitive pricing behavior and the effects of quantitative restrictions (QRs) in the domestic and import market for footwear. She finds that the QR raises the price of domestic footwear less

than the price of imported footwear. Both domestic and Taiwanese footwear producers price competitively in the market during unrestricted and restricted periods.

Seven types of machine tools, accounting for half of U.S. machine tool imports, have been subject to Voluntary Export Restraint (VER) protection since January 1, 1987. The VER applies to imports from Japan and Taiwan, with Germany and Switzerland being "threatened" suppliers. Dinopoulos and Kreinin find that the VER raised U.S. prices by 17 percent in 1987 and caused a rent transfer of over $100 million to the exporting countries. These price effects disappeared in 1988, and there was no clearcut evidence of quality upgrading.

Eichengreen and Goulder analyze the effects of alternative trade policies designed to reduce the U.S. trade deficit. They find that a temporary import surcharge has a larger short-term impact on the trade balance than a permanent surcharge does, but a permanent surcharge has a larger impact on welfare at home and abroad. Because import surcharges improve domestic real incomes, they benefit not only import-competing industries but also domestic nontradables. Although both policies improve the trade balance initially, both worsen it subsequently. Under certain assumptions about the source of the deficit, both policies delay the date by which trade deficits are finally eliminated.

Roberts and Tybout use data from the manufacturing centers of Colombia and Chile to examine the association between plant size distributions and sectorial trade exposure. Higher levels of trade exposure, measured as higher import shares, higher export shares, or lower rates of effective protection, are correlated with smaller plant sizes. The magnitude of the effect of trade exposure on plant size declines with ease of entry and exit in the industry. High-turnover industries have plant size distributions that are substantially less sensitive to variations in trade exposure.

De Melo and Roland-Holst estimate the welfare gains that Korea would achieve from abolishing import restraints (tariffs and equivalent measures) prevailing in 1982. Under constant returns to scale in all industries, welfare gains are estimated at 1 percent of GDP. With increasing returns to scale in three industrial sectors, estimates of the welfare gain range from -0.5 percent to 10 percent of 1982 GDP, depending on assumptions made about pricing behavior and profit levels that existed under protection.

Also attending the conference were: Khalid Al Dhakil, University of Colorado; Norman Fieleke, Federal Reserve Bank of Boston; Rachel McCulloch, NBER and Brandeis University; Sule Ozler, University of California at Los Angeles; and Kenneth A. Reinert, U.S. International Trade Commission.

The proceedings of this conference will be published for the NBER by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter.*

Workshop on Price Measurement

Over 100 economists and statisticians attended a Conference on Research in Income and Wealth workshop on price measurements and their uses, in Washington on March 22-23. The conference program, organized by Murray F. Foss, American Enterprise Institute; Marilyn Manser, Bureau of Labor Statistics (BLS); and Allan Young, Bureau of Economic Analysis (BEA), was:

Paul R. Liegey, BLS, "Quality Adjustments in Apparel Commodities in the CPI"

Marshall B. Reinsdorf, BLS, "The Effect of Outlet Price Differentials on the Consumer Price Index"

Discussant: Joel Popkin, Joel Popkin & Company

Thomas Betsock and Irwin Gerduk, BLS, "The Problem of List Prices in the Producer Price Index: The Steel Mill Products Case"

Murray F. Foss, "Does Government Regulation Inhibit the Reporting of Transactions Prices by Business?"

Discussant: Robert Crandall, The Brookings Institution

Ernst R. Berndt, NBER and MIT, and Zvi Griliches, NBER and Harvard University, "Price Indexes for Microcomputers with a Comparison of List and Street Prices"

Brian Catron, BLS, "Including Electronic Computing Equipment Price Indexes in the Capital Equipment Component of the Producer Price Index"

Stephen D. Oliner, Federal Reserve Board, "Constant-Quality Price Change, Depreciation, and Retirement of IBM Mainframe Computers"

Discussant: Rosanne Cole, IBM Corporation

Ellen Dulberger, IBM Corporation, "Measurement and Use of Alternative Price Indexes for Selected Semiconductors"

John R. Norsworthy, Rensselaer Polytechnic Institute, and Show-Ling Jang, D.C. Public Service Commission, "Cost Function Estimation of Quality Change Embodied in Inputs: The Use of Semiconductors in Computers and Telecommunications Equipment"

Kenneth S. Flamm, The Brookings Institution, "Technological Change in Electronic Equipment: Advances in Semiconductors and Their Impact on Computer and Communications Hardware"

Discussant: Jack Triplett, BEA

Richard C. Ziemer and Pamela A. Kelly, BEA, "The Deflation of Military Aircraft"

Discussant: Arthur Alexander, The Rand Corporation

Robert B. Parker and Leo M. Bernstein, BEA, "Deflation of Exports and Imports"

Discussant: Philip Smith, Statistics Canada

John S. Greenlees, Department of the Treasury, and Kimberly D. Zieschang, BLS, "Indexes of Real Net Exports: Theory and Application"

Discussant: W. Erwin Diewert, NBER and University of British Columbia

Panel Discussion: "Implications of BEA's Treatment of Computer Prices for Productivity Measurement," Edward F. Denison, The Brookings Institution; W. Erwin Diewert; Zvi Griliches; Charles R. Hulten, NBER and University of Maryland; and Thomas Rymes, Carleton University

Historically, it has been difficult to eliminate potential bias in the Consumer Price Index (CPI) arising from the substitution of noncomparable items. This bias has been most suspect in apparel indexes that reflect minimally changing or even declining long-run prices. Liegey uses hedonic regressions to make quality adjustments for noncomparable items in the apparel CPIs for women's coats and jackets and for women's suits. He calls for the development of additional models that explain factors that influence prices of goods and services, and for the development of collection documents and review procedures that will increase the number of noncomparable items whose prices can be quality adjusted.

Reinsdorf hypothesizes that a cost of living index based on a fixed set of outlets will rise faster than the prices paid on average by consumers for three reasons: 1) continuously existing outlets whose comparative prices decline will capture increased proportions of the expenditures of searching consumers; 2) outlets that successfully enter the marketplace will offer lower quality-adjusted prices than incumbents, on average, but costly consumer search will allow incumbents to delay adjusting prices to match the entrants; and 3) outlets that exit will have higher costs and prices, but the cost of consumer search may permit them to survive long enough to appear in index samples. Reinsdorf compares average prices in the old and new outlet samples and finds that outlet substitution bias is present in the food and fuel components of the CPI.

In January 1986 the steel industry lowered list prices and simultaneously reduced discounts in order to restore the 1982 relationship between list and net transactions prices. The Producer Price Index (PPI) for steel, which assumed that the 1982 relationship of list and transactions prices had remained stable, fell 4.2 percent in a month when transactions prices were rising. Betsock and Gerduk show that list prices are not suitable proxies for net transactions prices for measuring month-to-month changes in the steel industry, although they may be acceptable in long-term price measurement.

Foss briefly reviews the history of problems with list and transactions prices in the PPI that concluded with the 1979–86 expansion in sample size and the shift to probability sampling for four-digit industries. He asserts that the best sample design can be frustrated if companies refuse to cooperate, or if they fail to submit transactions prices. Foss provides data response rates, but not on whether firms report true transactions prices. He hypothesizes that the Robinson–Patman Act, a law against price discrimination dating from the 1930s, may discourage firms from reporting transactions prices, because responses to the BLS do not have the same legal immunity as those to the Census Bureau do. Foss suggests that the BLS might get better proxies for transactions prices if it accepted more averaging over time or over contracts.

Berndt and Griliches focus on the interpretation of implicit price indexes and coefficients from hedonic price equations, using detailed data from the retail and discount U.S. microcomputer (PC) markets. The simultaneous existence of incumbent, entering, and exiting models of computers raises issues of product heterogeneity in the PC market and of the nature of price and quality competition. It also creates some ambiguity in how one constructs and interprets price indexes. Berndt and Griliches report results from the estimation of a variety of hedonic regression equations using an unbalanced panel dataset for 1265 model-years from 1982–88, and they develop and implement empirically a specification test for selecting preferable hedonic price equations. They also report quality-adjusted price indexes, computed using a variety of procedures and having varying interpretations.

Catron examines the impact of including the experimental computer hardware price indexes calculated by the PPI program in an important high-level price index aggregate: the capital equipment of the finished goods stage-of-processing index. His analysis covers January 1987 through October 1989. The trend in computer hardware prices is sharply downward. The resulting recalculated indexes suggest that existing estimates of inflation are overstated, even for high-level index aggregates.

Oliner uses data on secondhand market prices for IBM mainframe computers to estimate their rate of quality-adjusted price change and their rate of depreciation. He also analyzes data on the installed stock of IBM mainframes to derive the implied distribution of retirements for these computers. He estimates that between the early 1970s and the mid-1980s, quality-adjusted prices for IBM mainframes on the secondhand market fell at an average annual rate in excess of 20 percent, a rate of decline slightly more rapid than that found in recent studies employing data on list prices. He also finds the pattern of depreciation for IBM mainframes to be nearly geometric, with price declining about 32 percent with each extra year of age. The estimated retirement distribution shows that IBM mainframes have had an average service life of about seven years. Taken together, the results on depreciation and retirement patterns suggest that the BEA's series on net capital stock for office and computing equipment may substantially overstate the value of such assets.

Electronic components have been largely responsible for both price declines and quality improvements in computer processors. Yet the component PPIs for electronic products used in the manufacture of processors do not show the same decline as the quality-adjusted price index of computer processors used in NIPAs (National Income and Product Accounts). Dulberger

finds that the NIPA deflator correctly measures the decline in quality-adjusted prices.

Norsworthy and Jang report quantitative evidence of quality change in semiconductors based on their use in telecommunications equipment manufacture. They estimate variable cost function models for computers and two telecommunications equipment manufacturing industries: telephone and telegraph equipment, and other telecommunications equipment. In these models, unmeasured quality change in semiconductors is assumed to be proportional to technology-related characteristics of semiconductors: device density and microprocessor bit width. Because there may be significant unmeasured quality change in telecommunications equipment itself, the estimates of implied quality change based on substitution patterns may be interpreted as lower bounds on actual quality change. They find that the quality change implied by the use of semiconductors in telecommunications equipment is considerably lower than that implied by their use in computers, largely because the output of computers has been adjusted for performance change. The multiple characteristics of semiconductors are consistent with different rates of effective quality change in different uses.

Flamm examines the widely divergent price series on the single most important semiconductor product, DRAMs. The DRAM market is segmented with contract prices accounting for 70 percent of sales. Flamm uses a sample of actual DRAM contracts to calculate a price index and concludes that data disaggregated by region and by distribution channel are essential to measure the effects of prices on chip consumers. A relatively low-cost data collection effort—possibly including the use of advertised prices as well as contract data provided by large consumers—could improve price measures of this important high tech commodity.

Ziemer and Kelly describe the major criteria used in developing measures of constant-dollar defense purchases for weapons systems within the framework of the NIPAs. Using the typical case of military aircraft, they describe price derivation, quality adjustments, learning curves, and splicing techniques. They examine the effects of the choice of the base period, specifically in relation to the aircraft's learning curve. They also report on the effect of quality adjustments on the constant-dollar series and on the effect of size of purchase on the implicit price deflators.

Parker and Bernstein trace the major changes since 1970 in the source data and estimating methods used in the deflation of exports and imports in the NIPAs. They provide a complete description of the present methodology, including deflation of net exports on what is called the command basis, and discuss the deflation of the counterentries that appear in other components of GNP. They conclude with comments on further improvements in the methodology, including both changes to be introduced in forthcoming annual and comprehensive revisions and improvements proposed for the more distant future.

Greenlees and Zieschang derive fixed-weight and superlative index number formulas for a nation's real balance of trade. Using published and unpublished data from the BLS and the Department of Commerce at the two-digit Standard International Trade Classification level, they compute quarterly indexes for the United States for 1978–88. They compare their estimated indexes to NIPA indexes and contrast the movements of their fixed-weight indexes to alternative superlative indexes based on the chain principle.

In the panel discussion, Denison faults the BEA's treatment of computer prices because: 1) the BEA fails to account for the use of labor and other inputs in computer operations; 2) BEA output measures overweight computer prices; and 3) the BEA attributes improvements in computer design to capital rather than advances in knowledge. Diewert, Griliches, Hulten, and Rymes find the BEA's computer price index more to their liking. Diewert and Griliches recommend the use of superlative index numbers and chaining to minimize index number bias, and the use of hedonic techniques to estimate shadow prices of new goods in the early part of the learning curve. Griliches and Rymes also point out that the BEA computer price index may be misused because inputs to the computer industry are not deflated by the same kind of index and productivity advance. Hulten comments that if capital is produced more efficiently, the economy needs less saving to sustain the original level of capital. Rapid technical change makes the measurement of capital stocks more difficult, according to Diewert.

Helen Stone Tice of the BEA assisted in the preparation of this article.

There will be a conference volume, edited by the program organizers and published by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.

Financial Crisis

As a part of its project on "The Risks of Economic Crisis," the NBER held a conference on "Financial Crisis" on March 22–24. The project as a whole studies both the domestic and the international sources of economic crises and the links between financial and more general macroeconomic crises. Previous conferences, organized by Sanford J. Grossman and Martin Feldstein, dealt with stock market volatility and reducing the risk of economic crisis, respectively.

Research Associate R. Glenn Hubbard, Columbia University, organized this conference program:

Frederic S. Mishkin, NBER and Columbia University, "When Do We Need a Lender of Last Resort? A Historical Perspective"
Discussant: Gary Gorton, University of Pennsylvania

Mark L. Gertler, NBER and University of Wisconsin at Madison; R. Glenn Hubbard; and Anil Kashyap, Federal Reserve Board, "Interest Rate Spreads, Credit Constraints, and Investment Fluctuations"

Ben S. Bernanke, NBER and Princeton University, and Harold James, Princeton University, "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison"
Discussant: Michael D. Bordo, NBER and Rutgers University

Barry J. Eichengreen, NBER and University of California at Berkeley, and Peter M. Garber, NBER and Brown University, "Before the Accord: U.S. Monetary-Financial Policy, 1945-51"
Discussant: Frederic S. Mishkin

Charles W. Calomiris, Northwestern University, and Gary Gorton, "The Origins of Banking Panics: Models, Facts, and Policy Implications"
Discussant: George Benston, Emory University

Paul R. Krugman, NBER and MIT, "External Shocks and Macroeconomic 'Hard Landings'"
Discussant: Peter M. Garber

Bankim Chada and Steven Symansky, International Monetary Fund, "Sustainability, Premia, and the Dollar"
Discussant: Cara S. Lown, Federal Reserve Bank of Dallas

George Benston; Michael Carhill, Federal Home Loan Bank of Atlanta; and Brian Olasov, Emory University, "The Failure and Survival of Savings and Loan Associations: Evidence from the Southeast"
Discussant: Patric H. Hendershott, NBER and Ohio State University

Patric H. Hendershott, and James D. Shilling, Louisiana State University, "The Continued Interest Rate Vulnerability of Thrifts"
Discussant: Eduardo S. Schwartz, University of California at Los Angeles

Eduardo S. Schwartz and Walter N. Torous, University of California at Los Angeles, "Caps on Adjustable Rate Mortgages: Valuation, Insurance, and Hedging"
Discussant: James D. Shilling

Mishkin examines the nature of financial crises from a historical perspective, using the literature on asymmetric information and financial structure. He focuses on U.S. financial crises beginning with the panic of 1857 and ending with the stock market crash of October 19, 1987. The asymmetric information approach explains the patterns in the data and many features of these crises that are hard to explain otherwise. It also suggests why financial crises have had such important consequences for the aggregate economy over the past 150 years.

