

National Bureau of Economic Research (NBER) (Ed.)

**Periodical Part**

**NBER Reporter Online, Volume 1992**

NBER Reporter Online

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National Bureau of Economic Research (NBER), Cambridge, Mass.

*Suggested Citation:* National Bureau of Economic Research (NBER) (Ed.) (1992) : NBER Reporter Online, Volume 1992, NBER Reporter Online, National Bureau of Economic Research (NBER), Cambridge, MA

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# NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

FALL 1992

## Program Report

### Public Economics

James M. Poterba

The NBER Program in Taxation was renamed the Program in Public Economics in 1991. This change recognizes that governments face significant challenges in designing expenditure policies as well as tax policies, and broadens the program to encompass research on these decisions as well as on issues of raising revenue. Since the last program report just over two years ago, members of the public economics program have conducted research on a wide range of subjects including the impact of tax policies on individuals and firms, the effects of taxation in an increasingly international economy, and the design of policies to reduce pollution. This report provides a brief overview of these recent activities.

### Taxation and the Behavior of Households and Firms

One of the perennial research issues in public finance is the nature and effects of the incentives created by tax policies. In the aftermath of a decade of major tax reforms, NBER researchers have begun the substantial task of estimating how tax policy affects household and corporate decisionmaking.

Recent research has considered how tax and spending policies affect household behavior. For example, NBER studies demonstrate that declining individual marginal tax rates have shifted the mix of worker compensation away from fringe benefits and toward taxable wages; suggest that the high implicit marginal tax rates in some welfare programs reduce the labor supply of potential program beneficiaries; and, conclude that the Social Security payroll tax and benefit formulas are

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This issue of the *Reporter* highlights the Bureau's Program in Public Economics. Next, Laurence M. Ball describes his research on inflation dynamics. Then, Robert C. Feenstra reports on his work on product variety, trade, and growth. After biographical sketches, news of NBER conferences, and other NBER news and reports, the *Reporter* concludes with short summaries of recent Working Papers.

responsible for significant individual differences in the total marginal tax rate on labor income.<sup>1</sup>

Further, several recent studies have contributed to the ongoing debate about the incentive and revenue effects of capital gains taxation. NBER researchers have gathered new evidence on the elasticity of gains realizations with respect to tax rates, and on the long-run effects of changing those rates; they also have studied how to design a realization-based tax on capital gains without distorting incentives to realize gains.<sup>2</sup>

<sup>1</sup>D. E. Hamermesh and S. A. Woodbury, "Taxes, Fringe Benefits, and Faculty," NBER Working Paper No. 3455, September 1990; R. Moffitt and B. Wolfe, "The Effect of the Medicaid Program on Welfare Participation and Labor Supply," NBER Working Paper No. 3286, March 1990; and M. Feldstein and A. Samwick, "Social Security Rules and Marginal Tax Rates," NBER Reprint No. 1743, August 1992.

<sup>2</sup>J. B. Slemrod and W. Shobe, "The Tax Elasticity of Capital Gains Realizations: Evidence from a Panel of Taxpayers," NBER Working Paper No. 3237, January 1990; P. H. Hendershott, E. Toder, and Y. Won, "Effects of Capital Gains Taxes on Revenue and Economic Efficiency," NBER Reprint No. 1622, October 1991; and A. J. Auerbach, "Retrospective Capital Gains Taxation," NBER Reprint No. 1609, September 1991.

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Preparation of the *NBER Reporter* is under the supervision of Donna Zerwitz.

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The substantial, and in many cases offsetting, changes in the taxation of corporate capital income in the Economic Recovery Tax Act of 1981 and the Tax Reform Act of 1986 provide a rare opportunity for directly assessing how tax policy affects investment and financing decisions. A number of NBER affiliates currently are investigating these issues. Two recent papers suggest that tax-related changes in incentives for investing in different types of assets are reflected in the observed levels of investment during the 1980s.<sup>3</sup>

Another line of research has explored the effect of tax policy changes on the decision to hold assets in corporate or noncorporate form.<sup>4</sup> This study suggests that the sharp changes in the relative tax rates on individuals and firms in the 1986 Tax Reform Act reduced the incentives to incorporate, and this explains the rapid growth of Subchapter S corporations since 1986. Finally, NBER researchers have continued to contribute to the basic theory of corporate investment and financial policy,<sup>5</sup> providing the foundation for further empirical research on taxation and firm behavior.

### Tax Policy in an International Economy

The growing integration of world capital markets, and the declining importance of national borders in Europe and elsewhere, has created a fundamentally new economic environment for tax policy. It is increasingly apparent that companies can transfer operations and especially taxable profits across state and national boundaries, in many cases distorting EC decisions and thwarting the intentions of tax authorities. This trend poses a new set of research issues for economists who study taxation, and even has led some to question the long-term viability of some existing tax instruments.<sup>6</sup> It is the basis of an ongoing NBER Project on International Taxation.

Researchers studying international taxation must master a substantial volume of complicated tax law, use this information to model the tax incentives facing companies, and then analyze whether firm behavior seems to respond to these incentives. Recent studies have applied this methodology to analyzing the influence of tax

<sup>3</sup>A. J. Auerbach and K. A. Hassett, "Tax Policy and Business Fixed Investment in the United States," NBER Reprint No. 1728, June 1992, and "Recent U.S. Investment Behavior and the Tax Reform Act of 1986: A Disaggregate View," NBER Reprint No. 1730, June 1992.

<sup>4</sup>R. H. Gordon and J. K. MacKie-Mason, "Taxes and the Choice of Organizational Form," NBER Working Paper No. 3781, July 1991.

<sup>5</sup>B. D. Bernheim, "Tax Policy and the Dividend Puzzle," NBER Working Paper No. 3434, September 1990; and H.-W. Sinn, "Taxation and the Cost of Capital: The 'Old' View, the 'New' View, and Another View," NBER Reprint No. 1677, December 1991.

<sup>6</sup>R. H. Gordon, "Can Capital Income Taxes Survive in Open Economies?" NBER Working Paper No. 3416, August 1990.

policy on several aspects of firm behavior. One study shows that corporate R and D spending is sensitive to the tax incentives generated by the post-1986 rules on allocating R and D expenses to worldwide income, and suggests that each 1 percent increase in the aftertax cost of R and D reduces outlays by more than 1 percent.<sup>7</sup> Other studies consider how tax factors influence the dividend repatriation decisions of U.S. multinational companies, and the extent to which tax changes in the mid-1980s contributed to the rise of inbound foreign direct investment in the late 1980s.<sup>8</sup> Yet another line of research focuses on how tax rate differentials between the United States and other nations affect the location of business activity and the allocation of profits within multinational firms.<sup>9</sup> These studies of international tax policy are providing an important foundation for designing corporation taxes in both the United States and other countries.

## Tax Policy and the Environment

Along with the taxation of multinational firms, the design of "green taxes" is an emerging issue in public economics. The worldwide revival of interest in protecting the environment, and the increasing recognition that pollution taxes provide a substantial source of potential revenue for deficit-strapped governments, have led to rapidly expanding interest among policymakers and academics in the design of environmental tax policies.

Tax policy can promote environmental objectives in many ways. Most proposals call for taxing emissions of pollutants or the inputs to processes that generate pollutants. An example of such a policy is the carbon tax, which is designed to reduce man-made emissions of gases that may contribute to global warming. The carbon tax is essentially a tax on fossil fuels, with different rates on coal, oil, and natural gas in relation to their predicted effects on global climate. NBER researchers have examined both the efficiency and distributional effects of such a tax, as well as many of the practical problems that would arise if a single nation tried to adopt

a carbon tax.<sup>10</sup> Related research has analyzed the distributional burdens imposed by excise taxes on fossil fuels,<sup>11</sup> and suggests that gasoline taxes are less regressive in a life-cycle framework than when viewed as a share of annual income.