Recent time-series work in macroeconomics has emphasized the role of the spread between interest rates on risky and safe debt in forecasting real GNP. Although the statistical relationship between the spread and output appears robust, relatively little effort has been devoted to providing a sound structural interpretation of the evidence. Gertler, Hubbard, and Kashyap argue that there may be a financial element in the business cycle propagation mechanism. Their reasoning draws heavily on some recent theoretical work that links informational problems in capital markets at the micro level with fluctuations in aggregate economic activity. They also provide some supporting econometric evidence, extending methods used recently to test for the impact of credit-market imperfections in investment.

Recent research on the Great Depression suggests that a major cause of the collapse was a worldwide deflation of price levels, which itself was the product of a structurally flawed and mismanaged international gold standard. Still at issue, though, is the exact link between falling prices and falling output in the early 1930s; that is, what was the transmission mechanism from deflation to depression? Bernanke and James suggest that deflation-induced financial crises (particularly banking crises) disrupted the normal operation of credit markets and helped transform deflation into depression. Using annual data for 20 countries, they confirm that countries that, for institutional or historical reasons, had more severe banking crises, also suffered significantly larger declines in output. They also present evidence that banking crises, particularly those in the United States, may have intensified the world deflation.

Eichengreen and Garber analyze U.S. monetary and financial policy from World War II until the famous Treasury-Fed Accord of 1951. During this period, government interest rates were stabilized at 2.5 percent or less, despite swings in the annual inflation rate from 25 percent to -3 percent to 10 percent. These pronounced fluctuations in ex post real interest rates did not undermine the stability of financial institutions; there were only five bank suspensions between 1945 and 1951. The authors show that the juxtaposition of periods of rapid inflation and deflation with stable nominal interest rates is a corollary of the Fed's implicit policy of maintaining a target zone for the price level. Eichengreen and Garber show how a credible price-level target zone regime decoupled inflation from inflationary expectations and stabilized nominal interest rates. They also argue that the Fed adhered to this target zone regime because of perceived threats to financial stability. In the aftermath of World War II, higher interest rates were thought to pose a threat to the stability of a U.S. banking system heavily invested in government bonds. Only when the banks' exposure to bond market risk had been reduced was policy reoriented toward other targets.

Are banking panics the by-product of random shocks to money demand under unit banking, or the result of a combination of adverse news about bank assets and uncertainty about losses of unit banks because of asymmetric information? Calomiris and Gorton favor the asymmetric information view. A model that sets a threshold level of tolerance for bank risk associated with asymmetric information can predict banking panics perfectly.

They occur if asset prices decline by a sufficient magnitude and commercial failures increase by a sufficient magnitude. Panics happen near business cycle peaks, and especially during the spring and fall. These are periods when leverage is high, and when the variance of news about asset values is greatest. Furthermore, prepanic periods are not associated with large interregional movements of money, nor with withdrawals from banks. Finally, the resolution of panics seems to depend on a restoration of public confidence in banks rather than on the availability of money, per se.

Krugman examines the rationales for fearing that a loss in confidence by foreign investors could produce a macroeconomic crisis in the United States. This risk depends crucially on the possibility of inflationary impacts of exchange depreciation: depreciation is less inflationary when the economy begins with excess capacity. Krugman compares U.S. experience in 1985–8 with previous dollar depreciations and with the Latin American experience.

The sustainability of the U.S. external position hinges on the willingness of international investors to add U.S. liabilities to their portfolios. Chadha and Symansky argue that investors are not likely to allow a "large" buildup of such claims. They model the effects of foreign investors imposing a "sustainable" foreign asset ratio on the United States, by positing the existence of a premium on dollar assets when the foreign asset position is expected to deviate from this level. The process presents an example of a self-correcting mechanism for attaining external balance. Simulations show that the premiums required may be modest for "correcting" potentially large movements in net foreign asset positions. However, the costs of such an imposed adjustment can be substantial in terms of lost output. Moreover, in the absence of a fiscal correction, this imposed external adjustment is likely to worsen the fiscal situation, thus increasing the costs of adjustment in terms of private consumption, investment, and future output.

Benston, Carhill, and Olasov consider seven hypotheses that purport to explain why some savings and loans (S&Ls) failed and some survived during the 1980s. They use data on 517 S&Ls operating continuously from year-end 1984 through year-end 1988, and for 62 S&Ls that ceased independent operations during this period. The data are derived from regulatory financial statements filed by the southeast (fourth) district. Interest rate increases in the 1980s rendered many S&Ls economically insolvent (although they continued to operate), even after interest rates declined somewhat. At year-end 1984, the market values of continuously operating S&Ls were 72 percent lower on average than their recorded book values. In this preliminary work, the authors find some, but not conclusive, evidence of greater risk-taking by S&Ls with low net worth.

The current FSLIC debacle generally is viewed as the result of sharply rising interest rates that eliminated the net worth of thrifts funding fixed-rate loans with short-term deposits, and thrifts responding by taking even greater risks. Hendershott and Shilling ask how vulnerable thrifts remain to an interest rate experience similar to the one that triggered the current debacle. They find that thrifts are even more vulnerable now than they were in 1977. The dollar volume of fixed-rate mortgages funded by short-term deposits is greater now than it was then, and thrifts also have put more than $325 billion of adjustable-rate loans with rate caps on their balance sheets. A sharp rise in interest rates (the one-year Treasury rate rose by nine percentage points between 1977 and 1981) would cause significant losses on these loans, as well as on the fixed-rate loans.

Schwartz and Torous develop a method of valuing adjustable-rate mortgages. They incorporate the conditional probability of prepaying as a function of the age of the mortgage and prevailing interest rates. The authors also estimate the value of lifetime and periodic cap options for different mortgage features. They conclude that the originators of adjustable-rate mortgages could minimize the interest rate risk by taking offsetting positions in other interest-sensitive securities, such as bonds or bond futures.

The proceedings of this conference will be published as an NBER conference volume. When it is available, announcement of it will appear in the *NBER Reporter*.

The Economics of Aging

The NBER held a conference on the Economics of Aging on April 6–7. The agenda, organized by Project Director David A. Wise of Harvard University, was:

Robin L. Lumsdaine, Harvard University, and James H. Stock and David A. Wise, NBER and Harvard University, "Three Models of Retirement: Computational Complexity versus Predictive Validity"

Discussant: Sylvester J. Scheiber, The Wyatt Company

John P. Rust, NBER and University of Wisconsin at Madison, "Estimation of a Dynamic Programming Model of Retirement Behavior"

Discussant: Daniel L. McFadden, NBER and MIT

Thomas E. MaCurdy and John B. Shoven, NBER and Stanford University, "Stocks, Bonds, and Pension Wealth"

Discussant: Jonathan Skinner, NBER and University of Virginia

Axel H. Börsch-Supan, NBER and University of Mannheim; Vassilis Hajivassiliou, Yale University; Laurence J. Kotlikoff, NBER and Boston University; and John Morris, Hebrew Rehabilitation Center for the Aged, "Health, Children, and Elderly Living Arrangements: A Multiperiod-Multinomial Probit Model with Unobserved Heterogeneity and Autocorrelated Errors" (NBER Working Paper No. 3343)

Discussant: Steven F. Venti, NBER and Dartmouth College

Axel H. Börsch-Supan; Jagadeesh Gokhale, Boston University; Laurence J. Kotlikoff; and John Morris, "Modeling Extended Family Transfers of Time and Money"

Discussant: Konrad Stahl, University of Mannheim

Michael D. Hurd, NBER and University of New York at Stony Brook, "Wealth Depletion, Consumption, and Aging"

Discussant: Lee Lillard, The Rand Corporation

Angus S. Deaton, NBER and Princeton University, and Christina H. Paxson, Princeton University, "Aging and Savings Patterns in the Ivory Coast and Thailand"

Discussant: Fumio Hayashi, NBER and University of Pennsylvania

Tatsuo Hatta, Osaka University, and Noriyoshi Oguchi, Tsukuba University, "Switching the Japanese Social Security System from Pay-As-You-Go to Fully Funded"

Discussant: Edward P. Lazear, NBER and University of Chicago

Alan M. Garber, NBER and Stanford University, and Thomas E. MaCurdy, "Payment Source and Episodes of Institutionalization"

Discussant: Paul J. Gertler, The Rand Corporation

Edward Norton, MIT, "Incentive Regulation of Nursing Homes"

Discussant: Sherwin Rosen, NBER and University of Chicago

Lumsdaine, Stock, and Wise compare the accuracy of three models in predicting retirement from a *Fortune* 500 company. Their study is based on actual retirement under the company's temporary "window plan" that provided a compensation bonus, equal to between 3 and 12 months of salary, to any employee aged 55 to 65 who agreed to retire in 1982. In 1981, before the window plan, about 37 percent of employees chose to retire by age 60. In 1982, when the window plan was in effect, about 77 percent of employees chose to retire by age 60. Thus, window plans can have enormous effects on retirement and can be a powerful tool of labor force management. The authors find that the "option value" model and the dynamic programming models are equally successful in predicting this retirement behavior; both are much better than more standard models.

Rust's paper is part of a comprehensive project on modeling retirement behavior. This paper deals primarily with the limitations of the data in the Retirement History Survey, the importance of interpreting data measurements carefully, and the difference between alternative measures of retirement behavior. For example, "when people stop working" is not the same as "when people apply for Social Security benefits," which is not the same as "when Social Security benefits begin to be paid."

MaCurdy and Shoven find that the long-term rate of return on stocks is higher than the long-term rate of return on bonds. Also, the long-term rate of return on stocks of smaller firms is higher than the long-term rate of return on stocks of larger firms for any consecutive 25-year period since 1925. Over the average 35-year career with regular contributions to a retirement fund, stock investments will be worth 3.5 times as much as bond investments to an individual at retirement. Even in the worst 35-year period since 1925, stock investments were worth 55 percent more than bond investments. Despite the difference in returns, though, fewer than 20 percent of TIAA-CREF participants choose to put more than half of their retirement savings into stock investments.

Börsch-Supan, Hajivassiliou, Kotlikoff, and Morris first confirm that increasing age and decreasing functional ability are the most important factors influencing the decision to enter a nursing home, But while past studies suggest that people with higher incomes were less likely to live in nursing homes, the current study finds that income has no effect on institutionalization.

Börsch-Supan, Gokhale, Kotlikoff, and Morris find that children not living with their elderly parents spend an average of 17 hours per month with them; the median amount of time spent is eight hours. Male children spend five hours less per month with their elderly parents than female children. Parents who are in poor health spend more time with their children, unless the parents are in nursing homes; then they spend less time together. Also, children spend more time with older parents.

Using data from the Retirement History Survey, Hurd finds that wealth, excluding housing, declines by about 3 percent per year during retirement. Wealth including housing declines by about 1.5 percent per year. Average consumption expenditures also decrease, by 2–4 percent per year. Hurd interprets these findings as consistent with the life-cycle theory. Hurd looks for a bequest motive in the data, but finds no significant difference in the wealth or the consumption patterns of people with and without children.

Older people in both Thailand and the Ivory Coast tend to live with younger relatives in multigenerational households. Deaton and Paxson report that, since living standards tend to be averaged within households, economic status is likely to be less variable over the life cycle in these countries. In addition, multigenerational households provide old-age insurance without needing to accumulate and decumulate assets. Savings are necessary only to smooth consumption through short-term variations in household income, rather than to smooth consumption over the life cycle.

Hatta and Oguchi describe a plan for switching the Japanese social security system from a pay-as-you-go to a fully funded program, so that the burden of support for the retiring baby-boom generation is not placed disproportionately on the subsequent generation. Under this plan, currently paid social security taxes would be deposited in a social security pension fund, which would then operate as a fully funded program. The retirement income liabilities already accrued by the government for past employment would be explicitly recognized through the issuance of a "liquidation

bond." Redemption of the liquidation bond would occur gradually over future generations, so that no one generation would bear a large share of the burden. According to Hatta and Oguchi, the change to a fully funded system would reduce fluctuations in the saving rate and the trade balance, remove the disproportionate burden of support from the post-baby-boom generation, and increase net government saving.

Garber and MaCurdy find that the average duration of a nursing home stay is 56 days when Medicare is the initial source of payment; 134 days when Medicaid is the initial source of payment; and 120 days when the initial payments are made privately. Women stay longer in nursing homes than men, especially those with Medicaid or those who pay privately. Age increases the length of stay for Medicare admissions, but not for admissions with other payment sources. Garber and MaCurdy also find that Medicaid patients are likely to enter nursing homes for very long periods that terminate either in death or transfer to a hospital. Those who pay privately are most likely to return to the community; Medicaid admissions are least likely. Death, rather than a change in living arrangements, is the most likely result for Medicare admissions, and the least likely result for private-pay admissions.

Norton analyzes the results of an experiment designed to improve the quality and effectiveness of nursing home care. Participating nursing homes were given financial incentives to admit sicker residents, improve their health, and discharge anyone capable of living at home or in a nursing home with less care. These nursing homes reduced the average length of stay of their residents and admitted people with greater disabilities than other homes. Because of the excess demand for nursing home care, Norton argues that the shorter duration of nursing home stays does not reduce Medicaid costs for nursing home care. However, total Medicaid costs are decreased, because Medicaid patients are transferred more quickly from hospitals to nursing homes, which are less expensive.

These papers and discussants' comments will be published in a Bureau conference volume. Its availability will be announced in a future issue of the *NBER Reporter*.

Project On Economic Growth Meets

On April 12–14, the NBER's Project on Economic Growth held its third in a series of semiannual conferences. Project Directors Robert J. Barro, Harvard University, and Paul M. Romer, University of Chicago and Stanford University, organized the following program:

Zvi Griliches, NBER and Harvard University, "The Search for R and D Spillovers"
Discussant: Boyan Jovanovic, New York University

Kevin M. Murphy, Andrei Shleifer, and Robert W. Vishny, NBER and University of Chicago, "The Allocation of Talent: Implications for Growth"
Discussant: Olivier J. Blanchard, NBER and MIT

J. Bradford De Long and Lawrence H. Summers, NBER and Harvard University, "Equipment Investment, Relative Prices, and Economic Growth"
Discussant: Anne O. Krueger, NBER and Duke University

David K. Backus and Patrick J. Kehoe, Federal Reserve Bank of Minneapolis, and Timothy J. Kehoe, University of Minnesota, "In Search of Scale Effects in Trade and Growth"
Discussant: Maurice Obstfeld, NBER and University of California at Berkeley

Alan Heston and Robert Summers, University of Pennsylvania, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–87"
Discussant: Edward E. Leamer, NBER and University of California at Los Angeles

Bruce C. Greenwald, Bell Communications Research; Michael A. Salinger, Columbia University; and Joseph E. Stiglitz, NBER and Stanford University, "Imperfect Capital Markets and Productivity Growth"
Discussant: Nick Stern, London School of Economics

Nancy L. Stokey, Northwestern University, "Human Capital, Product Quality, and Growth"
Discussant: Alwyn Young, Columbia University

Gene M. Grossman, NBER and Princeton University, and Elhanan Helpman, NBER and Tel Aviv University, "Quality Ladders and Product Cycles" (NBER Working Paper No. 3201)
Discussant: Robert E. Lucas, Jr., NBER and University of Chicago

Griliches surveys the literature on R and D spillovers, which are defined as external effects on a firm or industry's productivity that come from the knowledge or productive activity of other firms or industries. He concludes that the evidence presented in previous studies suggests that these spillovers exist and can be quite large. Hence, social and private returns to R and D can diverge substantially.

Murphy, Shleifer, and Vishny presume that people with entrepreneurial ability will be attracted to sectors with large markets, slowly diminishing returns to entrepreneurship, and contracts that allow their talent to be identified and compensated. The best entrepreneurs in an industry provide the best new ideas, which spill over to other firms and, thereby, lead to growth of the industry. Because individual entrepreneurs do not capture the full benefits from this spillover, several types of distortions are possible. Entrepreneurs may concentrate too heavily in sectors that reward entrepreneurship, since growth and social welfare would be enhanced if they spread themselves out. Also, various activities—including government, law, finance, and religion—may attract entrepreneurs and may have a neg-

ative effect on economic growth. For example, there is some evidence that the growth rate of per capita GDP is related positively to the fraction of college students majoring in engineering (a proxy for productive use of talent) and negatively to the fraction majoring in law (a proxy for "rent seeking").

De Long and Summers find that one measure of the ease of industrialization—the relative price of producer durables—is correlated negatively with the growth rate of real per capita GDP in 30 rich countries. They argue that some of the successful Asian countries have supported industrialization with policies that fostered low prices of producer durables. On the other hand, some unsuccessful South American countries have supported industrialists through policies that led to high prices of producer durables. They conclude that supporting industrialization is more conducive to growth than supporting industrialists.

Backus, Kehoe, and Kehoe ask if increasing returns from learning by doing, spillover effects related to human capital, or the fixed costs that apply to R and D contribute to economic growth. Growth may be related positively to per capita measures of inputs into the education process. However, the authors find little association between per capita growth and total GDP or total manufacturing output or measures of inputs into R and D, such as the numbers of scientists and engineers, or the share of GDP spent on R and D.

Heston and Summers present the Mark 5 version of their Penn World Table on national-account variables for over 150 countries, mostly since 1950 or from 1960–87. They use four benchmark studies of the UN's International Comparison Project (1970, 1975, 1980, 1985) to compile expenditures in a common currency so that comparisons of real quantity can be made between countries and over time. They also estimate quantities and relative prices of GDP and its major components. This work extends the previous versions of the Penn World Table by: intensive use of 1985 benchmark data; expansion of the number of countries, including detailed data on several nonmarket economies; extension of the time series for most countries to 1987; and an increase in the number of variables, including some preliminary estimates of capital stocks.

Greenwald, Salinger, and Stiglitz note that if prospective returns on investment are given, then a firm's R and D expenditures are sensitive to cash flow and idiosyncratic risks. But shocks to prospective returns are hard to separate empirically from changes in cash flows and risks. To make that separation, the authors focus on the effects of oil shocks on the R and D expenditures of automakers, and the effects of deregulation on productivity improvements in the airline industry. The oil shocks have a positive effect on returns to R and D (through the design of fuel-efficient cars), but cause R and D expenditures to decline, apparently in response to reduced cash flows. Similarly, airline deregulation may have had a negative effect on productivity growth in the industry.

Stokey relates the accumulation of human capital and the quality of consumption goods to economic growth and international trade. The accumulation of human capital and the economic growth rate both depend on intergenerational spillovers of knowledge and on the amount of time that individuals decide to devote to learning. Further, "higher-quality" individuals are needed to produce higher-quality goods; hence, increased quality of goods is linked directly to the accumulation of human capital. International trade affects both the incentives to acquire human capital and the growth rate. However, it is uncertain whether a country's opening to trade tends to make income levels converge or diverge.

Grossman and Helpman develop a two-country model of endogenous innovation and imitation. Firms in one country race to bring out the next generation of products. Each product can be improved indefinitely, but these improvements are costly and entail uncertain prospects of success. In the other country, entrepreneurs invest in learning the production processes of their competitor; successful imitations thrive, because costs of production are lower. Innovation and imitation respond to changes in the sizes of the two regions and to policies that promote learning in each region. In partiicular, increases in the incentive to imitate turn out to have an ambiguous effect on the incentive to innovate.

Also attending the conference were: William Easterly, the World Bank; and Xavier Sala-i-Martin, Harvard University, who assisted in the preparation of this article.

A forthcoming issue of the *Quarterly Journal of Economics* (MIT Press) will be devoted to this conference.

Asset Pricing and Financial Markets

About 75 economists met in Cambridge on May 11–12 for an NBER-sponsored Universities Research Conference on "Asset Pricing and Financial Markets." NBER Research Associate John Y. Campbell, Princeton University, organized the following program:

Blake LeBaron, University of Wisconsin, "Some Relations between Volatility and Serial Correlations in Stock Market Returns: The Dow Jones Industrials, 1850–1989"

Discussants: Gregory Duffee, Federal Reserve Board, and Gautam Kaul, University of Michigan

Paul McNelis, Georgetown University, and Salih Neftci, City University of New York, "An Investigation of Speculative Bubbles as Geometric Shapes in Stock Prices"

Discussants: Andrew W. Lo, NBER and MIT, and Philip Rothman, New York University

Giuseppe Bertola, Centre for Economic Policy Research and Princeton University, and Ricardo J. Caballero, Columbia University, "Target Zones and Realignments"

Discussants: Peter M. Garber, NBER and Brown University, and Maurice Obstfeld, NBER and University of California at Berkeley

Murugappa Krishnan, Purdue University, and Jordi Caballe, University of Barcelona, "Insider Trading and Asset Pricing in an Imperfectly Competitive Multi-Security Market"

Discussants: Albert S. Kyle, University of California at Berkeley, and Asani Sarkar, University of Illinois

Joel Hasbrouck, New York University, "Stock Trades and Informational Asymmetries: An Econometric Analysis"

Discussants: Maureen O'Hara, Cornell University, and Kenneth J. Singleton, NBER and Stanford University

Kenneth A. Froot, NBER and Harvard University; David A. Scharfstein, NBER and MIT; and Jeremy Stein, Harvard University, "Herd on the Street: Informational Inefficiencies in a Market with Short-Term Speculation" (NBER Working Paper No. 3250)

Discussants: Gary Gorton, NBER and University of Pennsylvania, and Andrei Shleifer, NBER and University of Chicago

K. Geert Rouwenhorst, University of Rochester, "Asset Returns and Business Cycles: A General Equilibrium Approach"

Discussants: Stephen G. Cecchetti, NBER and Ohio State University, and Pamela Labadie, Columbia University

Mervyn A. King, NBER and London School of Economics, and Enrique Sentana and Sushil Wadhwani, London School of Economics, "A Heteroskedastic Factor Model of Asset Returns and Risk Premia with Time-Varying Volatility: An Application to Sixteen World Stock Markets"

Discussants: Peter Bossaerts, Carnegie-Mellon University, and Campbell Harvey, Duke University

John H. Cochrane, University of Chicago, "Production-Based Asset Pricing and the Link between Stock Returns and Economic Fluctuations" (NBER Working Paper No. 3212)

Discussants: Ronald Balvers, University of Notre Dame, and A. Craig MacKinlay, NBER and University of Pennsylvania

LeBaron studies the relationship between volatility and serial correlation of daily and weekly stock returns. He finds that the first-order serial correlation of returns is lower when volatility is higher. This could be caused in part by the "nontrading effect": when some stocks are not traded, stock index returns display spurious positive serial correlation, but nontrading is less common when volatility is high. However, LeBaron argues that nontrading is not a complete explanation for this puzzling phenomenon.

McNelis and Neftci propose a new method for detecting the existence of speculative bubbles in asset prices. They argue that a speculative bubble has a characteristic shape: first, exponential growth in the stock price, and then a sudden collapse. They calculate a measure of "distance" between prespecified bubble shapes and the observed data at each point in time. An appropriate standard error then indicates at which points the data and bubble come close to resembling each other. They apply their method to U.S. stock prices in 1850–1989 and find that there were surprisingly few episodes during which the pattern of stock prices resembled that of the 1987 stock market crash.

According to recent models of credible exchange rate bands, the exchange rate should spend most of its time at the edge of its band, and the interest rate differential should predict that the exchange rate will return from the edge to the center of the band. Bertola and Caballero find that recent experience in the European Monetary System contradicts these implications. They argue that a model with exchange rate realignments fits the data better.

Krishnan and Cabbale model the behavior of an informed insider who may have superior information about the future value of several securities and wishes to profit from this information. Their model also includes uninformed liquidity traders and marketmakers who observe the order flows for several securities simultaneously. The insider will tend to camouflage his demand by spreading it across several securities, so the model provides a rationale for portfolio diversification beyond the usual motive of risk reduction.

Hasbrouck argues that the importance of asymmetric information in a particular security market can be measured by calculating the proportion of the price innovation variance that is attributable to trading in the security. He corrects this measure for temporary imperfections in measured prices by estimating a long-run or efficient price at each point in time. Hasbrouck finds that asymmetric information has a more important effect on the prices of small stocks than on the prices of large stocks.

Froot, Scharfstein, and Stein discuss the popular notion that speculators with short horizons can damage the social value of financial markets. They present a model in which speculators with short horizons may "herd" on the same information , trying to learn what other informed traders also know, instead of trying to learn what others do not know. There can be multiple herding equilibriums, and herding speculators may even choose to study information that is completely unrelated to fundamentals. Herding equilibriums are informationally inefficient in that asset prices incorporate less information than they would otherwise.

Rouwenhorst studies the relationship between the business cycle and changing expected returns on stocks and bonds. He presents a simple real business cycle model with production in which assets such as risky corporate bonds and levered equity can be studied naturally. The model fits the predictability of stock market

returns at long horizons, and the tendency for returns and volatility to be high during recessions.

King, Sentana, and Wadhwani ask what forces affect the changing variances and covariances of returns in 16 national stock markets. They estimate a model with observable and unobserved macroeconomic factors, and allow the variances of the factors and idiosyncratic shocks to change through time. The authors find that only a small proportion of the covariance between national stock markets can be accounted for by observable macoreconomic variables.

Cochrane looks at the relationship between stock returns and investment. He derives a theoretical restriction between the stock market and the "investment return," a nonlinear function of investment that is close to the growth rate of the investment capital ratio. He finds that the investment return moves closely with the aggregate stock market and is forecast by the same variables. This suggests that it may be easier to understand the relationship between the stock market and production than the relationship between the stock market and consumption, even though the latter has been the focus of much recent research.

Conference Calendar

Each *NBER Reporter* includes a calendar of upcoming conferences and other meetings that are of interest to large numbers of economists (especially in academia) or to smaller groups of economists concentrated in certain fields (such as labor, taxation, finance). The calendar is primarily intended to assist those who plan conferences and meetings, to avoid conflicts. **All activities listed should be considered to be "by invitation only," except where indicated otherwise in footnotes.**

Organizations wishing to have meetings listed in the Conference Calendar should send information, comparable to that given below, to Conference Calendar, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please also provide a short (fewer than fifty words) description of the meetings for use in determining whether listings are appropriate for inclusion. The deadline for receipt of material to be included in the Fall 1990 issue of the *Reporter* is September 1. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss Davis at (617) 868-3900.

July 20-22, 1990
The Standard of Living in Early 19th Century America, NBER

July 23-26, 1990
Franco-American Economic Seminar, NBER

July 31-August 1, 1990
Program Meeting: International Studies, NBER

August 2-3, 1990
International Seminar on International Trade, NBER

August 3, 1990
U.S.-Japan Corporate Finance Symposium, NBER

August 6-9, 1990
Joint Statistical Meetings, American Statistical Association*

August 9-10, 1990
Program Meeting: International Studies, "International Competitiveness," NBER

August 22-29, 1990
World Congress, Econometric Society*

August 26-30, 1990
46th Conference: Public Finance with Several Levels of Government, International Institute of Public Finance*

September 13-14, 1990
Panel on Economic Activity, Brookings Institution

September 23-26, 1990
Annual Meeting, National Association of Business Economists*

October 5, 1990
Conference on Trade Policy, NBER

October 17-21, 1990
Conference on American Economic Policy, NBER

October 18-20, 1990
Annual Research Conference, Association for Public Policy Analysis and Management*

October 26, 1990
Economic Fluctuations Research Meeting, NBER

October 26-27, 1990
Conference on Microeconomic History, NBER

November 1-2, 1990
Program Meeting: Financial Markets and Monetary Economics, NBER

November 9-10, 1990
Conference on Economic Growth, NBER

November 11-14, 1990
83rd Annual Conference on Taxation, National Tax Associatiation-Tax Institute of America*

November 13, 1990
Conference on Tax Policy and the Economy, NBER

November 15-16, 1990
Program Meeting: Taxation, NBER

**Open conference, subject to rules of the sponsoring organization.*

November 16-17, 1990
Carnegie-Rochester Public Policy Conference, Carnegie-Mellon University—University of Rochester

November 18-20, 1990
Annual Meeting, Southern Economic Association*

November 30, 1990
Program Meeting: Labor Studies, NBER

December 13-14, 1990
Brookings Papers on Economic Activity: Microeconomics, Brookings Institution

December 14-15, 1990
Universities Research Conference: Exchange Rate Regimes, NBER

December 28-30, 1990
Annual Meeting, American Economic Association*

January 3-7, 1991
US/Japan Housing Markets, NBER

January 7-8, 1991
Fiscal Policies in an Open Macro Economy, NBER, Center for Economic Policy Research, and Tokyo Center for Economic Research

February 2-3, 1991
Transatlantic Public Economic Seminar, NBER

February 9, 1991
Economic Fluctuations Research Meeting, NBER

February 14-17, 1991
Second Annual U.S.-Japan Economic Forum, NBER

February 21-22, 1991
Program Meeting: Financial Markets and Monetary Economics, NBER

March 8-9, 1991
Sixth Annual Macroeconomics Conference, NBER

March 15-16, 1991
Fourth InterAmerican Seminar on Economics, NBER

April 4-6, 1991
Annual Meeting, Midwest Economic Association*

April 5-6, 1991
Conference on Tax-Exempt Debt, NBER

April 11-12, 1991
Program Meeting: Taxation, NBER

April 19-20, 1991
Carnegie-Rochester Public Policy Conference, Carnegie-Mellon University—University of Rochester

May 17-19, 1991
Conference on Higher Education, NBER

June 20-22, 1991
Second Annual Conference: The Political Economy of Tax Reforms, NBER and Korea Development Institute