Tax policy also can be used to encourage investments in pollution abatement technology. One recent study analyzes the impact of the residential energy credit, a tax expenditure policy in the late 1970s that provided homeowners with incentives to invest in energy conservation.<sup>12</sup> It suggests that the limited effect of the credit was largely the result of consumer uncertainty about the future course of energy prices.

## Social Insurance

Outlays on social insurance programs, including cash programs such as Social Security and in-kind programs such as Medicare, are the fastest-growing expenditure item in the U.S. public sector. Recent research by members of the public economics program has analyzed how these programs affect individual and firm behavior, and has considered their optimal design.

An important innovation in the ongoing Social Security debate has been the development of "generational accounts," a simple accounting framework for describing how various policy reforms affect the well-being of different generations.<sup>13</sup> Researchers also have begun to study the effects of government mandates that private firms provide various types of social insurance. One study shows that when states mandate that employers must provide workers' compensation insurance, wages fall by roughly three-quarters of the employers' cost of this insurance.<sup>14</sup> Other work considers the interaction be-

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<sup>7</sup>J. R. Hines, Jr., "On the Sensitivity of R and D to Delicate Tax Changes: The Behavior of U.S. Multinationals in the 1980s," NBER Working Paper No. 3930, December 1991.

<sup>8</sup>R. Altshuler and T. S. Newlon, "The Effects of U.S. Tax Policy on the Income Repatriation Patterns of U.S. Multinational Corporations," NBER Working Paper No. 3925, December 1991; and A. J. Auerbach and K. A. Hassett, "Taxation and Foreign Direct Investment in the United States: A Reconsideration of the Evidence," NBER Working Paper No. 3895, November 1991.

<sup>9</sup>J. R. Hines, Jr. and E. M. Rice, "Fiscal Paradise: Foreign Tax Havens and American Business," NBER Working Paper No. 3477, October 1990; and D. Harris, R. Mørck, J. B. Slemrod, and B. Yeung, "Income Shifting in U.S. Multinational Corporations," NBER Working Paper No. 3924, December 1991.

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<sup>10</sup>L. H. Goulder, "Do the Costs of a Carbon Tax Vanish When Interactions with Other Taxes Are Accounted For?" NBER Working Paper No. 4061, May 1992; and J. M. Poterba, "Tax Policy to Combat Global Warming: On Designing a Carbon Tax," NBER Reprint No. 1678, December 1991.

<sup>11</sup>J. M. Poterba, "Is the Gasoline Tax Regressive?" NBER Working Paper No. 3578, January 1991; and D. Fullerton and D. L. Rogers, "Lifetime versus Annual Perspectives on Tax Incidence," NBER Reprint No. 1684, January 1992.

<sup>12</sup>K. A. Hassett and G. E. Metcalf, "Energy Tax Credits and Residential Conservation Investment," NBER Working Paper No. 4020, March 1992.

<sup>13</sup>A. J. Auerbach, J. Gokhale, and L. J. Kotlikoff, "Generational Accounts—A Meaningful Alternative to Deficit Accounting," NBER Reprint No. 1636, October 1991.

<sup>14</sup>J. Gruber and A. B. Krueger, "The Incidence of Mandated Employer-Provided Insurance: Lessons from Workers' Compensation Insurance," NBER Working Paper No. 3557, December 1990.

tween tax subsidies for insurance purchases and the tax treatment of casualty losses.<sup>15</sup>

Many researchers in the public economics program also have been active participants in the NBER's Aging Program, which was established as a separate program in 1990. Their ongoing studies of Social Security, Medicare, and related policies will be described in a future issue of the *NBER Reporter*.

## State and Local Public Finance

The last decade of fiscal pressures at the federal level has resulted in the devolution of many government responsibilities from the federal government to states and localities. This has created important research opportunities in studying fiscal federalism and the behavior of state and local governments.

NBER researchers recently have completed two major projects on state and local public finance. The first, a study of the tax-exempt bond market, included research papers on the subsidy effects of exempting municipal interest from federal income taxation, the ownership of tax-exempt bonds, how states and localities decide how much debt to issue, and a range of other subjects.<sup>16</sup>

The second project, which centered around upgrading the NBER's TAXSIM program to include detailed information on state tax liabilities, analyzed the complex links between state and federal tax policies. Researchers investigated the effect of tax exporting, the ability of a state or locality to tax nonresidents effectively, the choice of tax mix, how changing the deductibility of sales tax payments from the federal personal income tax affected the use of sales versus income taxes at the state level, and a number of other topics involving tax policy interactions.<sup>17</sup>

Public economics program members also have pursued more general questions about the determinants of state and local government behavior. One recent study considers the lessons of the U.S. federal experience for designing tax policies in Europe, while another explores how governors and state legislatures decide whether to

increase taxes.<sup>18</sup> Still another line of research considers the decision to adopt state or local enterprise zones, and their effects on economic activity.<sup>19</sup>

## Other Areas of Research

This summary has described several major research areas that members of the public economics program have contributed to in the last two years, but there are many other projects that do not fit easily into one of these categories. These include theoretical investigations of optimal income taxation,<sup>20</sup> analysis of the "implicit taxes" that households face as a result of college scholarship rules,<sup>21</sup> and an inquiry into how tax policy toward charitable giving affects art museums.<sup>22</sup> There was even a study that used data from tax returns to confirm Andrew Carnegie's conjecture that people who inherited large sums of money worked less than those who did not inherit.<sup>23</sup> Program members continue to contribute to our knowledge on a vast range of issues.

## Government Service

No report on the public economics program would be complete without some discussion of the role that program members play as occasional visitors to Washington in policy advisory positions. The list of NBER researchers who are currently on leave is truly remarkable. Michael J. Boskin is completing his fourth year as Chairman of the Council of Economic Advisers (CEA). David F. Bradford, formerly Director of the NBER's taxation program, joined Boskin there in 1991, and Faculty Research Fellow Andrew B. Lyon is on leave as a senior staff member at the CEA. Research Associate Alan

<sup>18</sup>R. P. Inman and D. L. Rubinfeld, "Fiscal Federalism in Europe: Lessons from the United States Experience," NBER Working Paper No. 3941, December 1991; and T. Besley and A. C. Case, "Incumbent Behavior: Vote Seeking, Tax Setting, and Yardstick Competition," NBER Working Paper No. 4041, March 1992.

<sup>19</sup>L. E. Papke, "Tax Policy and Urban Development: Evidence from an Enterprise Zone Program," NBER Working Paper No. 3945, December 1991.

<sup>20</sup>D. L. Brito, J. H. Hamilton, S. M. Slutsky, and J. E. Stiglitz, "Pareto-Efficient Tax Structures," NBER Reprint No. 1659, November 1991; Y. Mayshar, J. B. Slemrod, and S. Yitzhaki, "The Optimal Two-Bracket Linear Income Tax," NBER Working Paper No. 3847, September 1991; and A. Alesina and P. Weil, "Menus of Linear Income Tax Schedules," NBER Working Paper No. 3968, January 1992.

<sup>21</sup>M. Feldstein, "College Scholarship Rules and Private Saving," NBER Working Paper No. 4032, March 1992.

<sup>22</sup>D. Fullerton, "Tax Policy Toward Art Museums," NBER Working Paper No. 3379, June 1990.

<sup>23</sup>D. Holtz-Eakin, D. Joulfaian, and H. S. Rosen, "The Carnegie Conjecture: Some Empirical Evidence," NBER Working Paper No. 4118, July 1992.

<sup>15</sup>L. Kaplow, "The Income Tax as Insurance: The Casualty Loss and Medical Expense Deductions and the Exclusion of Medical Insurance Premiums," NBER Reprint No. 1727, June 1992.