August 19-22, 1991
Joint Statistical Meetings, American Statistical Association*

**Open conference, subject to rules of the sponsoring organization.*

August 25-29, 1991
47th Congress: Public Finance in a Changing Political Environment, International Institute of Public Finance*

September 22-25, 1991
Annual Meeting, National Association of Business Economists*

October 2-5, 1991
20th (biannual) Conference, Center for International Research on Economic Tendency Surveys*

October 3-6, 1991
Retrospective on the Bretton Woods System: Lessons for International Monetary Reforms, NBER

October 11-14, 1991
International Atlantic Economic Conference, Atlantic Economic Society*

November 7-8, 1991
Program Meeting: Taxation, NBER

November 24-26, 1991
Annual Meeting, Southern Economic Association*

January 3-5, 1992
Annual Meeting, American Economic Association*

March 26-28, 1992
Annual Meeting, Midwest Economic Association*

May 1, 1992
Conference on Aging, NBER

**Open conference, subject to rules of the sponsoring organization.*

Bureau News

Labor Economists Meet

About 40 members and guests of the NBER's Program in Labor Studies met in Cambridge on March 30. Program Director Richard E. Baldwin, Harvard University, chose the following papers for discussion:

Orley C. Ashenfelter, NBER, Princeton University and New York University School of Law, and David E. Bloom, NBER and Columbia University, "Lawyers as Agents of the Devil in a Prisoner's Dilemma Game"

David Card and Alan B. Krueger, NBER and Princeton University, "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States" (NBER Working Paper No. 3358)

Daniel S. Hamermesh, NBER and Michigan State University, and Steven A. Woodbury, Michigan State University and W. E. Upjohn Institute, "Taxes, Fringes, and Faculty"

David L. Durbin, National Council on Compensation Insurance; Bruce D. Meyer, NBER and Northwestern University; and W. Kip Viscusi, Duke University, "Workers' Compensation and Injury Duration: Evidence from a Natural Experiment"

Ashenfelter and Bloom ask if the parties in a typical dispute are in the classic prisoner's dilemma. That is, the probability of winning the dispute may be the same if neither side has a lawyer or if both sides have lawyers; but when only one side has a lawyer, that side's chances of winning the dispute are increased. Since lawyers cost money, both sides come out ahead if they agree not to hire help. But each side in the dispute will gain an advantage by hiring a lawyer if there is no such agreement. The authors estimate the incentives for parties to obtain legal representation in wage disputes that were settled by final-offer arbitration in New Jersey. They also report briefly on similar studies of: 1) the arbitration of discharge grievances; 2) the arbitration of court-annexed disputes in Pittsburgh; and 3) the settlement of child custody disputes in California. The data indicate that all these disputes involve prisoner's dilemmas.

Card and Krueger estimate the impact of the quality of primary and secondary schooling—measured by the average term length, pupil-teacher ratio, and relative pay of teachers in the state—on the rate of return to education. They analyze 1970 and 1980 Census data and find that men who are educated in states with higher-quality schools have a higher economic return to additional years of education, if their current state of residence, state of birth, the return to education in the region where they currently reside, and other factors are held constant. A decrease in the pupil-teacher ratio from 25 to 20 pupils per teacher, for example, is associated with an increase of 0.4 percent in the rate of return to education. Importantly, the estimated relationship between the return to education and measures of school quality is roughly the same for black men and for white men, even though drastically different factors affect the level and pace of change of school quality for blacks and whites in the samples examined. Also, the return to education is lower in states with a higher fraction of male teachers and in states where the average education of teachers is lower.

The growth of employee benefits in academe has closely paralleled their economywide growth. Using panel data on nearly 1500 institutions of higher learning, Hamermesh and Woodbury find the demand for benefits to be quite responsive to changes in real income and to variations in the tax price of benefits. They estimate that the Tax Reform Act of 1986 reduced the demand for benefits by $13 to $27 billion annually.

Durbin, Meyer, and Viscusi find that the level of temporary total benefits has a strong effect on the duration of workers' compensation claims. The estimated effect varies somewhat depending on the methodology used, and whether the data are from Kentucky or Michigan. Elasticities range from .21 to .85, suggesting that workers' compensation benefits have large labor supply effects.

Program Meeting on Taxation

Over 40 members and guests of the NBER's Program in Taxation met in Cambridge on April 19–20. The agenda, organized by Program Director David F. Bradford of Princeton University and Associate Director James M. Poterba of MIT, was:

Robert J. Barro, NBER and Harvard University, and Xavier Sala-i-Martin, Harvard University, "Public Finance in Models of Economic Growth"
Discussant: Kenneth L. Judd, NBER and Stanford University

Chad Leechor and Jack Mintz, University of Toronto, "On the Taxation of Multinational Corporate Investment When the Deferral Method Is Used by the Capital-Exporting Country"
Discussant: Joel B. Slemrod, NBER and University of Michigan

David M. Cutler, MIT; James M. Poterba; Louise Sheiner, Harvard University; and Lawrence H. Summers, NBER and Harvard University, "An Aging Society: Opportunity or Challenge"
Discussant: Laurence J. Kotlikoff, NBER and Boston University

Roger H. Gordon, NBER and University of Michigan, "Do Publicly Traded Corporations Act in the Public Interest?" (NBER Working Paper No. 3303)
Discussant: Oliver Hart, MIT

Sanjay Bagat, University of Colorado, and Andrei Shleifer and Robert W. Vishny, NBER and University of Chicago, "The Aftermath of Hostile Takeovers"
Discussant: Mark A. Wolfson, NBER and Stanford University

James Berkovec, University of Virginia, and Don Fullerton, NBER and University of Virginia, "A General Equilibrium Model of Housing, Taxes, and Portfolio Choice"
Discussant: James R. Hines, Jr., NBER and Princeton University

Hans-Werner Sinn, NBER and University of Munich, "Can Direct and Indirect Taxes Be Added for Inter-

national Comparisons of Competitiveness?" (NBER Working Paper No. 3263)

Discussant: B. Douglas Bernheim, NBER and Northwestern University

Barro and Sala-i-Martin ask what is the optimal fiscal policy under several different scenarios of economic growth. They consider learning-by-doing and spillovers of knowledge; government services that are productive inputs for private producers; imperfectly competitive markets for capital goods; and producers who innovate by developing new varieties of consumer products. Under these assumptions, their analysis suggests that optimal fiscal policy involves subsidizing capital inputs while raising revenue from broad-based consumption taxes.

Leechor and Mintz consider how the deferral method of taxing the subsidiaries of multinational firms affects their cost of capital for these firms. They find that the subsidiary's cost of capital depends on the tax system in the host country, the dividend-payout ratio of the subsidiary, and the differences between the tax systems of the host and the home country.

Cutler, Poterba, Sheiner, and Summers argue that the slow growth of the U.S. population, which eventually will raise the ratio of elderly dependents to working individuals, does not justify increased national saving. They argue first that the near-term effect of the population's aging will be a decline, not a rise, in the dependent share of the population. Second, when the labor force grows more slowly, society needs to devote fewer resources to investment to preserve the level of capital per worker. This yields a "consumption dividend" that partly offsets the rising number of dependent individuals in the population. Third, other developed nations are aging more rapidly than the United States, and the need for higher U.S. saving is attenuated by the availability of foreign saving. Finally, slower labor force growth may induce faster productivity growth, counterbalancing the increase in dependency.

Models of corporate behavior normally assume that a firm acts in the interest of shareholders, and that shareholders care only about the returns they receive on the shares they own in that firm. But shareholders also should care about the effects of a manager's decisons on the value of shares they own in other firms, on the price they pay as consumers of the firm's output, on the value of the firm's bonds they own, and on government tax revenue that finances public expenditures that benefit them. Gordon argues that many of these effects are likely to be important, and he examines how a variety of conventional conclusions about corporate behavior might change as a result.

Bagat, Shleifer, and Vishny examine what happened after each of 62 successful and unsuccessful hostile takeovers between 1984 and 1986. They find that there are relatively few post-takeover layoffs, which explains about 10 to 20 percent of the takeover premium. The staff at headquarters is most at risk of a layoff. Taxes are a moderately important source of gains, but losses of bidding shareholders are not. Most importantly, hostile takeovers typically result in bustups of conglomerates and allocation of divisions to other firms in the same industry. Hostile acquirers and organizers of management buyouts usually just broker this reallocation of assets. This suggests that an important part of the 1980s' takeover wave is the breaking up of conglomerates in American industry and the return to specialization. This return to specialization appears to have been prompted by the poor performance of conglomerates and the lenient antitrust policy of the Reagan era.

Berkovec and Fullerton find that net rates of return determine how much housing an individual buys, but demographic factors determine whether or not the individual will buy versus rent a home. Levying a tax on owner-occupied housing would raise economic welfare, not only by reallocating capital but also by allowing the government to take part of the risk from individual properties and diversify it away. Measures to disallow deductions for property tax or mortgage interest paid do not help to share this risk. Berkovec and Fullerton find that the recent tax reform caused a small shift from rental to owner-occupied housing, and created welfare gains by reallocating risk.

Sinn argues that direct and indirect taxes sometimes should not be added when comparing international competitiveness. It is possible that a country with a high value-added tax needs a high capital income tax to maintain its international competitiveness and vice-versa. The correct view depends on which combination of the origin, destination, source, and residence principles prevail, and on whether accelerated depreciation is allowed.

Workshop on Macroeconomic History

NBER researchers N. Gregory Mankiw of Harvard University and Christina D. Romer of the University of California at Berkeley organized a workshop on macroeconomic history held in Cambridge on April 27. The program was:

Bennett T. McCallum, NBER and Carnegie-Mellon University, "Money and Prices in Colonial America: A New Test of Competing Theories"

Discussant: Bruce Smith, University of Western Ontario

Gary Gorton, University of Pennsylvania, "Free Banking, Wildcat Banking, and the Market for Bank Notes"

Discussant: Hugh Rockoff, NBER and Rutgers University

Frederic S. Mishkin, NBER and Columbia University, "Asymmetric Information and Financial Crises: A Historical Perspective"

Discussant: Robert J. Barro, NBER and Harvard University

Ben S. Bernanke, NBER and Princeton University, and Harold James, Princeton University, "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison (This paper is summarized in "Financial Crisis.")

Discussant: Barry J. Eichengreen, NBER and University of California at Berkeley

Daniel B. Nelson, University of Chicago, "Was the Deflation of 1929-30 Anticipated? The Monetary Regime as Viewed by the Business Press"

James D. Hamilton, University of Virginia, "Was the Deflation during the Great Depression Anticipated? Evidence from the Commodity Futures Market"

Discussant: Robert J. Gordon, NBER and Northwestern University

Was velocity stable in colonial America? McCallum examines the relationship between money holdings and price levels when colonial governments issued paper currency (bills of credit) in large amounts. In several instances, large and rapid increases in the stock of outstanding paper currency led to negligible changes in price levels. However, the money supply included specie as well as paper currency. If specie holdings declined to offset the rise in other money, velocity could have been stable even though paper currency increased sharply. Because data on both stocks and flow of specie are almost nonexistent, McCallum develops a new method for the estimation of normal real money holdings, relying on paper currency data for a few inflationary episodes. He concludes that his evidence supports a stable relationship between prices and the quantity of money.

During the American Free Banking Era, 1838-63, all banks issued distinct private monies. These bank notes circulated at discounts from face value in secondary markets located at a distance from the issuing bank. Gorton uses newly discovered data on monthly bank note prices for all banks in North America to study the secondary market for privately issued bank notes from 1838-59. He finds that the bank note market priced risk accurately. The transportation costs involved in redeeming notes explain only part of the variation in discount on the notes; bank default risk was priced diferentially, and risk premiums varied cyclically.

Mishkin looks at financial crises in the United States from the panic of 1857 to the stock market crash of October 19, 1987. He finds that asymmetric information explains patterns in the data and many features of these crises that are hard to explain otherwise. It also suggests why financial crises have had such important consequences for the aggregate economy over the past 150 years or so.

Nelson examines the discussions in the business press about the future course of prices and monetary policy from April 1929 through December 1930. He finds evidence of moderate anticipated deflation through the spring of 1930. By mid-1930, however, many commentators were warning of possibly drastic deflation ahead. Nelson also finds evidence that unusually high economic uncertainty depressed consumption in 1930.

During most of the Great Depression, futures prices were well above spot prices for most commodities; evidently the spectacular declines in agricultural prices caught many people by surprise. Hamilton suggests that deflation-induced defaults on loans, not high ex ante real interest rates, are the key to understanding rural banking failures during the Depression. Commodity markets anticipated stable consumer prices during the first year of the Depression; later, markets anticipated deflation, but not as severe as what actually occurred. According to Hamilton, the dramatic drop in nominal Treasury bill yields should be interpreted as a drop in ex ante real rates.

Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the *NBER Reporter* list titles 1-1354 and contain abstracts of the Working Papers cited below.)

These reprints are free of charge to corporate associates and other sponsors of the National Bureau. For all others there is a charge of $3.00 per reprint to defray the costs of production, postage, and handling. Please do not send cash. Reprints must be requested by number, in writing, from: Reprint Series, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

1355. "Implicit Contracts, Labor Mobility, and Unemployment," by Richard J. Arnott, Arthur J. Hosios, and Joseph E. Stiglitz, 1988 (NBER Working Paper No. 2316)

1356. "Consistent Covariance Matrix Estimation with Cross-Sectional Dependence and Heteroskedasticity in Financial Data," by Kenneth A. Froot, 1989 (NBER Technical Working Paper No. 62)

1357. "The Baby Boom, the Baby Bust, and the Housing Market," by N. Gregory Mankiw and David N. Weil, 1989 (NBER Working Paper No. 2794)

1358. "Voluntary Debt Reduction: Incentives and Welfare," by Elhanan Helpman, 1989 (NBER Working Paper No. 2692)

1359. "The Production-Smoothing Model Is Alive and Well," by Ray C. Fair, 1989 (NBER Working Paper No. 2877)

1360. "On the Consistency of Short-Run and Long-Run Exchange Rate Expectations," by Kenneth A. Froot, 1989 (NBER Working Paper No. 2577)

1361. "New Hope for the Expectations Hypothesis of the Term Structure of Interest Rates," by Kenneth A. Froot, 1989 (NBER Working Paper No. 2363)

1362. "LDC Debt: Indexation, Forgiveness, and Investment Incentives," by Kenneth A. Froot, David S. Scharfstein, and Jeremy C. Stein, 1989 (NBER Working Paper No. 2541)

1363. "The Dynamic Effects of Aggregate Demand and Supply Disturbances," by Olivier Jean Blanchard and Danny Quah, 1989 (NBER Working Paper No. 2737)

1364. "Import Competition and the Stock Market Return to Capital," by Gene M. Grossman and James A. Levinsohn, 1989 (NBER Working Paper No. 2420)

1365. "Nutrition and Infant Health in Japan," by Tetsuji Yamada, Tadashi Yamada, and Frank S. Chaloupka, 1989 (NBER Working Paper No. 2444)

1366. "Optimal Advice for Monetary Policy," by Susanto Basu, Miles S. Kimball, N. Gregory Mankiw, and David N. Weil, 1990 (NBER Working Paper No. 3054)

1367. "A Traditional Interpretation of Macroeconomic Fluctuations," by Olivier Jean Blanchard, 1989 (NBER Working Paper No. 2044)

1368. "Why Does Stock Market Volatility Change Over Time?" by G. William Schwert, 1989 (NBER Working Paper No. 2798)

1369. "Business Cycles, Financial Crises, and Stock Volatility," by G. William Schwert, 1989 (NBER Working Paper No. 2957)

1370. "Investment, Openness, and Country Risk," by Joshua Aizenman, 1989 (NBER Working Paper No. 2410)

1371. "Inflation and Taxation with Optimizing Governments," by James M. Poterba and Julio J. Rotemberg, 1990 (NBER Working Paper No. 2567)

1372. "Asymmetries in Policy Between Exportables and Import-Competing Goods," by Anne O. Krueger, 1990 (NBER Working Paper No. 2904)

1373. "The Divergence of Black and White Marriage Patterns," by Neil G. Bennett, David E. Bloom, and Patricia H. Craig, 1989

1374. "Wages, Employer Costs, and Employee Performance in the Firm," by Harry J. Holzer, 1990 (NBER Working Paper No. 2830)

1375. "Shirking or Productive Schmoozing: Wages and the Allocation of Time at Work," by Daniel S. Hamermesh, 1990 (NBER Working Paper No. 2800)

1376. "Finite Lifetimes and the Effects of Budget Deficits on National Saving," by James M. Poterba and Lawrence H. Summers, 1987 (NBER Working Paper No. 2144)

1377. "Fads, Martingales, and Market Efficiency," by Bruce N. Lehmann, 1990 (NBER Working Paper No. 2533)

1378. "The Deadweight Loss from 'Nonneutral' Capital Income Taxation," by Alan J. Auerbach, 1989 (NBER Working Paper No. 2510)

1379. "Estimating the Long-Run Relationship between Interest Rates and Inflation," by Lawrence H. Summers, 1986 (NBER Working Paper No. 1448)

1380. "New Indexes of Coincident and Leading Ecomomic Indicators," by James H. Stock and Mark W. Watson, 1989

1381. "Why Have Private Savings Rates in the United States and Canada Diverged?" by Chris Carroll and Lawrence H. Summers, 1987 (NBER Working Paper No. 2319)

1382. "Tax Reform and the Market for Tax-Exempt Debt," by James M. Poterba, 1989 (NBER Working Paper No. 2900)

1383. "Temporary Terms-of-Trade Disturbances, the Real Exchange Rate, and the Current Account," by Sebastian Edwards, 1989 (NBER Working Paper No. 2629)

1384. "The Significance of Tax Law Asymmetries: An Empirical Investigation," by Rosanne Altshuler and Alan J. Auerbach, 1990 (NBER Working Paper No. 2279)

1385. "Real and Monetary Determinants of Real Exchange Rate Behavior," by Sebastian Edwards, 1988 (NBER Working Paper No. 2721)

1386. "Pregnancy Wantedness and the Early Initiation of Prenatal Care," by Theodore J. Joyce and Michael Grossman, 1990 (NBER Working Paper No. 2827)

1387. "The International Monetary Fund and the Developing Countries: A Critical Evaluation," by Sebastian Edwards, 1989 (NBER Working Paper No. 2909)

1388. "How Elastic Is the Government's Demand for Weapons?" by Frank R. Lichtenberg, 1989 (NBER Working Paper No. 3025)

1389. "Stabilization with Exchange Rate Management under Uncertainty," by Allan Drazen and Elhanan Helpman, 1988 (NBER Working Paper No. 2268)

1390. "Money, Credit, and Business Fluctuations," by Joseph E. Stiglitz, 1988 (NBER Working Paper No. 2823)

1391. "Bonuses, Overtime, and Employment: Korea versus Japan." by Takatoshi Ito and Kyoungsik Kang, 1989 (NBER Working Paper No. 3012)

1392. "The Cost of Capital in the United States and Japan: A Comparison," by Albert Ando and Alan J. Auerbach, 1988 (NBER Working Paper No. 2286)

1393. "Real Business Cycle Models," by Bennett T. McCallum, 1989 (NBER Working Paper No. 2480)

1394. "Two-Person Dynamic Equilibrium in the Capital Market," by Bernard Dumas, 1989 (NBER Working Paper No. 2016)

1395. "Where Do the New U.S. Immigrants Live?" by Ann P. Bartel, 1989 (NBER Working Paper No. 2049)

1396. "The Effects of Taxation on the Merger Decision," by Alan J. Auerbach and David Reishus, 1988 (NBER Working Paper No. 2192)

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Current Working Papers

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Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the Working Paper. Abstracts of all Working Papers issued since March 1990 are presented below. For previous papers, see past issues of the *NBER Reporter*. Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. They are not reviewed by the Board of Directors of the NBER.

Historical Factors in Long-Run Growth

Risk Sharing, Crew Quality, Labor Shares, and Wages in the Nineteenth-Century American Whaling Industry

Lance E. Davis, Robert E. Gallman,
and **Teresa D. Hutchins**
Historical Working Paper No. 13
May 1990
JEL No. 042

This paper examines 36,640 labor contracts signed between whalemen and the agents who organized 1258 whaling voyages that departed from New Bedford, Massachusetts between January 1, 1840 and December 31, 1858 and between January 1 and December 31, 1866. The contracts contain information on the whalemen's occupation and on the fraction of output of the voyage that they were entitled to receive upon completion. We investigate the benefits associated with this unique contract and the occupational and spatial distribution of the whalemen's pay. We compare wages in whaling with those in the merchant marine and in shore-based pursuits. We also attempt to assess the efficiency of this early labor market and to explore the relationship between the labor contract, crew quality, technical change, and productivity.

NBER Working Papers

Tenure Choice of American Youth

Donald R. Haurin, Patric H. Hendershott,
and **Dongwook Kim**
Working Paper No. 3310
March 1990
JEL Nos. 323, 932

While there seems to be no end to estimates of determinants of housing tenure, prior studies have not accounted for the simultaneity of tenure choice with household formation, labor supply, or the marriage decision. Our estimates are superior to those in the literature both because we address these issues and because we better measure the cost of owning relative to renting. Accounting for simultaneity with the household formation and labor supply decisions matters. Using a household's predicted wage rate rather than its observed income doubles the response of tenure choice to the price of owning relative to renting. Including selectivity correction variables for household formation cuts the response of tenure choice to the predicted wage by 25 percent. Moreover, the impact of variations in demographic variables on tenure choice is reduced sharply after correcting for selectivity bias.

Risk and Return on Real Estate: Evidence from Equity REITs

K. C. Chan, Patric H. Hendershott,
and **Anthony B. Sanders**
Working Paper No. 3311
March 1990
JEL No. 313

We analyze monthly returns on an equally weighted index of 18 to 23 equity (real property) real estate investment trusts (REITs) that were traded on major stock exchanges from 1973–87. We use a multifactor Arbitrage Price Model using prespecified macroeconomic factors. We also test whether equity REIT returns are related to changes in the discount on closed-end stock funds, which seems plausible given the closed-end nature of REITs.

Three factors, and the percentage change in the discount on closed-end stock funds, consistently drive equity REIT returns: unexpected inflation, and changes in the risk and term structures of interest rates. The impacts of these variables on equity REIT returns is around 60 percent of the impacts on corporate stock returns generally. As expected, the effects are greater for more heavily levered REITs than for less levered REITs. Real estate, at least as measured by the return performance of equity REITs, is less risky than stocks generally, but does not offer a superior risk-adjusted return and is not a hedge against unexpected inflation.

Does Labor Supply Explain Fluctuations in Average Hours Worked?

Joshua D. Angrist
Working Paper No. 3312
March 1990
JEL No. 821

Economists long have debated what labor supply has to do with fluctuations in hours worked. This paper uses a time series of cross-sections from the 1964–88 Current Population Surveys to study whether microeconomic intertemporal substitution models can explain time-series fluctuations in annual averages. Conditional on a parametric trend, labor supply equations fit the 1975–87 data remarkably well. But estimates for 1963–74 are not robust, and estimated labor supply elasticities are much lower in the earlier period.

Fiscal Policy and the External Deficit: Siblings, but Not Twins

John F. Helliwell
Working Paper No. 3313
April 1990
JEL Nos. 321, 431

This paper surveys a number of partial and macroeconomic approaches to the determination of the current account and then summarizes evidence from multicountry economic models about the linkages between U.S. government spending and the U.S. current account during the 1980s. The available evidence from a large number of multicountry models suggests that U.S. fiscal policy in the first half of the 1980s was responsible for about half of the buildup in the external deficit, and that the accumulated net foreign debt is about $500 billion higher than it would have been without the fiscal expansion.

Risk-Adjusted Deposit Insurance for Japanese Banks

Bohyong Kang, Rama V. Ramachandran,
and **Ryuzo Sato**
Working Paper No. 3314
April 1990

This paper evaluates the Japanese deposit insurance scheme by contrasting the flat insurance rate with a market-determined, risk-adjusted rate. The model used to calculate the risk-adjusted rate is from Ronn and Verma (1986). It uses Merton's (1977) notion that deposit insurance can be related one-to-one to the put option. This permits us to apply the Black and Scholes (1973) model to calculate the insurance rate.

We calculate risk-adjusted premiums for 13 city banks and 22 regional banks. We find that the interbank spread in risk-adjusted rates in Japan is as wide as in the United States. But the insurance system is only one component of the safety network for a country's banking system.

Tariffs and Sectorial Adjustments in an Open Economy

Stephen J. Turnovsky
Working Paper No. 3315
April 1990
JEL Nos. 422, 431

This paper analyzes the impact of a tariff on sectorial adjustments in an economy that produces two traded consumption goods, one of which is exported, and a nontraded investment good. I emphasize the importance of sectorial capital intensities. In particular, qualitative dynamic adjustment depends on the relative capital intensities of the import-competing consumption good sector and the nontraded investment good sector. I analyze effects on sectorial labor allocation and show that the long-run effect on aggregate capital accumulation depends on the relative capital intensities of the import and export sectors.

The Welfare Economics of Moral Hazard

Richard J. Arnott and **Joseph E. Stiglitz**
Working Paper No. 3316
April 1990
JEL No. 024

This paper shows that, except in certain limiting cases, competitive equilibrium with moral hazard is constrained inefficient. The first section compares the competitive equilibrium and the constrained social optimum in a fairly general model and identifies types of market failure. Each of the subsequent sections focuses on a particular market failure.

World Real Interest Rates

Robert J. Barro and **Xavier Sala-i-Martin**
Working Paper No. 3317
April 1990
JEL Nos. 430, 310, 320, 023

We think of the expected real interest rate for ten OECD countries (our counterpart of the world economy) as being determined by the equation of aggregate investment demand to aggregate desired saving. Stock market returns isolate shifts to investment demand; and changes in oil prices, monetary growth, and fiscal variables isolate shifts to desired saving.

We estimate the reduced form for GDP-weighted world averages of the expected short-term real interest rate and the investment ratio from 1959–88. The estimates reveal significant effects in the predicted direction for world stock returns, oil prices, and world monetary growth, but that fiscal variables are unimportant. Structural estimation implies that a one percentage point increase in the expected real interest rate raises the desired saving rate by one-third of a percentage point.

Fluctuations in world stock returns and oil prices explain a good deal of the time series for the world average of expected real interest rates: specifically, why rates were low in 1974–9 and high in 1981–6. The model also explains the fall in real rates in 1987–8 and the subsequent upturn in 1989. The fitted relationship forecasts an increase in the world average of real interest rates in 1990 to 5.6 percent, nearly a full percentage point above the highest value attained in the entire prior sample, 1958–89.

We also estimate systems of equations for individual countries' expected real interest rates and investment ratios. We find that each country's expected real interest rate depends primarily on world factors rather than on own-country factors. This suggests a good deal of integration of world capital and goods markets.

Entry, Contestability, and Deregulated Airline Markets: An Event Study Analysis of People Express

Michael D. Whinston and **Scott C. Collins**
Working Paper No. 3318
April 1990

A number of recent papers have studied the relationship between price and market structure in the deregulated airline industry through a cross-sectional analysis of city-pair markets. Several potential difficulties underlie the inferences drawn in these analyses. This paper considers an alternative approach: we use the reactions of stock prices to announcements of entry to shed light on the nature of competitive behavior in this industry. Our approach offers a clean test of contestable market theory; it provides evidence on the level of profits or sunk costs present in these markets; and it shows the degree of competitive "localization" that exists in the industry. We focus particularly on the entry of People Express Airline in 1984 and 1985. We also examine the price and quantity changes that occurred following entry.

Reinterpreting the Failure of Foreign Exchange Market Efficiency Tests: Small Transaction Costs, Big Hysteresis Bands

Richard E. Baldwin
Working Paper No. 3319
April 1990
JEL Nos. 431, 432

Small transaction costs and uncertainty imply that optimal cross-currency interest rate speculation is marked by a first-order hysteresis band. Consequently, uncovered interest parity does not hold, and market efficiency tests based on it are misspecified. Indeed, measured prediction errors are a combination of true prediction errors and a wedge that consists of the "option value" of being in foreign currency and either plus or minus the transaction cost. Because of this wedge, we should expect measured prediction errors to be correlated serially, correlated with the current forward rate, and perhaps to have a nonzero mean, if the interest differential itself is correlated serially. The existence of the wedge helps account both for the failure of market efficiency tests and for the difficulties in finding an empirically successful model of the risk premium.

Predicting Exchange Rate Crises: Mexico Revisited

Linda S. Goldberg
Working Paper No. 3320
April 1990
JEL Nos. 430, 431, 432

This paper predicts ex ante the probability of currency crises and the size of expected devaluations, month by month, for Mexico between 1980–6. The forces contributing to speculative attacks on the Mexican peso include internal money creation, external credit shocks, and relative price shocks. The model proves highly successful for generating forecasts of the probability of speculative attacks on the peso and for predicting lower bounds for post-collapse exchange rates, using a range of assumptions about critical levels of central bank reserve floors. Simulation results suggest that reducing domestic credit growth, increasing the uncertainty surrounding this growth, and reducing the size and perhaps increasing the frequency of currency realignments might have greatly reduced the amount of currency speculation against the peso in some of the crisis periods between 1980–6.

The Internationalization of the U.S. Labor Market

John M. Abowd and **Richard B. Freeman**
Working Paper No. 3321
April 1990
JEL Nos. 820, 400

During the 1970s and 1980s, immigration, trade, and foreign investment became increasingly important in the U.S. labor market. The number of legal and illegal immigrants increased, altering the size and composition of the work force, and substantially raising the immigrant share of labor in gateway cities. The national origins of immigrants changed from primarily European to Mexican, Latin American, and Asian. Foreign trade rose relative to gross national product, and a massive trade deficit developed in the 1980s. Foreign investment in the United States grew rapidly, with foreign direct investment increasing until 3 percent of American workers were employed in foreign-owned firms. Indeed, the changes of the 1970s and 1980s brought about the internationalization in the U.S. labor market.

This paper shows that the first-order effects of immigration on the labor market arise primarily from the geographic variation in immigrant shares of the local labor force. The first-order effects of goods flows on the labor market arise from industrial variation in the openness of the product market. Direct foreign investments, although significant, do not give rise to businesses substantially different from existing American-owned businesses.