<sup>16</sup>J. M. Poterba, ed., *The Economics of Tax-Exempt Bond Markets* (Annapolis, MD, April 5-6, 1991), National Tax Journal 44, 4, Supplement (December 1991), MIT Press; R. H. Gordon and G. E. Metcalf, "Do Tax-Exempt Bonds Really Subsidize Municipal Capital?" NBER Working Paper No. 3835, September 1991; D. R. Feenberg and J. M. Poterba, "Which Households Own Municipal Bonds? Evidence from Tax Returns," NBER Reprint No. 1738, July 1992; and G. E. Metcalf, "The Role of Federal Taxation in the Supply of Municipal Bonds: Evidence from Municipal Governments," NBER Working Paper No. 3891, November 1991.

<sup>17</sup>G. E. Metcalf, "Tax Exporting, Federal Deductibility, and State Tax Structure," NBER Working Paper No. 3839, September 1991.

J. Auerbach is currently the Chief Economist of the Joint Tax Committee, R. Glenn Hubbard is the Deputy Assistant Secretary of Tax Policy at the Treasury Department, and Lawrence H. Summers is the Chief Economist of the World Bank. Finally, former program member Lawrence B. Lindsey, who served as the President's Special Assistant for Domestic Policy for several years, has been confirmed to membership on the Federal Reserve Board of Governors.

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## Research Summaries

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### Inflation Dynamics

Laurence M. Ball

Policy toward inflation is a continual struggle. The Federal Reserve can reduce inflation by slowing money growth, but at a large cost: when inflation falls, as in the early 1980s, output falls as well. Recently, fears of a deeper recession have prevented the Fed from pushing toward zero inflation. In addition, even when the Fed pays the price of disinflation, the gains may not be permanent. Inflation rises again when there is an adverse macroeconomic shock, such as wartime spending (in the late 1960s) or a rise in oil prices (in the 1970s and, to some degree, in 1990). Finally, inflation is often unstable: periods of high average inflation exhibit considerable variability. The resulting uncertainty adds to the economic costs of inflation.

Could policymakers keep inflation low and stable without large output losses? It is difficult to address this question, because economists do not agree on the behavior of inflation. Indeed, many economic models suggest that this behavior should not occur—for example, disinflations should not cause the recessions that we observe in actual experience. This article describes research that seeks a better understanding of inflation, with the ultimate goal of designing better policies.

### The Costs of Disinflation

Classical economics postulates that money is neutral: changes in nominal variables, such as inflation, do not affect real output. Unfortunately, this idea is refuted by history: Romer and Romer show that efforts to reduce inflation almost inevitably produce recessions.<sup>1</sup> The conventional explanation for this fact centers on slow adjust-

ment of nominal wages and prices. In particular, following Taylor's influential work,<sup>2</sup> "New Keynesians" argue that the staggered timing of price adjustments across firms creates inertia in the price level. Since prices adjust slowly to a monetary contraction, the effects fall largely on output.

I argue that this view is incorrect.<sup>3</sup> In particular, it confuses *levels* with *growth rates*. Taylor shows that, with staggered adjustment, the price level adjusts slowly to a decrease in the money stock. (Intuitively, no group of firms wants to go first in substantially cutting its prices.) In modern economies, however, a monetary contraction is a slowdown in the growth of money, not an absolute decrease in the level of the money stock. I show that staggered adjustment in theory should not impede the response of inflation to such a policy. If disinflation is "credible"—if it is announced in advance, and price setters believe the announcement—then inflation should fall quickly without lower output. (Indeed, I can show that, in theory, disinflation *raises* output.) This theoretical analysis is unappealing because it does not fit the U.S. experience of costly disinflations. It shows that the high cost of disinflation is probably not the result of staggered price adjustments.

In another paper, I present further negative results, and also some positive ones.<sup>4</sup> The main alternative to New Keynesian theories of disinflation is Sargent's "New Classical" view.<sup>5</sup> According to Sargent, disinflations are costly because they are often not credible: price setters do not believe announcements of slower money growth. When money growth does fall, price setters are surprised, and these negative surprises reduce output.

In my view, this argument alone—like staggered adjustment alone—does not explain the effects of disinflation. If price setters have rational expectations, negative monetary surprises must be balanced by positive surprises in other episodes. Intuitively, positive surprises occur when tough-talking policymakers renege on promised disinflation. Theoretically, positive surprises should raise output just as negative surprises reduce it; announced disinflations should not reduce output *on average*. In reality, disinflations often cause recessions, but we do not observe significant booms when policymakers renege.

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<sup>2</sup>J. B. Taylor, "Aggregate Dynamics and Staggered Contracts," *Journal of Political Economy* 88 (1980), pp. 1–23.

<sup>3</sup>L. M. Ball, "Credible Disinflation with Staggered Price Setting," NBER Working Paper No. 3555, December 1990.

<sup>4</sup>L. M. Ball, "Disinflation with Imperfect Credibility," NBER Working Paper No. 3983, February 1992.

<sup>5</sup>T. J. Sargent, "Stopping Moderate Inflation: The Methods of Poincaré and Thatcher," in *Inflation, Debt, and Indexation*, R. Dornbusch and M. H. Simonsen, eds. Cambridge, MA: MIT Press, 1983, pp. 54–96.

<sup>1</sup>C. D. Romer and D. H. Romer, "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," NBER Reprint No. 1353, February 1990, and in *NBER Macroeconomics Annual*, 1989, Volume 4, O. J. Blanchard and S. Fischer, eds. Cambridge, MA: MIT Press, 1989, pp. 121–170.

On the positive side, while neither New Keynesian nor New Classical theories are satisfactory, a *combination* of the two may be. My paper adds the Classical assumption of imperfect credibility to a Keynesian model of staggered price adjustment. In this case, announcements of disinflation lead to lower output not only when policy proves tighter than expected, but on average. That is, in contrast to the pure Classical case, recessions are not matched by equally large booms.

A brief explanation is that firms' fears that the Fed will renege prevent them from greatly reducing their rate of price increase. Thus the absence of credibility produces the inflation inertia that is missing in the pure Keynesian case. These results are attractive because they are empirically plausible, and because they suggest that Keynesian and Classical theories are complementary.

## The Genesis of Inflation

So far I have asked why it is costly to reduce inflation. But how does high inflation arise in the first place? In the postwar United States, major increases in inflation have followed macroeconomic shocks, such as overheated fiscal policy in the late 1960s and increases in oil prices in the 1970s. The idea that such shocks are inflationary is part of conventional wisdom. However, as with the costs of disinflation, conventional wisdom has weak foundations.

The difficulty here is in explaining why the inflationary effects of shocks are persistent. In textbook models, an oil shock shifts the aggregate supply curve to the left, raising the price level. This increase in prices is a *temporary* increase in inflation. If the initial shock were the end of the story, inflation would return to its previous level after prices adjusted. In practice, however, oil shocks produce a persistent rise in inflation—one that lasts until the Fed creates a recession to disinflate. In other words, the shock triggers not a one-time rise in prices, but a series of increases that lasts indefinitely.

A common explanation for persistence is that an initial rise in inflation raises expectations of future inflation. The Fed accommodates these expectations by keeping inflation high, because unexpectedly low inflation would reduce output. Unfortunately, this explanation begs the question of why individuals expect inflation to stay high. Again, the direct effect of an oil shock is temporary. The expectation that inflation will continue may be self-fulfilling, but so is the expectation that it will not: if expected inflation stays low, the Fed need not inflate to avoid a recession. Why doesn't inflation end with the direct effect of the shock?

I propose a solution to this puzzle by building on the game-theoretic analysis of monetary policy initiated by Kydland and Prescott (1979).<sup>6</sup> As in Barro (1986), the pub-

lic's inflation expectations depend on their beliefs about how strongly policymakers dislike inflation. Policymakers have an incentive to keep inflation low to convince the public that they hate inflation.