An Empirical Analysis of Cigarette Addiction

Gary S. Becker, **Michael Grossman**, and **Kevin M. Murphy**
Working Paper No. 3322
April 1990
JEL No. 913

We use a framework suggested by a model of rational addiction to analyze empirically the demand for cigarettes. The data consist of per capita cigarette sales (in packs) annually by state for 1955–85. The empirical results support the implications of a rational addiction model: cross-price effects are negative (consumption in different periods are complements); long-run price responses exceed short-run responses; and permanent price effects exceed temporary price effects. A 10 percent permanent increase in the price of cigarettes reduces current consumption by 4 percent in the short run and by 7.5 percent in the long run. In contrast, a 10 percent increase in the price for only one period decreases consumption by only 3 percent. In addition, a one-period price of 10 percent reduces consumption in the previous period by approximately 0.7 percent and consumption in the subsequent period by 1.5 percent. These estimates illustrate the importance of the intertemporal linkages in cigarette demand implied by rational addictive behavior.

Financial Innovation and Current Trends in U.S. Financial Markets

Frederic S. Mishkin
Working Paper No. 3323
April 1990
JEL No. 310

This paper discusses recent developments in U.S. financial markets and provides an economic analysis of why various recent financial innovations have occurred. This not only will provide us with a better understanding of existing financial markets in the United States and why they have been undergoing so much change in recent years, but it also may provide us with clues as to where our financial system may be heading.

Do Stock Prices Move Together Too Much?

Robert S. Pindyck and **Julio J. Rotemberg**
Working Paper No. 3324
April 1990
JEL Nos. 313, 521

We show that comovements of individual stock prices cannot be justified by economic fundamentals. This finding is a rejection of the present value model of security valuation. Unlike other tests of this model, ours is robust in that it allows for volatility in ex ante rates of return. The only constraint we impose is that investors' utilities are functions of a single consumption index. This implies that changes in discount rates must be related to changes in macroeconomic variables. Hence stock prices of companies in unrelated lines of business should move together only in response to changes in current or expected future macroeconomic conditions. We also show that this constraint implies that any priced factors in the APT model must be related to macroeconomic variables. Hence our results are also a rejection of the APT, so constrained.

Long-Run Policy Analysis and Long-Run Growth

Sergio Rebelo
Working Paper No. 3325
April 1990
JEL No. 111

The wide cross-country disparity in rates of economic growth is the most puzzling feature of the development process. This paper describes a class of models in which this type of heterogeneous growth can occur as a result of cross-country differences in government policy. These differences in policy regimes also can create incentives for labor migration from slow-growing to fast-growing countries.

In the class of models that we study, growth is endogenous but the technology exhibits constant returns to scale, and there is a steady-state path that accords with Kaldor's stylized facts of economic development. The key to making growth endogenous in the absence of increasing returns is the presence of a "core" of capital goods that can be produced without the direct or indirect contribution of factors that cannot be accumulated, such as land.

The Relation between Firm Growth and *Q* with Multiple Capital Goods: Theory and Evidence from Panel Data on Japanese Firms

Fumio Hayashi and **Tohru Inoue**
Working Paper No. 3326
April 1990
JEL Nos. 022, 211, 223, 229

Using a model of investment with multiple capital goods and a one-to-one relationship between the growth rate of the capital aggregate and the stock-market-based *Q*, we estimate the growth-*Q* relationship. We use a panel of Japanese manufacturing firms and assume that *Q* is endogenous. For early years of our sample, cash flow has significant explanatory power, over and above *Q*. For heavy industry, the significance of cash flow disappears for more recent years, after Japanese capital markets were liberalized. The estimated *Q* coefficient implies that the adjustment cost is less than half of gross profits, net of the adjustment cost.

Canada-U.S. Free Trade and Pressures for Tax Harmonization

Roger H. Gordon
Working Paper No. 3327
April 1990
JEL Nos. 320, 423

To what degree will the recent free trade agreement create pressure on the United States and Canada to modify, and perhaps harmonize, their tax systems? What will be the implications of the more extensive policy changes now going on within the E.C.?

This paper examines the types of pressures for reform created by recent agreements, focusing on capital mobility, elimination of tariff and nontariff barriers, and mobility of individuals. As the local public finance literature shows, unrestricted mobility of goods and people drives fiscal systems toward a benefit tax structure, in which individuals and firms are taxed according to the costs they impose on the community. More limited mobility should have more limited effects. However, since existing national tax structures differ dramatically from those that have evolved to finance local governments, even limited mobility can force substantial changes in each country's fiscal structure. In addition to characterizing the equilibrium tax structure that should result from increased mobility, this paper explores the circumstances in which there can be mutual gains from moving away from the equilibrium tax structure.

Fiscal Policy Interdependence and Efficiency

Willem H. Buiter and **Kenneth M. Kletzer**
Working Paper No. 3328
April 1990
JEL Nos. 431, 411, 441, 024, 111

This paper uses a two-country, overlapping-generations model to study the international transmission of fiscal policy among open, interdependent economies with free mobility of international capital. With only lump-sum taxes and transfers, international transmission involves only pecuniary externalities: barring dynamic inefficiency, only distributional issues (intergenerational and international) are involved. With age-specific taxes and transfers, the ability to run deficits and issue debt does not enhance the choice set of the governments.

The Welfare Economics of Cooperative and Noncooperative Fiscal Policy

Willem H. Buiter and **Kenneth M. Kletzer**
Working Paper No. 3329
April 1990
JEL Nos. 431, 411, 441, 111

In a competitive, two-country, overlapping-generations model with perfect capital mobility, a plan that is Pareto optimal with respect to individual preferences can be sustained without coordination of national fiscal policies if only lump-sum taxes and government borrowing are used. Cooperation is required to achieve a Pareto optimum with respect to a utilitarian global social welfare function.

Without international lump-sum transfers and allowing distortionary taxes on capital income, Pareto optimums with respect to national and global social welfare functions will not be optimal for the individual: efficiency is traded off for a more desirable intergenerational and international distribution of resources.

With nationally provided international public goods, achieving individual Pareto efficiency requires coordination of public spending but not financing.

The Output, Employment, and Interest Rate Effects of Government Consumption

S. Rao Aiyagari, Lawrence J. Christiano, and **Martin S. Eichenbaum**
Working Paper No. 3330
April 1990
JEL Nos. 130, 320

This paper investigates the impact of changes in government consumption on aggregate variables in the context of a stochastic, neoclassical growth model. We show, theoretically, that the impact on output and employment of a persistent change in government consumption exceeds that of a temporary change. We also show that, in principle, there can be an analog to the Keynesian multiplier in the neoclassical growth model. Finally, in an empirically plausible version of the model, the interest rate impact of a persistent government consumption shock exceeds that of a temporary one. Our results provide examples counter to existing claims in the literature.

Pensions and Labor Market Activity: Behavior and Data Requirements

Alan L. Gustman and **Olivia S. Mitchell**
Working Paper No. 3331
April 1990
JEL No. 800

Pensions have played a key role in transforming the way workers are paid in the U.S. labor market. This paper reviews and synthesizes what is known about the form and function of employer-provided pensions and identifies areas in which further information is most needed to increase our understanding of behavior and to guide the pension policies of the next decade. A number of studies explore the tax advantages of pensions, the special value of pension annuities and related insurance, and the value of pensions to the firm in regulating retirement, mobility, and productivity. This paper investigates whether available evidence is consistent with behavioral models, highlights remaining questions, and attempts to determine what types of data would be most helpful in furthering our understanding of pension plans.

Pensions must be viewed as part of a long-term employment relationship. For this reason, researchers must move beyond descriptive studies toward structural models that permit tests between diverse pension theories. Studies of this kind have heavy data requirements. Specifically, there is a pressing need for a nationally representative survey in which the unit of observation is the firm, the establishment, or the pension plan. To understand the pension-wage and pension-turnover/retirement relationship, more information is required on the processes determining compensation and employment. Combining information on employee characteristics, turnover and retirement patterns, company inputs and outputs, and the firm's overall financial characteristics would go a long way toward helping researchers distinguish among the leading explanations for why firms offer pensions. Of even greater utility would be longitudinal data combining company-side information with employment and wage histories of employees.

Systematic Movements in Real Exchange Rates in the G-5: Evidence on the Integration of Internal and External Markets

Richard C. Marston
Working Paper No. 3332
April 1990
JEL No. 431

Many recent studies have documented the random behavior of real exchange rates. This paper shows that real exchange rates defined for different sectors of the economy move closely together, even though each of the sectorial real exchange rates taken alone has a large random component. The sectorial real exchange rates are tied by internal price links caused by factor mobility within each national economy. Moreover, any differences that develop between real exchange rates can be explained almost entirely by productivity differentials, at least in the long run.

This paper contrasts the strong ties that bind prices from different sectors internally with ties that bind prices of goods from the same sector internationally. Prices are correlated much more highly internally than externally because flexible exchange rates disrupt normal pricing relationships between goods from different countries.

Capital Flight and Tax Competition: Are There Viable Solutions to Both Problems?

Alberto Giovannini and **James R. Hines, Jr.**
Working Paper No. 3333
April 1990
JEL Nos. 320, 440

This paper discusses a model corporate tax system based on the residence principle. This tax system, while preserving national sovereignties, minimizes the distortions from international capital mobility. The paper is motivated by an analysis of European capital income tax systems and the distortions they might give rise to as obstacles to international capital flows diminish. The alternative system we analyze has two main properties: it exploits the territoriality of law enforcement and allows countries to set the corporate tax rate—and the extent of double taxation of corporate income—independently from their partners. We conclude with some suggestive evidence of the potential revenue effects of this tax system among European countries.

Ownership, Agency, and Wages: An Examination of Franchising in the Fast Food Industry

Alan B. Krueger
Working Paper No. 3334
April 1990
JEL No. 820

This paper estimates the difference in compensation between company-owned and franchisee-owned fast food restaurants. The contrast is interesting because contractual arrangements give managers of company-

owned outlets less of an incentive to monitor and supervise employees. Estimates based on two datasets suggest that employee compensation is slightly greater at company-owned outlets than at franchisee-owned outlets. The earnings gap is 9 percent for assistant and shift managers, and 2 percent for full-time crew workers. Furthermore, the tenure-earnings profile is steeper at company-owned restaurants. These findings suggest that monitoring difficulties influence the timing and generosity of compensation.

Drawing Inferences from Statistics Based on Multiyear Asset Returns

Matthew Richardson and **James H. Stock**
Working Paper No. 3335
April 1990
JEL No. 211

The possibility of mean reversion in stock prices has been examined recently using statistics based on multiyear returns. Previous researchers have noted difficulties in drawing inferences about these statistics because of poor performance of the usual approximating asymptotic distributions. Therefore, we develop an alternative asymptotic distribution theory that provides substantially better approximations to the relevant finite-sample distributions. It also leads to empirical inferences much less at odds with the hypothesis of no mean reversion.

Wage Levels and Method of Pay

Charles C. Brown
Working Paper No. 3336
April 1990
JEL No. 821

The traditional research on method of pay and wages compares workers paid piece rates with those paid by the hour and finds (as predicted by the theory) that workers paid piece rates earn more. In this paper, hourly workers are divided into those paid standard rates (that is, whose wage does not vary with performance) and those paid by merit plans. An extension of the standard theory predicts that those paid piece rates would have the highest earnings, those paid standard rates the lowest, and those with merit pay "in between." However, the Industry Wage Surveys show that workers with merit pay receive lower wages than those in the other two groups.

The Quality Dimension in Army Retention

Charles C. Brown
Working Paper No. 3337
April 1990
JEL No. 821

While there has been a great deal of research on the characteristics of those who enter the U.S. Armed Forces, there has been little work on whether those who *reenlist* are above- or below-average performers. Despite the relatively "egalitarian" (little pay for performance) structure of military compensation, I find that those who do better on tests of proficiency in their military occupation are *more* likely to reenlist than those who do less well, and this difference is not caused primarily by the Army's unwillingness to allow its worst performers to reenlist. In contrast, those with the best scores on the general ability test given prior to enlistment are *less* likely to reenlist.

Public Policy and Economic Growth: Developing Neoclassical Implications

Robert C. King and **Sergio Rebelo**
Working Paper No. 3338
April 1990
JEL No. 111

Why is there so much disparity in long-term growth rates among countries? Perhaps differences in national public policies affect individual incentives for accumulating capital in both its physical and human forms. We show that such incentive effects can induce large differences in long-run growth rates. Since many of the key tax rates are difficult to measure, our procedure is indirect. We work within a calibrated, two-sector endogenous growth model, which has its origins in the microeconomic literature on human capital formation. We show that national taxation can affect long-run growth rates substantially. In particular, for small open economies with substantial capital mobility, national taxation readily can lead to "development traps" (in which countries stagnate or regress) or to "growth miracles" (in which countries shift from little growth to rapid expansion). This influence of taxation on the rate of economic growth has important welfare implications: in basic endogenous growth models, the welfare cost of a 10 percent increase in the rate of income tax can be 40 times larger than in the basic neoclassical model.

Internal Net Worth and the Investment Process: An Application to U.S. Agriculture

R. Glenn Hubbard and **Anil Kashyap**
Working Paper No. 3339
April 1990

Recent models of firm investment decisions stressing information in capital markets suggest that movements in internal finance can predict investment spending, even after controlling for measures of firms' investment opportunities. We present new evidence in favor of these models. First, we focus on the U.S. agriculture sector, which has experienced large fluctuations in net worth (by reasonable measures) and the profitability of investment. Second, rather than relying on investment function representations (for example, the *q*-theory approach), we use predictions generated by firms' Euler equation for capital accumulation. Intuitively, during periods in which net worth is high, the Euler

equation should hold across adjacent periods; the equation will not hold for periods in which the shadow price of external finance is high because of low net worth. Such an approach offers an alternative model for periods in which internal net worth is low (holding investment opportunities constant), and generates a link between internal net worth and investment spending during periods of significant deflation in the value of net worth.

We present our empirical evidence in three parts. First, the data reject the neoclassical, perfect-capital-markets model for investment. Omitting periods during which there were substantial negative shocks to farmers' net equity positions, the model's overidentifying restrictions no longer can be rejected. Second, allowing for movements in net equity positions contributes to explaining investment. Third, the effect of changes in net worth on investment is significantly more important during the deflationary periods than during "boom" periods. Taken together, these findings support a class of "internal funds" models of investment under asymmetric information.

Government Failures in Development

Anne O. Krueger
Working Paper No. 3340
April 1990
JEL No. 112

This paper takes as a given the proposition that, in many developing countries, governmental policies have been highly distortive and harmful to economic growth. These policies have included omissions, such as neglect of infrastructure, and commission, such as highly restrictive trade regimes and credit rationing. I discuss the issues arising from recognition that governments, like markets, are imperfect.

What Is National Saving? Alternative Measures in Historical and International Context

David F. Bradford
Working Paper No. 3341
April 1990
JEL Nos. 221, 224

Most discussion of national saving behavior is based on national income account data. This paper lays out some of the main alternative conceptions of saving and compares recent U.S. saving with historical patterns and with other nations' saving. I argue, in particular, that more attention should be paid to measures of national wealth at asset market values. I pull together data from the national balance sheets on wealth at market value compiled for the United States by the Flow of Funds Division of the Board of Governors of the Federal Reserve System (1989) and by various sources in three other countries: Japan, Sweden, and the United Kingdom.

Going Different Ways: Unionism in the United States and Other Advanced OECD Countries

David G. Blanchflower and **Richard B. Freeman**
Working Paper No. 3342
April 1990

This paper compares the changing pattern of unionization in OECD countries, reviews existing evidence, and presents new information on differences across countries in union-nonunion differentials in the labor market. Mostly, we use the microdata files of the International Social Survey Programme for cross-country surveys of 1985–7.

Our analysis shows that American unions have a larger effect on wages than unions in other countries, but not on other outcomes. We argue that the high union premium in the United States contributed to the decline in U.S. union density and to the consequent divergence of the U.S. industrial relations system from those in most OECD countries. Our findings suggest that U.S. unions must make major innovations in their tactics and policies to regain a position of strength in the private sector. The nation will have to develop new industrial relations institutions to avoid having Congress and the judiciary intervening frequently in workplace decisions.

Health, Children, and Elderly Living Arrangements: A Multiperiod-Multinomial Probit Model with Unobserved Heterogeneity and Autocorrelated Errors

Axel Börsch-Supan, Vassilis Hajivassiliou, Laurence J. Kotlikoff, and **John N. Morris**
Working Paper No. 3343
April 1990
JEL Nos. 913, 211, 932

We find that choices in living arrangements are governed predominantly by functional ability and, to a lesser degree (but still statistically and numerically significantly) by age. The income effect is measured precisely and robustly. Institutions are an inferior living arrangement as measured by the willingness to spend income not to enter an institution. A somewhat surprising result is that changes in marital status do not appear to matter a great deal. The only supply factor included in our analysis—the number of living children—is, as can be expected, a significant factor for choosing shared living arrangements.

Homework in Macroeconomics I: Basic Theory

Jess Benhabib, Richard Rogerson, and **Randall Wright**
Working Paper No. 3344, Part I
April 1990
JEL Nos. 023, 821

This paper argues that the home, or nonmarket, sector is empirically large, whether measured in terms of

the time devoted to household production activities or in terms of the value of output produced at home. We also argue that there may be a good deal of substitutability between the market and nonmarket sectors, and that this may be an important missing element in existing macroeconomic models.

We pursue this within a framework that labor economists have studied for some time. Symmetrically with the market, households use labor and capital to produce a nonmarket consumption good according to a technology that may be stochastic. We show that any model with home production is observationally equivalent to another model without home production, but with different preferences. However, for a given set of preferences, incorporating household production can dramatically change the nature and the interpretation of several macroeconomic phenomena. For example, we show that it is possible to have involuntary unemployment and normal leisure at the same time in models with home production—something that cannot arise in models without it. As another example, we discuss how home production affect the interpretation of models with consumer durables.

Homework in Macroeconomics II: Aggregate Fluctuations

Jess Benhabib, Richard Rogerson, and **Randall Wright**
Working Paper No. 3344, Part II
April 1990
JEL Nos. 023, 821

This paper explores the implications of including home, or nonmarket, production in an otherwise standard model of cyclical fluctuations. In particular, we use the basic framework that labor economists have studied for some time to generalize the stochastic growth model, or the real business cycle model, to include a household sector. Symmetrically with the market sector, the household sector uses labor and capital to produce output according to a stochastic technology. We calibrate the model based on microeconomic evidence and long-run considerations, simulate it, and examine its statistical properties. We find that introducing home production significantly improves the quantitative performance of the standard model along several dimensions simultaneously. It also implies a very different interpretation of the nature of aggregate fluctuations.

Provision of Child Care: Cost Functions for Profitmaking and Not-for-Profit Day Care Centers

Sheila Hollowell, Swati Mukerjee, and **Anne Dryden Witte**
Working Paper No. 3345
April 1990
JEL Nos. 635, 636, 912

This paper estimates cost functions for day care centers in Massachusetts. The production technology assumed is the generalized homothetic Cobb-Douglas production function. The cost function dual to this production function is estimated separately for profitmaking organizations (PMOs) and not-for-profit organizations (NPOs). We discuss the results in the context of current NPO literature. NPOs operate at higher average costs than PMOs for most output levels, as predicted by the literature. However, the provision of more staff per child-hour, our measure of quality, increases costs by similar amounts in PMOs and NPOs. Further, present forms of subsidies do not help either PMOs and NPOs and in fact, promote "shirking" in NPOs. PMOs are nonoptimizing with reference to the amount of education and experience in their personnel. The results suggest that experienced labor may be working for less than its marginal product in the day care industry.

Labor Market Distortions and Structural Adjustment in Developing Countries

Alejandra Cox Edwards and **Sebastian Edwards**
Working Paper No. 3346
May 1990
JEL Nos. 400, 410

This paper provides a typology of different labor market configurations and investigates how a trade liberalization reform and the relaxation of capital controls can affect the level of aggregate employment and the rate of unemployment. We consider a number of models, starting from the traditional Australian approach. We then analyze a multiple-sectors intertemporal setting and a model with uncertainty and search. We identify situations under which structural adjustment results in unemployment.

On Uniform Import Tariffs in Developing Countries

Sebastian Edwards
Working Paper No. 3347
May 1990
JEL Nos. 400, 410

This paper theoretically assesses the desirability of uniform import tariffs from a welfare perspective. Since the eruption of the debt crisis, many proposals for structural reforms in the developing countries have contemplated a trade liberalization process that would create a low and uniform tariff structure. This paper reviews the literature on the subject and constructs a general equilibrium model to evaluate the consequences of alternative structural adjustment policies. Throughout the analysis, I assume that labor markets and markets for nontradables are subject to some distortions.

Does Corporate Performance Improve After Mergers?

Paul M. Healy, Krishna G. Palepu, and **Richard S. Rubak**
Working Paper No. 3348
May 1990

We examine the post-acquisition operating performance of merged firms using a sample of the 50 largest

mergers between U.S. public industrial firms completed in 1979–83. The results indicate that merged firms have significant improvements in asset productivity relative to their industries after the merger, leading to higher post-merger operating cash flow returns. Sample firms maintain their capital expenditure and R and D rates relative to their industries after the merger, indicating that merged firms do not reduce their long-term investments. There is a strong positive relationship between post-merger increases in operating cash flows and abnormal stock returns at merger announcements, indicating that expectations of economic improvements underlie the equity revaluations of the merging firms.

Testing the Positive Theory of Government Finance

David S. Durlauf and **Steven N. Durlauf**
Working Paper No. 3349
May 1990
JEL Nos. 321, 323

Researchers studying dynamic economies have reasoned that optimally chosen tax rates should follow a random walk approximately. We conduct a frequency-domain examination of the properties of the tax rate series and conclude that while there is a substantial smoothing role for debt, the first difference in the series is not white noise. The conclusion follows both from an analysis of the entire spectral distribution function of tax changes and from the behavior of individual frequencies. There is pronounced activity in tax changes at an eight-year cycle, which is suggestive of an electoral component to tax changes. Our regression analysis confirms that there is a cyclical component to tax changes, corresponding to changes in political party administration. The results suggest that the positive theory of government finance needs to be refined to incorporate features of political equilibrium.

Valuation of Variance Forecasts with Simulated Option Markets

Robert F. Engle III, Che-Hsiung Hong, and **Alex Kane**
Working Paper No. 3350
May 1990
JEL No. 522

We propose a framework to assess incremental profits for competing algorithms to forecast the variance of a prespecified asset. The test is based on the return history of the asset in question. We set up a hypothetical insurance market using competing forecasting algorithms. One algorithm is used by each hypothetical agent in an ex post ante forecasting exercise, using the available history of the asset returns. The profit differentials across agents (in various groupings) reflect incremental values of the forecasting algorithms.

The technique is demonstrated with the NYSE portfolio, July 22, 1966 to December 31, 1985. For the limited set of alternative specifications, we find that GARCH(1,1) yields better profits than the three competing specifications. The profit from pricing one-day options on the NYSE portfolio with a GARCH specification to make variance forecasts, against three alternatives, is significant. The evidence also suggests that using a limited estimation period may be preferable to estimating specification parameters from all available observations. Finally, the hedging activity that requires a variance-determined hedge ratio is an important component of the success of a variance-forecast algorithm.

The NBER Immigration, Trade, and Labor Markets Data File

John M. Abowd
Working Paper No. 3351
May 1990
JEL Nos. 820, 400

The NBER Immigration, Trade, and Labor Markets Data Files were developed from public sources to facilitate industry-based and area-based research on the effects of international trade and immigration on labor markets in the United States. The industry data files contain: shipments; a shipments deflator; value added; employment; payroll; hours; real capital stock; imports; exports; unionization; and immigration ratios for 450 four-digit (1972 Standard Industrial Classification) manufacturing industries. The primary source of the data on industry production and factor use is the Annual Survey of Manufactures. The primary source of the international trade data is the defunct BLS Trade Monitoring System (1972–81), which was extended to earlier and later years using U.S. Commodity Exports and Imports as Related to Output, U.S. Department of Commerce Official Statistics, and the Annual Survey of Manufactures. The primary source of the unionization data is the Current Population Survey (1973–84), which cannot be extended to earlier years. The primary source of the immigrant ratio data is the Census of Population (1960, 1970, and 1980). The area data files contain information on immigrants in the work force by state and major SMSAs (Standard Metropolitan Statistical Areas) from the Census of Population, 1970 and 1980. The data are available from the author on floppy disk (Stata™ or ASCII format), computer tape (SAS™ format), or by electronic mail.

The Effects of International Competition on Collective Bargaining Outcomes: A Comparison of the United States and Canada

John M. Abowd and **Thomas Lemieux**
Working Paper No. 3352
May 1990
JEL Nos. 820, 400

We study the effects of import and export competition on collectively bargained wage settlements and bargaining unit employment from the 1960s to the mid-1980s for the United States and Canada. We consider both value-based and price-based measures of international competition. We distinguish between the ex-

pected effects of increased international trade on new collective bargaining agreements and the realized effects over the life of existing agreements. Using value-based trade measures, the estimated effect of an increase in import domestic market share, holding constant the rate of growth of the domestic market, is negative for employment in both countries and exceeds the effect of a comparable change in the size of the domestic market. The import effect on wage rates is also negative for the United States but not for Canada. The import wage effect in the United States is also larger than the effect of a comparable change in the domestic market size. The estimated effect of increased export growth is positive for employment in both countries. The export effect on employment is comparable in magnitude to the effect of a change in the size of the domestic market. The export effect on wage rates is weakly positive for the United States and ambiguous for Canada. For Canada, we also estimate world price effects. Increases in the world import price index for the industry are associated with increased union employment and lower wage settlements.

Product Market Competition, Union Organizing Activity, and Employer Resistance

John M. Abowd and **Henry S. Farber**
Working Paper No. 3353
May 1990
JEL No. 830

We develop and estimate a model of a union's optimal organizing activity that accounts for the decision of employers to resist union organizing. The central exogenous variable is the quantity of quasi-rents per worker available to be split between unions and employers. We measure available quasi-rents per worker as the difference between total industry revenues, net of raw materials costs and labor costs, evaluated at the opportunity cost of the workers.

Using two-digit industry level data for 35 U.S. industries from 1955–86, we find that both organizing activity and employer resistance to unionization are related positively to available quasi-rents per worker. However, there is still a strong negative trend in union organizing activity and a strong positive trend in employer resistance, after controlling for quasi-rents per worker. Thus, the explanation for the decline in union organizing activity and the increase in employer resistance to unionization since the mid-1970s lies elsewhere.

Some Inefficiency Implications of Generational Politics and Exchange

Laurence J. Kotlikoff and **Robert W. Rosenthal**
Working Paper No. 3354
May 1990
JEL No. 320

Generational selfishness is a central assumption in the vast literature of the life-cycle model. Much of this literature deals with the impact of alternative government policies in light of self-interested generational behavior. Surprisingly, the choices of governments in virtually all of these analyses are assumed to be independent of the preferences of the selfish generations that these governments presumably represent. We address this anomaly by modeling each generation as having a government that strictly represents its interests. Such selfish generational governments potentially will distort the economy along a number of dimensions.

We consider two types of inefficiencies that have received little or no attention in the literature. The first is the monopolization of factor supplies; the second is the under- or overprovision of durable public goods. We demonstrate that selfish generations may place sizable marginal taxes on their factor supplies in order to monopolize their factor markets. We also show that selfish generations will provide inefficient levels of durable public goods both at the local and the national levels. Finally, we demonstrate that generational inefficiencies can arise even in models of cooperative bargaining because of the first-mover advantage of earlier generations.

Market Power, Economic Profitability, and Productivity Growth Measurement: An Integrated Structural Approach

Catherine J. Morrison
Working Paper No. 3355
May 1990
JEL Nos. 600, 620, 631

This paper treats scale economies, profit-maximizing markups, economic profitability, capacity utilization, and productivity growth within an integrated structural model, and assesses their interactions empirically using annual two-digit U.S. manufacturing data. I focus on error biases in measuring productivity using traditional accounting procedures. Using this structure, I examine Robert E. Hall's important conjecture that the coexistence of normal economic profits and positive markups of price over marginal cost imply the existence of substantial scale economies and excess capacity.

The empirical results suggest that markups in most U.S. manufacturing firms have increased over time, and tend to be countercyclical. However, procyclical capacity utilization and scale economies tend to offset the short-run profit potential from markup behavior. As a result, economic profits on average are normal, but declining profitability is prevalent in most industries since the early 1970s. Also, although cost and revenue shares tend to be approximately equal, the error biases in standard productivity growth measures resulting from input fixity and scale economies are substantial, particularly over business cycles.

A General Model of Dynamic Labor Demand

Daniel S. Hamermesh
Working Paper No. 3356
May 1990
JEL Nos. 824, 211

This study derives and estimates a dynamic model of factor demand that includes both fixed and quadratic

variable costs of adjustment. Using quarterly data on the employment of mechanics at seven airlines, I find that both types of adjustment costs characterize the dynamic constraints facing employers. Using monthly data covering production-worker employment in seven manufacturing plants, I show that only fixed costs are important. The apparent diversity of the underlying costs of adjustment means that it is difficult to draw useful inferences from macroeconomic estimates. This suggests the importance of examining broader arrays of microeconomic time series that describe labor demand.

Volatility and Links between National Stock Markets

Mervyn A. King, Enrique Sentana, and **Sushil Wadhwani**
Working Paper No. 3357
May 1990

The empirical objective of this study is to account for the time variation in the covariances between markets. Using data on 16 national stock markets, we estimate a multivariate factor model in which the volatility of returns is induced by changing volatility in the orthogonal factors. Excess returns are assumed to depend both on innovations in observable economic variables and on unobservable factors. The risk premium on an asset is a linear combination of the risk premiums associated with factors.

The main empirical finding is that only a small proportion of the time variation in the covariances between national stock markets can be accounted for by observable economic variables. Changes in correlations markets are driven primarily by movements in unobservable variables.