In my paper, however, a low-inflation regime can be upset by an adverse supply shock. When the shock occurs, maintaining low inflation requires anti-accommodative monetary policy, and hence higher unemployment. If a policymaker cares about unemployment as well as inflation, he allows inflation to rise even though he previously kept inflation low. This behavior reveals that the policymaker's aversion to inflation is limited, and thus raises the public's inflation expectations. Once expected inflation rises, the policymaker must raise actual inflation to avoid higher unemployment. In other words, while the direct effect of a supply shock is temporary, a policymaker's response provides information about his tastes that influences future expectations.

## The Level and Variability of Inflation

Many authors have argued that a higher level of inflation produces greater uncertainty about future inflation. The costs of this uncertainty, such as greater risk in nominal contracts, are a major reason that economists dislike inflation. However, while there is a widespread belief in an inflation-uncertainty link, there is no consensus about *why* this relationship exists. I propose an explanation using a game-theoretic model with heterogeneous policymakers.<sup>7</sup>

There are both "conservative" policymakers whose only goal is to keep inflation low, and "liberals" who care about both inflation and unemployment. The relationship between inflation and uncertainty depends on the degree of policy consensus. When inflation is low, both conservatives and liberals try to maintain the status quo—nobody thinks it is desirable to raise inflation intentionally. In contrast, high inflation creates a dilemma: policymakers would like to disinflate, but fear the recession that would probably result. Conservatives are willing to pay the cost of disinflation, but liberals are not. The public does not know which faction will control policy in a given period. Thus, when inflation is high, the public is uncertain of inflation's future course.

Stephen Cecchetti and I present empirical evidence on this point.<sup>8</sup> Engle argues that high inflation is *not* associated with particularly high levels of uncertainty in the

<sup>7</sup>L. M. Ball, "Why Does High Inflation Raise Inflation Uncertainty?" *NBER Working Paper No. 3224*, January 1990, and *Journal of Monetary Economics* (June 1992), pp. 371–388.

<sup>8</sup>L. M. Ball and S. G. Cecchetti, "Inflation and Uncertainty at Short and Long Horizons," *NBER Reprint No. 1522*, February 1991, and *Brookings Papers on Economic Activity* 1 (1990), pp. 215–245 and 253–254.

<sup>6</sup>L. M. Ball, "Time-Consistent Policy and Persistent Changes in Inflation," *NBER Working Paper No. 3529*, December 1990.



postwar United States.<sup>9</sup> We show, however, that this result holds only for *short-run* uncertainty, measured by forecast errors for next quarter's inflation. Uncertainty about inflation over the next few years is strongly related to the current level.

<sup>9</sup>R. F. Engle, "Estimates of the Variance of U.S. Inflation Based upon the ARCH Model," *Journal of Money, Credit and Banking* 15 (1983), pp. 286–301.

## Product Variety, Trade, and Growth

Robert C. Feenstra

Since the early 1980s, theoretical work in international trade has incorporated models of monopolistic competition.<sup>1</sup> Much of my own research has used these models to estimate the effects of trade barriers and economic growth on trade patterns.

### Variety

One trade policy that dramatically affected the characteristics of imports was the "voluntary" export restraint (VER) that limited the sale of Japanese autos in the United States. The VER began in April 1981 and limited the *number* of cars that could be exported by Japanese firms; the VER thus created an incentive for Japanese firms to upgrade their export models. In the following years, many Japanese models became heavier, more powerful, and added air conditioning, automatic transmissions, and other features as standard equipment. I estimate that fully one-half of the nominal increase in prices of Japanese imports from 1980 to 1985 reflects the upgrading of their characteristics.<sup>2</sup>

Correcting the price increases for the quality upgrading is one step toward inferring the "pure" increase in prices explained by the VER. The other step is to estimate what would have happened to Japanese auto prices in the absence of any trade restriction. To determine this, I use the prices of Japanese compact trucks imported into the United States. These were not subject to the export restraint, but did have an increase in their tar-

iff from 4 percent to 25 percent effective August 1980. By incorporating this tariff change into a hedonic regression for trucks, I can estimate the quality-adjusted price change that would have occurred under free trade. I find that the export restraint raised prices by \$1000 by 1983 and 1984. In later years the export restraint was loosened, so the price effect fell.

The tariff imposed on imports of Japanese trucks allows us to evaluate the effect of trade policy on new product varieties. After the imposition of the tariff, several U.S. companies began producing compact trucks that were very similar to existing Japanese trucks. Using econometric methods, I find that some Japanese trucks were sufficiently different, or distinctive, to provide a substantial welfare gain. However, the American models produced only a small additional welfare gain, since they were similar to the Japanese models.<sup>3</sup>

In joint work with James A. Levinsohn, I identify the close substitutes of a product in terms of its characteristics in order to compute demand elasticities.<sup>4</sup> The firm uses these own and cross-price elasticities to determine profit-maximizing prices under Bertrand competition. The optimal prices are related directly to the "distance" (that is, similarity or difference) to neighbors: as the distance increases, so does the price.<sup>5</sup> We find that distance is very significant, especially in explaining the high prices of certain luxury cars.

In future research, we intend to examine how the VER on Japanese autos affected pricing behavior. In particular, American models with Japanese neighbors should show some increase in price under the quota. This would shift demand toward the Japanese competitors, who would have to respond by increasing their own price. Thus, the quota acts to support collusion among the firms, as has been demonstrated theoretically. An empirical model of neighbors and oligopoly pricing will allow this hypothesis to be tested.

The upgrading of imports under quota restraints has occurred in many industries in addition to autos. In research with Randi Boorstein, I have estimated the increase in quality of steel imports as the difference between the increased value of such imports and the increase in an exact price index of steel products. I find that quality upgrading in steel imports during the first year of the 1969–74 quota explains one-half of the nom-

<sup>1</sup>This terminology is taken from E. Helpman and P. R. Krugman, *Market Structure and Foreign Trade*, Cambridge, MA: MIT Press, 1985. The authors provide a comprehensive treatment of monopolistic competition and international trade models.

<sup>2</sup>See R. C. Feenstra, "Voluntary Export Restraints in U.S. Autos, 1980–1: Quality, Employment, and Welfare Effects," in R. E. Baldwin and A. O. Krueger, eds., *The Structure and Evolution of Recent U.S. Trade Policy*, Chicago: University of Chicago Press, 1984, pp. 35–59; and R. C. Feenstra, "Quality Change Under Trade Restraints in Japanese Autos," *Quarterly Journal of Economics* 103, 1 (February 1988), pp. 131–146.

<sup>3</sup>R. C. Feenstra, "Gains from Trade in Differentiated Products: Japanese Compact Trucks," in R. C. Feenstra, ed., *Empirical Methods for International Trade*, Cambridge, MA: MIT Press, 1988, pp. 119–136.

<sup>4</sup>J. A. Levinsohn and R. C. Feenstra, "Identifying the Competition," *Journal of International Economics* 28, 3/4 (1990), pp. 199–216.

<sup>5</sup>R. C. Feenstra and J. A. Levinsohn, "Distance, Demand, and Oligopoly Pricing," NBER Working Paper No. 3076, August 1989; revised as "Oligopoly Pricing and the Characteristics Approach," November 1991, mimeo.



inal increase in the unit value, although less of the increase in later years.<sup>6</sup>

Changes in this measure of import quality are explained by shifting relative consumption weights within the import bundle, and there is a welfare cost to this distortion in consumption. The welfare cost can be seen as the cost of the quota as compared to a price-equivalent ad valorem tariff, which would not lead to quality change. Again, this welfare cost can be measured by a comparison of index numbers: for 1969, the welfare cost of upgrading was in the range \$3.5 million to \$7 million.<sup>7</sup>

New product varieties also can be incorporated into the index number measurements. New varieties in particular can be used when estimating U.S. import demand. We know that the estimated income elasticity of U.S. import demand exceeds unity, and also exceeds the income elasticity of foreign demand for U.S. exports. These estimates imply that equal growth in the United States and abroad automatically will lead to a worsening in the U.S. trade balance. Some authors have suggested, however, that the high U.S. income elasticity is caused by the omission of new product varieties from import price indexes. Then the rising share of imports in the United States is attributed to a high income elasticity in the demand equations.