We also estimate the risk premiums for each country and are able to identify substantial movements in the required return on equity. Our results also suggest that, although intercorrelations between markets have risen since the 1987 stock market crash, this is not necessarily evidence of a trend increase.

Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States

David Card and **Alan B. Krueger**
Working Paper No. 3358
May 1990
JEL No. 820

This paper estimates the effects of school quality—measured by the pupil-teacher ratio, the average term length, and the relative pay of teachers—on the rate of return to education for men born between 1920 and 1949. Using earnings data from the 1980 Census, we find that men who were educated in states with higher-quality schools have a higher return to additional years of schooling, holding constant their current state of residence, their state of birth, the average return to education in the region where they currently reside, and other factors. A decrease in the pupil-teacher ratio from 30 to 25, for example, is associated with a 0.4 percentage point increase in the rate of return to education. The estimated relationship between the return to education and measures of school quality is similar for blacks and whites. Since improvements in school quality for black students were driven mainly by political and judicial pressures, we argue that the evidence for blacks reinforces a causal interpretation of the link between school quality and earnings. We also find that returns to schooling are higher for students educated in states with a higher fraction of female teachers, and in states with higher average teacher education. Holding measures of school quality constant, however, we find no evidence that parental income or education affects rates of return at the state level.

Asymmetric Information and the New Theory of the Firm: Financial Constraints and Risk Behavior

Bruce C. Greenwald and **Joseph E. Stiglitz**
Working Paper No. 3359
May 1990
JEL No. 020

This paper summarizes recent developments in the theory of the firm that have arisen in examining the implications of imperfect information. It shows that a wide range of these models have similar implications for the likely reaction of firms to external environmental and policy changes. Two significant implications are: 1) that firms behave as if they are risk-averse individuals maximizing a utility function of terminal wealth (profitability), even when the risks involved are unsystematic; and 2) in many circumstances, because this utility function is likely to be characterized by decreasing absolute risk aversion, firms are likely to respond significantly (and positively) to changes in cash flow and profitability. Together these two phenomena account for a wide range of firm behaviors that have been observed empirically (both formally and informally) and that are difficult to explain in terms of the traditional theory of the firm. Furthermore, the responses of such firms to policy interventions are likely to differ significantly from those of neoclassical firms.

Equilibrium Models of Endogenous Fluctuations: An Introduction

Michael Woodford
Working Paper No. 3360
May 1990

These lectures comment on recent theoretical models of endogenous fluctuations in economic dynamics, including the literature on nonlinear deterministic cycles and on "sunspot equilibriums." Two important themes are: 1) reasons to be interested in models of purely endogenous fluctuations, even though actual economies admittedly are subject to exogenous stochastic shocks; and 2) the importance of market imperfections in making possible equilibriums characterized by endogenous fluctuations of either of two types.

Self-Fulfilling Expectations and Fluctuations in Aggregate Demand

Michael Woodford
Working Paper No. 3361
May 1990

This paper presents an intertemporal general equilibrium model with rationing in the product market, in which stationary sunspot equilibriums exist, indicating the possibility of fluctuations in economic activity simply caused by self-fulfilling variations in economic agents' expectations. Specifically, revised expectations about future aggregate demand change current investment demand, which (amplified by a "multiplier" process) then affects current aggregate demand. I discuss parameter values required for endogenous fluctuations, as well as quantitative properties of the fluctuations predicted. Countercyclical stabilization policies rule out such equilibriums.

Public Finance in Models of Economic Growth

Robert J. Barro and **Xavier Sala-i-Martin**
Working Paper No. 3362
May 1990
JEL Nos. 111, 023, 320

The recent literature on endogenous economic growth allows for effects of fiscal policy on long-term growth. If the social rate of return on investment exceeds the private return, then tax policies that encourage investment can raise the growth rate and levels of utility. An excess of social return over private return can reflect learning-by-doing with spillover effects, the financing of government consumption purchases with an income tax, and monopoly pricing of new types of capital goods. Tax incentives for investment are not called for if the private rate of return on investment equals the social return. This situation applies in growth models if the accumulation of a broad concept of capital does not entail diminishing returns, or if technological progress appears as an expanding variety of consumer products.

In growth models that incorporate public services, the optimal tax policy hinges on the characteristics of the services. If the public services are publicly provided private goods, which are rival and excludable, or publicly provided public goods, which are nonrival and nonexcludable, then lump-sum taxation is superior to income taxation. Many types of public goods are subject to congestion and therefore are rival but to some extent nonexcludable. In these cases, income taxation works approximately as a user fee and therefore can be superior to lump-sum taxation. In particular, the incentives for investment and growth are too high if taxes are lump sum. We argue that the congestion model applies to a wide array of public expenditures, including transportation facilities, public utilities, courts, and possibly national defense and police.

The Provision of Time to the Elderly by Their Children

Axel Börsch-Supan, Jagadeesh Gokhale, Laurence J. Kotlikoff, and **John Morris**
Working Paper No. 3363
May 1990
JEL No. 918

This paper uses matched data on the elderly and their children to study the provision of time by children to the elderly. We develop a Tobit model and a structural model to analyze the determinants of this decision. The main determinants of the amount of time given to parents appear to be the children's age, reported health, and institutionalization status, and the children's age, health, and sex. Older parents, less healthy parents, and noninstitutionalized parents receive more time from their children, while younger children, healthier children, and female children provide more time. In contrast to these demographic determinants, economic variables, such as children's wage rate and income levels, appear to play a rather insignificant role in the provision of time. In addition, the evidence does not support the hypothesis that parents purchase time from their children.

Price Behavior in Japanese and U.S. Manufacturing

Richard C. Marston
Working Paper No. 3364
May 1990
JEL No. 431

Relative price changes in Japanese and U.S. manufacturing are driven by two forces: productivity growth, which leads to secular changes in costs; and exchange rate fluctuations, which change relative prices between the two countries. In sectors where productivity growth is high, reductions in costs can neutralize exchange rate appreciations and keep prices competitive with those abroad, at least in the long run. But even in these sectors, exchange rate fluctuations are the dominant influence on relative competitiveness in the short run.

Faced with swings in exchange rates, firms adopt measures to defend their export markets. This paper presents estimates of "pricing to market" elasticities that suggest that firms lower their export prices in domestic currency relative to their domestic prices in order to limit the effects of currency appreciations. There is evidence that firms in both countries pursue such pricing strategies, but pricing to market is more extensive in Japan. In response to an appreciation of the yen, Japanese firms sharply reduce their export prices in yen to limit the pass-through of the appreciation into the dollar prices of their exports.

Fear, Unemployment, and Pay Flexibility

David G. Blanchflower
Working Paper No. 3365
May 1990

This paper uses newly available cross-section data to study wage determination in the United Kingdom in the 1980s. I contrast the results with those from a comparable sample from the United States for 1977–88.

I find that fear of unemployment substantially de-

presses pay in both countries. There is some evidence of a wage ratchet in the United Kingdom whereby rates of pay are more flexible upward than downward. The unemployment elasticity of pay averages -0.1 in the United Kingdom and apparently is zero in the United States. Finally, wages are almost twice as flexible in nonunion and small workplaces in the United Kingdom as in union or larger workplaces.

The Manufacturing Sector Master File: 1959-87

Bronwyn H. Hall
Working Paper No. 3366
May 1990
JEL Nos. 223, 226, 229

This paper describes the panel of publicly traded U.S. manufacturing firms that was created and updated by by the NBER's productivity program from 1978 through 1990. The panel consists of 2726 large manufacturing firms, each with one to 29 years of data. The sample covers 1976-87, with data back to 1959 where possible. There are about 90 variables for each firm-year of data; the variables give the complete income statement, balance sheet, statement of changes, and data on the market value of the common stock.

The firms on the file are identified both by their CUSIP number and by name, making it feasible to match these data to other sources. A special feature of this data file is that all exits from the file between 1976 and 1987 have been identified and the reasons for exit have been tabulated in a diskette file. I describe this file in Appendix A of the paper.

The Gold Standard as a Rule

Michael D. Bordo and **Finn E. Kydland**
Working Paper No. 3367
May 1990
JEL Nos. 310, 432, 041

In this paper, we show that the monetary rule followed by a number of key countries before 1914, especially England, and to a lesser extent the United States, represented a commitment technology that prevented the monetary authorities from changing planned future policy. The experiences of these major countries suggest that the gold standard was intended as a contingent rule. By that we mean that the authorities could abandon the fixed price of gold temporarily during a wartime emergency on the understanding that convertibility at the original price of gold would be restored when the emergency passed. The experiences of other countries, however, suggest that the gold standard rule often was viewed more as a desirable goal than as an operational constraint.

Forecasting Prices and Excess Returns in the Housing Market

Karl E. Case and **Robert J. Shiller**
Working Paper No. 3368
May 1990
JEL No. 932

Price changes and excess returns in the U.S. market for homes can be forecast. A number of information variables predict changes in housing prices and excess returns to housing relative to debt over the succeeding year. Price changes observed over the course of a year tend to continue in the same direction for an additional year. Construction cost divided by price, the change in per capita real income, and the change in adult population all are related positively to price changes or excess returns over the succeeding year.

Our results are based on time-series cross-section regressions with quarterly data from 1970Q1 to 1987Q3 for Atlanta, Chicago, Dallas, and San Francisco.

Efficient Windows and Labor Force Reduction

Robin L. Lumsdaine, James H. Stock, and **David A. Wise**
Working Paper No. 3369
May 1990
JEL Nos. 918, 320

Recently, many U.S. firms have offered "window" plans that provide bonuses to a group of workers if they retire within a specified (short) time span. This paper examines a window plan at a *Fortune* 500 firm, and addresses two main issues. First, what was the effect of the window plan on departures? Second, assuming a variety of possible firm objectives, what would be the design of an efficient window plan?

We address these questions using the retirement model in Stock and Wise (1988a, 1988b). The model, estimated using data for an earlier year, accurately predicts the subsequent large increase in retirements under the window plan. We find that the firm successfully maximized departures. However, if its goal was to minimize either expected future wage payments or the current cost per induced retirement, then the firm could have saved more with efficient plans constructed using the model. One interpretation is that the firm was interested primarily in reducing the overall size of the labor force, or in retiring older employees to allow for promotion of younger employees.

The Stock Market, Profit, and Investment

Olivier J. Blanchard, Changyong Rhee, and **Lawrence H. Summers**
Working Paper No. 3370
May 1990
JEL Nos. 023, 130, 310

When making investment decisions, should managers follow the signals given by the stock market even if those signals do not coincide with the managers' assessments of fundamental value? This paper reviews the theoretical arguments and examines the empirical evidence. We construct and use a new U.S. time series of data on the q ratio from 1900-88. We decompose q—the ratio of the market value of corporate capital to its replacement cost—into the product of two terms that reflect fundamentals and "valuation," or the ratio of market value to fundamentals. We then examine the relationship of investment to each of the two, using a number of alternative proxies for fundamentals. We interpret our results as pointing strongly, but not overwhelmingly, to a larger role of fundamentals than of valuation in investment decisions.

The Cost of Capital in Japan: Recent Evidence and Further Results

Albert Ando and **Alan J. Auerbach**
Working Paper No. 3371
May 1990
JEL Nos. 320, 520

We extend our recent work in measuring the cost of capital in Japan and the United States by considering several questions that were raised by our results.

We find that the small firm-large firm distinction appears to be more significant in Japan than in the United States. Also, correcting Japanese accounting statements for cross-holding raises the estimated Japanese cost of capital by about one percentage point. Finally, correcting Japanese accounting statements for unmeasured returns to land has a significantly more important effect; the most conservative correction we attempt raises the implied Japanese return to capital to equal that of the United States during the mid-1980s.

Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries

Francesco Giavazzi and **Marco Pagano**
Working Paper No. 3372
May 1990
JEL Nos. 320, 430

According to conventional wisdom, a fiscal consolidation is likely to cause real aggregate demand to contract. It often has been argued, however, that this conclusion is misleading because it neglects the role of expectations of future policy: if the fiscal consolidation is read by the private sector as a signal that the share of government spending in GDP is being reduced permanently, then households will revise their estimate of their permanent income upward and will raise current and planned consumption.

Only the empirical evidence can sort out which of these contending views about fiscal policy is more appropriate—that is, how often the contractionary effect of a fiscal consolidation prevails on its expansionary expectational effect.

This paper brings new evidence to bear on this issue, drawing on the European exercise in fiscal rectitude in the 1980s, and focusing in particular on its two most extreme cases—Denmark and Ireland. We find that, at least in the experience of these two countries, the expectations view has a serious claim to empirical relevance.

Moral Hazard in Partnerships

Martin Gaynor and **Paul J. Gertler**
Working Paper No. 3373
June 1990
JEL Nos. 913, 011, 514, 635

This paper investigates incentive structures within partnerships. Partnerships provide a classic example of the trade-off between risk spreading and moral hazard. The degree to which firms choose to spread risk and sacrifice efficiency incentives depends upon risk preferences, for which data typically are unavailable. We are able to overcome this difficulty through the existence of a unique dataset on a prominent form of professional partnership: medical group practice.

We consider a two-stage model in which agents choose effort in response to incentives, and in which the firm can choose two different instruments to affect incentives and to spread risk: the compensation method and the number of members. There are two new theoretical results. First, relative to the compensation method, or the group size that would be chosen in the absence of risk or risk aversion, the best compensation method will sacrifice efficiency incentives in order to spread risk, and the best membership size will exceed the first-best size for the same reasons. Second, a further increase in risk or risk aversion leads the firm to sacrifice more efficiency incentives in order to spread more risk. Hence, firms that are more risk averse or face greater uncertainty pay larger risk premiums in terms of sacrificed output caused by shirking.

The empirical results are striking and are consistent with the theory. Firms that report more risk aversion have greater departures from first-best organizational incentive structures. Specifically, increased risk aversion leads to compensation arrangements that spread more risk through greater sharing of output and to decreased group size in order to counteract diminished incentives. We also find that compensation arrangements that have greater degrees of sharing of output across physicians significantly reduce each physician's productivity, whereas reductions in group size significantly increase productivity. The estimated premium associated with risk aversion accounts for almost 11 percent of gross income, comparing the most risk-averse to the least risk-averse physicians in the sample.

The Term Structure of Interest Rate Differentials in a Target Zone: Theory and Swedish Data

Lars E. O. Svensson
Working Paper No. 3374
June 1990
JEL Nos. 431, 432, 313

I derive the term structure of interest rate differentials in a model of a small open economy with a target zone exchange rate regime. I model the target zone as a regulated Brownian motion and compute the interest rate differentials as the solution to a parabolic partial differential equation with derivative boundary conditions, both via a Fourier-series analytical solution and via a direct numerical solution. I derive several specific properties of the term structure of interest rate differentials. For instance, for a given time to maturity, the interest rate differential is decreasing in the exchange rate. For a given exchange rate, the absolute value of the interest rate differential and its instantaneous variability both are decreasing in the time to maturity. I incorporate devaluation/realignment risks and they imply upward shifts of the interest rate differentials. Some implications of the theory are broadly consistent with data on Swedish exchange rates and interest differentials for 1986–9.

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