To correct for this, it is possible to incorporate new product varieties directly into the price indexes.<sup>8</sup> Including new product varieties lowers the price index by an amount that depends on their share in expenditure, and on the elasticity of substitution. In practice, new product varieties can be measured by using data on new supplying countries, and treating products as differentiated across countries. Applying this technique to several U.S. imports, I find that the corrected price indexes rise significantly slower than conventional measures. The corrected indexes can explain a part—but not all—of the high income elasticities in the import demand equations.

## Growth

Modifying index numbers for new and disappearing product varieties is one way to implement empirically the recent models of endogenous growth, particularly growth resulting from the expansion of intermediate in-

puts.<sup>9</sup> Just as new varieties will lower the price indexes, they will raise the quantity index, reflecting the contribution of new input varieties to productivity. Again, the extent to which the new input varieties affect the quantity index depends on their share in expenditure, along with the elasticity of substitution. If there are many different kinds of inputs, then we also can determine their effect on GNP. Provided that the primary resources are adjusted for profits in the production of the intermediates, this function has constant returns to scale while holding the ranges of intermediate inputs fixed, and is increasing in these ranges.<sup>10</sup>

In joint research, I have applied these quantity indexes to explain the productivity of industries in South Korea.<sup>11</sup> In this case, it is difficult to measure new inputs available to the firms directly, but an indirect method is available. Each of the firms belonged to a *chaebol*, or business group, that consists of firms with some common ownership and strong vertical links. For each of these groups, we can observe the addition of new input-producing firms over time, and can presume that these firms supplied preferentially to other businesses in the group. Provided that exactly the same inputs were not available earlier, this should enhance the productivity of the purchasing firms. We find that in industries dominated by *chaebol* that experienced substantial new entry over 1983–6, productivity was higher than otherwise. The results support the hypothesis that the new entrants to the *chaebol* conferred a productivity boost to the member firms.

This discussion indicates how an increasing range of inputs in the endogenous growth models can be implemented empirically. An alternative formulation is to consider *quality* improvements in intermediate inputs, as in the “quality ladders” model.<sup>12</sup> Under this approach, new generations of inputs replace the old: computers are a good example. Using characteristics data, we can estimate the declining price per unit of services of each generation, but for many other goods these data would not be available. I believe it will still be possible to implement the “quality ladders” approach, if we are willing to make the same simplifications used in the theory.

<sup>6</sup>R. C. Feenstra and R. Boorstein, “Quality Upgrading and Its Welfare Cost in U.S. Steel Imports, 1969–74,” in E. Helpman and A. Razin, eds., *International Trade and Trade Policy*, Cambridge, MA: MIT Press, 1991, pp. 167–186.

<sup>7</sup>For other examples of upgrading and its welfare costs, see R. C. Feenstra, “How Costly Is Protectionism?” *Journal of Economic Perspectives* 6, 3 (Summer 1992), pp. 159–178.

<sup>8</sup>R. C. Feenstra, “New Goods and Index Numbers: U.S. Import Prices,” NBER Working Paper No. 3610, February 1991; revised as “New Product Varieties and the Measurement of International Prices,” August 1992, mimeo.

<sup>9</sup>See, for example, G. M. Grossman and E. Helpman, *Innovation and Growth in the Global Economy*, Cambridge, MA: MIT Press, 1991.

<sup>10</sup>R. C. Feenstra and J. R. Markusen, “Accounting for Growth with New Intermediate Inputs,” NBER Working Paper No. 4114, July 1992.

<sup>11</sup>R. C. Feenstra, J. R. Markusen, and W. Zeile, “Accounting for Growth with New Intermediate Inputs: Theory and Evidence,” *American Economic Review* (May 1992), pp. 415–421.

<sup>12</sup>See G. M. Grossman and E. Helpman, *Innovation and Growth in the Global Economy*, chapters 4 and 12, and also P. S. Segerstrom, T. C. A. Anant, and E. Dinopoulos, “A Schumpeterian Model of the Product Life Cycle,” *American Economic Review* 80, 5 (December 1990), pp. 1077–1091.

In particular, the utility function adopted in this approach is linear in the generations of each product, where newer generations receive a higher welfare weight. The linearity implies that the price of each generation is an accurate measure of its utility (or quality) per unit. Then a quality index can be constructed by applying relative quantity weights across the prices of each generation: this is identical to the "product mix" index that has been used to measure upgrading of imports under quotas. Using this index, changes in product quality over time and across countries can be measured.

In current research, I am applying this technique to U.S. imports from South Korea and Taiwan. It appears that Korea is the leader among these two countries, being the first to export new products or generations to the United States. After some lag, these products are transferred to Taiwan, which then exports to the United States. Analyzing this pattern more systematically will provide an empirical counterpart to the "quality ladders" model.

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## Profiles

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### Laurence M. Ball

Laurence M. Ball has been a faculty research fellow in the NBER's Program in Economic Fluctuations since 1987. Ball received a B.A. in economics from Amherst College in 1980, and a Ph.D. in economics from MIT in 1986.



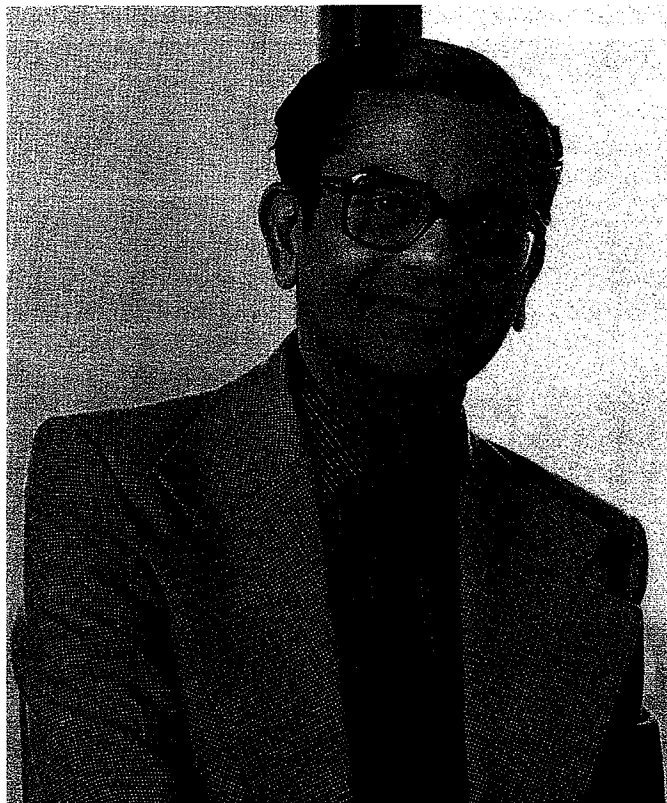
From 1985–9, Ball was an assistant professor of economics at NYU's Graduate School of Business Administration. In 1989, he was appointed assistant professor of economics at Princeton University, where he currently specializes in macroeconomics.

Ball was also an NBER Olin Fellow in 1990–1, and now holds a Sloan Research Fellowship (for 1991–3). His research has been published in a number of journals, including the *American Economic Review*.

Ball's wife, Patricia Bovers, is studying historic preservation. Their son, Leverett, was born last July. In their spare time, the Balls like to go canoeing in Maine.

### Jagdish Bhagwati

Jagdish Bhagwati, the Arthur Lehman Professor of Economics and professor of political science at Columbia University, joined the NBER's Board of Directors in 1989. A native of India, Bhagwati received his bachelor's degree from Bombay University, his master's from Cambridge University, and his Ph.D. from MIT. Bhagwati joined the MIT faculty in 1968, and was named the Ford International Professor of Economics in 1978. In 1980, he went to Columbia University.



Since 1991, Bhagwati also has served as Economic Policy Advisor to the Director-General, General Agreement on Tariffs and Trade. He has published more than 200 articles and over 30 volumes, and is regarded as

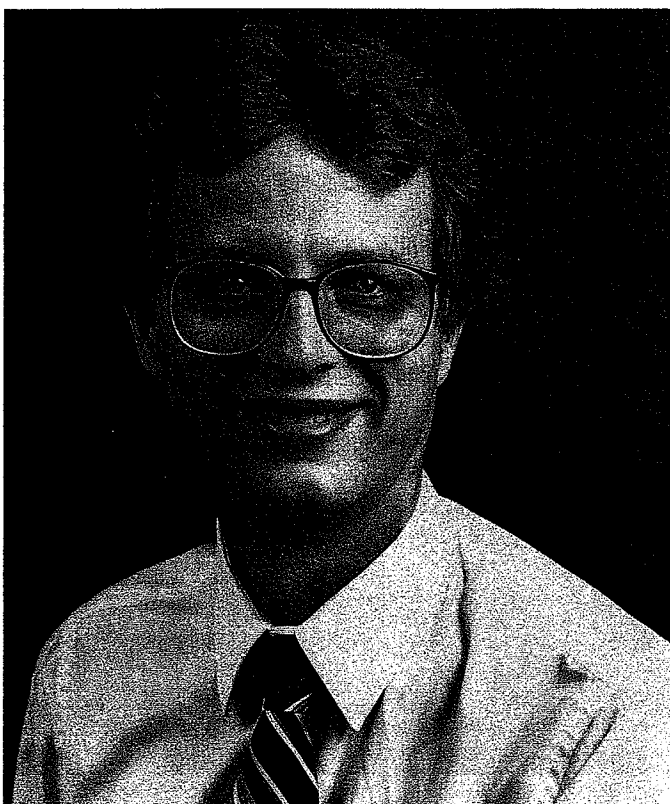
one of the foremost international trade theorists today. Best known for his seminal work in the 1950s and 1960s on the theory of commercial policy, he also has made notable contributions to developmental theory and policy, public finance, immigration, and, starting in the 1980s, to the new theory of political economy.

Bhagwati founded the *Journal of International Economics* in 1971 and *Economics & Politics* in 1989. His most recent books are *Protectionism*, published by the MIT Press in 1988, and *The World Trading System at Risk*, published by Princeton University Press in 1991. Bhagwati is a Fellow of the Econometric Society and of the American Academy of Arts and Sciences.

Bhagwati is married to Padma Desai, also a professor of economics at Columbia University. They have one daughter, Anuradha Kristina.

## Robert C. Feenstra

Robert C. Feenstra was recently named associate director of the NBER's international studies program with responsibility for international trade and investment. He has been affiliated with the NBER since 1987. He is also professor and chair of the Department of Economics at University of California, Davis.



Feenstra received his B.A. in economics from the University of British Columbia in 1977 and his Ph.D. from MIT in 1981. He was an assistant professor of economics at Columbia University from 1981 to 1986. He

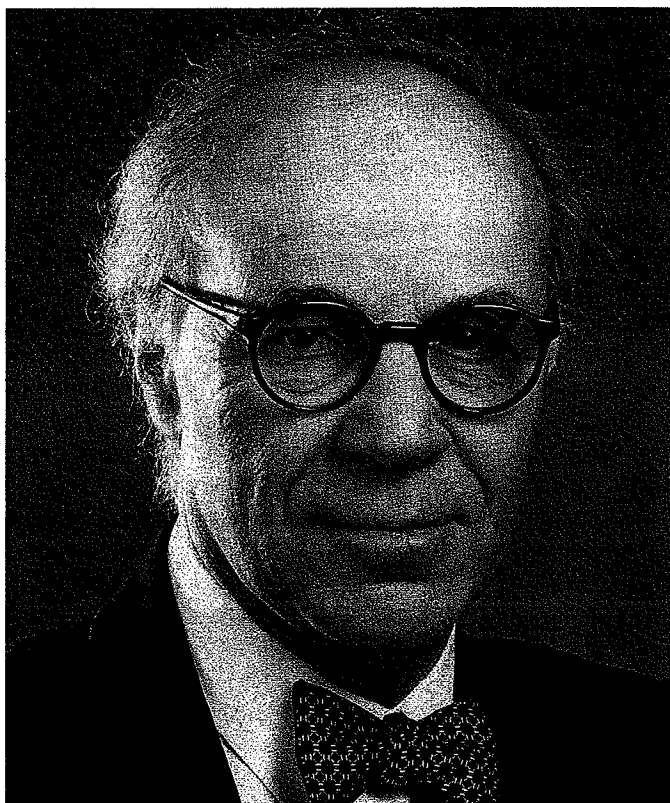
was named an associate professor of economics at the University of California, Davis in 1986 and was promoted to professor in 1990.

Feenstra was coeditor of the *Journal of International Economics* from 1987–90 and has been its associate editor since 1991. His work on international trade has been published in the *American Economic Review*, the *Journal of International Economics*, and the *Journal of Political Economy*. He is also the editor of *Trade Policies for International Competitiveness*, published by the University of Chicago Press for the NBER in 1989.

Feenstra's wife, Gail, is a writer for the Sustainable Agriculture Research and Education Program at the University of California. They have two children, Heather (7) and Evan (4). Feenstra's hobbies include gardening and woodworking.

## Lawrence R. Klein

Winner of the 1980 Nobel Prize in Economics, Lawrence R. Klein became a member of the NBER's Board of Directors in 1988. Klein is also the Emeritus Benjamin Franklin Professor of Economics and Finance at the University of Pennsylvania.



Klein received his B.A. in economics from the University of California, Berkeley, in 1942, and his Ph.D. in economics from MIT in 1944. In 1958, after several years as a lecturer, consultant, and researcher—including three years as an NBER research associate—Klein

joined the economics faculty at the University of Pennsylvania. He served as University Professor of Economics from 1964–7 and was named the Franklin Professor in 1968. He became a professor emeritus in 1991.

Klein has served as president of the American Economic Association, the Eastern Economic Association, and the Econometric Society. He was awarded the American Economic Association's John Bates Clark Medal in 1959. He is a fellow of the Econometric Society, the New York Academy of Sciences, and the British Academy. He is also a member of the American Academy of Arts and Sciences, the American Philosophical Society, and the U.S. National Academy of Sciences.

A specialist in macroeconomics, Klein has published more than 250 journal articles. His most recent book is *Comparative Performance of U.S. Econometric Models*, published by Oxford University Press in 1991.

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## Conferences

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### NBER Study Analyzes Foreign Direct Investment

A two-year NBER project on foreign direct investment, headed by Research Associate Kenneth A. Froot, Harvard University, held its final meeting in Cambridge on May 15–16. The research reports presented at this meeting were:

Robert Z. Lawrence, NBER and Harvard University, "Why Is Foreign Direct Investment in Japan So Low?"

Discussant: Richard C. Marston, NBER and University of Pennsylvania

Edward M. Graham, Institute for International Economics, and Paul R. Krugman, NBER and MIT, "The Surge in Foreign Direct Investment in the Late 1980s: Conceptual Issues"

Discussant: Kenneth A. Froot

Robert E. Lipsey, NBER and Queens College, "Foreign Direct Investment in the United States: Changes Over Three Decades" (NBER Working Paper No. 4124)

Discussant: David Belli, U.S. Department of Commerce

David B. Yoffie, Harvard University, "Foreign Direct Investment in Semiconductors"

Discussant: S. Lael Brainard, NBER and MIT

Rachel McCulloch, NBER and Brandeis University, "New Perspectives on Foreign Direct Investment"

Discussant: Michael Dooley, NBER and University of California, Santa Cruz

Louis T. Wells, Harvard University, "Mobile Exporters: New Foreign Investors in East Asia"

Discussant: Peter Petri, Brandeis University

Raymond Vernon, Harvard University, "Where Are the Multinationals Headed?"

Discussant: Richard E. Caves, Harvard University

Paul M. Healy, MIT, and Krishna G. Palepu, Harvard University, "Crossborder Equity Investments Among Firms in Industrialized Countries"

Discussant: Rene Stulz, NBER and Ohio State University

Deborah L. Swenson, Duke University, "Foreign Mergers and Acquisitions in the United States"

Discussant: Donald Lessard, MIT

In most countries, new foreign direct investment (FDI) occurs predominantly by acquisitions. But in Japan, the relatively unusual culture and institutions make the demand for acquisitions high while apparent limitations on the supply of acquirable firms reduce foreign entry. Lawrence finds that informal barriers to acquisitions, particularly associated with the presence of Japanese corporate groups, or "keiretsu," impede FDI in Japan.

FDI flows have come in surges since World War II. The latest and largest occurred in the second half of the 1980s; in that surge, European and Japanese multinational firms greatly increased their FDI in other developed countries. Graham and Krugman find that this surge and its sudden end cannot be explained fully by existing theories of FDI or by other theories of international capital flow.

U.S. direct investment inflows in the 1980s comprised almost half the world's total. But even with this large inflow, foreign firms employed less than 5 percent of the U.S. labor force, Lipsey finds. He also notes that foreign affiliates import more, relative to their exports, than U.S. firms do, but are acting more like U.S. firms as time goes on. The trade balances of both U.S. and foreign firms are sensitive to exchange rates. Finally, Lipsey finds that the financing of foreign investment from retained earnings fell to almost zero in the 1980s. This was because of the rapid growth of investment and its low profitability.

FDI in semiconductors can be grouped into three waves. In the 1960s and 1970s, U.S. firms invested heavily in overseas assembly and test facilities, taking advantage of low labor costs in Southeast Asia, and invested only in fabrication facilities in Europe to avoid tariffs. In the mid-1970s, European firms bought American companies to acquire the latest technology. In the late 1980s and continuing into the early 1990s, U.S. firms have built facilities in Europe, and Japanese firms have invested in both the United States and Europe, both to avoid trade restrictions and to acquire technology. Yoffie finds that political changes—the U.S.–Japan Semiconductor Trade Agreement of 1986 and Europe's 1992

program—and changes in technology explain most of these waves.

McCulloch reviews the changing composition of global direct investment flows, and analyzes these developments in the context of contemporaneous changes in global competition. Direct investment is an integral part of firms' global strategy. Two-way flows signal that American companies no longer have a monopoly on competitive advantages required for global expansion. Blurring of the distinction between host and source countries raises questions about the U.S. leadership role in GATT negotiations to limit host-country investment policies.

Wells observes that firms from East Asian developing countries account for the majority of recent FDI in Indonesia, and for much FDI elsewhere in Asia. These firms, largely export oriented, differ from earlier investors in East Asia, which produced primarily for the local market. The recent investors, particularly Korea and Taiwan, draw on their established marketing contacts in the industrialized countries to use the low-cost labor of their host countries.

Multinational enterprises now dominate international flows of goods and services. Vernon notes that the identity of the headquarters country once helped to explain the behavior of such enterprises, but that is no longer so. In markets with certain specified characteristics, ignorance and uncertainty are both critical to firm behavior, along with scale and transaction costs.

Healy and Palepu find that corporate equity acquisitions across countries grew tenfold between 1985 and 1990, and currently account for about 30 percent of all intercorporate investments. After adjusting for size differences across countries, they observe that the United Kingdom is both the largest target and acquirer nation. The United States is an important target country, but U.S. companies have been relatively passive in making foreign acquisitions. In contrast, very few Japanese firms have been targets of international acquisitions, although Japanese firms themselves have invested abroad. International activity in target countries is explained in part by regulations that seek to deter foreign investment, differences across countries in ownership structure and markets for corporate control, and target countries' recent growth. Changes in real exchange rates between target and acquirer countries, and growth rates of acquirer countries, are not important in explaining patterns of international equity investment.

Swenson uses a panel of foreign and domestic acquisitions in the United States from 1974–90 to compare the transactions methods, target choices, and wealth outcomes of the respective activities. She finds that the most pronounced difference arises in the wealth gains of target shareholders. Foreign acquisitions generated gains almost 10 percent higher than those in similar domestic acquisitions. Foreign firms also appear to buy

firms that are growing more rapidly, and have significantly higher price-to-earnings ratios. Foreign firms also are less likely to encounter competition from other bidding firms. Finally, foreign acquisitions are more sensitive to exchange rate movements.

Other participants included NBER associates Geoffrey Carliner; Kathryn M. E. Dominguez, Martin Feldstein, and James R. Hines, Jr., Harvard University; Robert C. Feenstra, University of California, Davis; Alberto Giovannini, Columbia University; Linda S. Goldberg, New York University; and Michael Klein and Kala Krishna, Tufts University. Also attending were Kathryn Dewenter, University of Chicago; Persa Economou, Michelle Gittleman, and Karl Sauvart, United Nations; Dennis Encarnation, Ann Harrison, Debora Spar, Richard Vietor, and G. Peter Wilson, Harvard University; Michael G. Rukstadt, Stanford University; and William Zeile, U.S. Department of Commerce.

## Measurement of Depreciation and the Capital Stock

More than 130 economists and policymakers gathered in Washington, DC on June 5 for a workshop on "Measurement of Depreciation and the Capital Stock." Sponsored by the NBER's Conference on Research in Income and Wealth, this meeting was organized by Michael Harper and Jack E. Triplett, U.S. Bureau of Labor Statistics (BLS); Stephen D. Oliner, Federal Reserve Board; and Frank Wykoff, Pomona College. The program was:

Welcoming Remarks: Alan Greenspan, Chairman, Federal Reserve Board

Allan Young, Bureau of Economic Analysis (BEA), "The Use of Research Results on Depreciation and Capital Stock in the National Accounts"

Jack E. Triplett, "Measuring Depreciation and the Capital Stock: A Review of Concepts and Data Needs"

Discussants: Lau Christensen, Christensen Associates, and M. Ishaq Nadiri, NBER and New York University

Dale W. Jorgensen, Harvard University, "Capital as a Factor of Production: An Update"

Discussant: Walter Oi, University of Rochester

Lucy Allen, Yale University, "Adverse Selection in the Market for Used Construction Equipment"

Iain Cockburn, NBER and University of British Columbia, and Murray Frank, University of British Columbia, "Market Conditions and Retirement of Physical Capital: Evidence from Oil Tankers" (NBER Working Paper No. 4194)

Stephen D. Oliner, "Estimates of Depreciation and Retirement for Computer Peripheral Equipment"

Discussant: Robert J. Gordon, NBER and Northwestern University

Mark E. Doms, University of Wisconsin, "Estimating Capital Efficiency Schedules Within Production Functions"

M. Ishaq Nadiri, and Ingmar R. Prucha, University of Maryland, "Estimation of the Depreciation Rate of Physical and R and D Capital in the U.S. Total Manufacturing Sector"

Discussant: Catherine Morrison, Tufts University

Panel Discussion: "Unresolved Conceptual and Empirical Issues in Measuring Depreciation and Capital Stock"

Chair: Melvyn A. Fuss, NBER and University of Toronto

Panelists: Robert Eisner, Northwestern University; Barbara Fraumeni, Northeastern University; Robert E. Hall, NBER and Stanford University; and Michael Harper

Frank Wykoff, "Where Do We Go From Here?"

Discussants: Carol Corrado, Federal Reserve Board; Edwin Dean, BLS; Dale Jorgensen; and Jack E. Triplett

Greenspan noted that a workshop devoted to the measurement of capital stock and depreciation is long overdue. Although capital measurement poses difficult problems, it is one of the most important endeavors in economics, he continued. This explains why the profession has continued to grapple with measurement issues that were discussed nearly 50 years ago. Currently, Greenspan concluded, the measurement of income in the national accounts is on a considerably better footing than the measurement of balance sheets is. However, the recent phenomenon of declining asset prices, and its effect on real decisions, demonstrates the need for a fully integrated set of balance sheet and product accounts.

Young said that the BEA already has begun to reevaluate the measurement of capital stock and depreciation in the national accounts, but will take care to keep its current procedures that are of value. The BEA is most concerned now with the proper conceptual framework for measuring capital and depreciation; concerns about the availability of data, and the use of these data to obtain empirical estimates, are secondary.

Triplett points out that a single measure of capital cannot be appropriate for all applications. In particular, the national accounts measure of capital used up in production differs from the measure of capital services used in analyses of the contribution of capital to output and productivity. However, to measure changes in the market value of capital goods, the concept of depreciation relevant for the national accounts—the capital consumption allowance—is the same as the depreciation

term that appears in the user cost of capital: both measure the age-related decline in the value of a capital good. Triplett concludes that depreciation is a critical element in capital measurement for both production analysis and the national accounts. He argues that studies of used asset prices, despite their shortcomings, still provide the most promising approach for obtaining depreciation estimates for productive assets that trade in such markets.

Jorgensen surveys empirical research on depreciation and its applications in three important areas of economic measurement: description of the U.S. tax system, productivity measurement, and the accounting for national income and wealth. This empirical research is based on an analysis of new and used asset prices, supplemented by data on retirement patterns of assets. The results will improve estimates of the tax burdens borne by different assets and of the role of capital in productivity growth. These results also could improve measures of national income and wealth employed by the BEA.

Allen examines auction data for loader backhoes from 1988–91 to determine whether the goods traded in used markets are representative of all goods. She finds that the prices of equipment sold at liquidation auctions were significantly higher than of equipment sold at other auctions. This suggests that the equipment selected by ongoing firms to be traded in the used market is worse than the equipment they choose not to trade, and that this "adverse selection" effect is greater for younger equipment.

Cockburn and Frank analyze capital depreciation for oil tankers from 1979 to 1989. They also estimate the effect of changes in market conditions on the price and scrapping of tankers. They find that energy price rises had a major impact on the value of ships, and on which ships were scrapped.

Oliner uses price data from the secondhand market to estimate depreciation and retirement patterns for computer peripheral equipment. He finds that the average service life for such equipment is relatively short and has declined over time. Consistent with this result, the rate of depreciation for peripheral equipment appears to have accelerated over time. These findings suggest that the capital stock data published by the BEA overstate the growth of the stock of office and computing equipment.

Doms uses plant level panel data for a select group of steel plants that employ a common technology to estimate the decline in the efficiency of capital goods as they age. He finds that the decline is geometric.

Nadiri and Prucha develop a model that allows for jointly estimating the depreciation rates of physical and R and D capital for the U.S. manufacturing sector. They calculate a depreciation rate of 0.065 for plant and equipment and 0.102 for R and D capital. Their model internally generates capital stocks for both physical and

R and D capital. Their results suggest that replacement investment is almost three times as large as net investment for both types of capital, indicating that net capital formation has been far from adequate to support a vigorous growth in the manufacturing sector over the past few decades.

Eisner cited a host of areas for additional research: 1) allowing more completely for quality changes in measures of price and quantities of investment goods; 2) estimating whether the market prices of used capital goods accurately proxy for the valuation of the capital goods that are never traded; and 3) analyzing the effect of tax provisions and interest rates on depreciation patterns.

Fraumeni suggested that, despite a number of outstanding unresolved issues, the BEA ought to revise its published measures of capital stock and depreciation to incorporate more fully recent research findings. The BEA also should become involved more directly in research on capital measurement, if not by conducting its own studies, at least by actively encouraging outside studies in the areas of greatest interest, she concluded.

Hall pointed out that the existing measures of the aggregate capital stock combine different vintages of capital with weights that are independent of changes in economic conditions. Yet, the productivity of various vintages of a capital good depend on such events as a jump in energy prices. Thus, future research should attempt to characterize the endogenous responses to changes in factor prices and other events in order to better specify the aggregation weights.

Harper indicated that the BLS aggregates the productive stocks of different types of capital with estimated rental prices. Although this approach has a strong theoretical base, a number of difficult problems arise in the estimation of these unobserved rental prices. In addition, to improve existing estimates of productive capital stocks, we need more information on decay and retirement patterns, especially their variations over the business cycle.

Wykoff noted that, 20 years ago, there were almost no empirical estimates of depreciation. In the 1970s, Hulten and Wykoff developed the first comprehensive estimates of economic depreciation for business equipment and structures. Since 1980, their results have been applied in a wide range of studies, but little has been done to refine their original estimates. The statistical agencies should take the lead in sponsoring new research on capital measurement, he concluded, particularly studies of retirement patterns and the utilization of older capital.

Corrado conceded that the Federal Reserve System needs improved measures of capital accumulation to gauge the maximum rate of output growth that is consistent with stable inflation. In addition, the Fed has an interest in seeing improvements to existing measures of manufacturing capital stock because these are used as an input to the Fed's estimate of industrial capacity.

Dean explained that the BLS measures of productive capital stock currently conform with the state-of-the-art methodology advocated by Jorgensen and others. For future work, the BLS likely will focus on measuring capital in financial institutions and, more generally, will conduct research on quality change, obsolescence, and price deflation.

Jorgensen added that the statistical agencies should give the highest priority to introducing existing research results into their published estimates of capital stock. The ultimate goal should be an integrated set of productive stocks and wealth stocks for capital, he believes.

Triplett told the group that, in the summer of 1991, the BEA considered revising its published capital stocks to be more in line with the results of Hulten and Wykoff. But there was too little time to do so before the release of the benchmark revision of the National Income Accounts at the end of 1991. Now that the BEA has several years before the next benchmark revision, Triplett believes that it would be a more propitious time to undertake a major revision.

## Trans-Atlantic Public Economics Seminar

The NBER's Trans-Atlantic Public Economics Seminar (TAPES) met on June 11–13. This year's meeting was sponsored jointly by the Center for Economic Studies of the University of Munich and was funded in part by a grant from the German Marshall Fund of the United States. NBER Research Associates Roger H. Gordon, University of Michigan, and Hans-Werner Sinn, University of Munich, organized the program:

Jack Mintz and Thomas Tsiopoulos, University of Toronto, "On the Effectiveness of Corporate Tax Incentives for Foreign Investment in the Presence of Tax Crediting: An Application to Central-Eastern European Countries"

Discussants: Søren Bo Nielsen, Copenhagen Business School, and Jean Yves Duclos, London School of Economics

Don Fullerton, NBER and Carnegie-Mellon University, and Marios Karayannis, Price Waterhouse, "Tax Evasion and the Allocation of Capital"

Discussants: Frans van Winden, University of Amsterdam, and Christoph M. Schmidt, University of Munich

Rosanne Altshuler, NBER and Columbia University, and Scott Newlon, U.S. Department of the Treasury, "Tax Effects on Income Repatriations by U.S. Multinationals: Evidence From Panel Data"

Discussants: Christian Keuschnigg, Institute for Higher Studies, Vienna, and Bernd Huber, University of Würzburg



Vesa Kanninen, University of Helsinki, and Jan Södersten, University of Uppsala, "A New View of Corporate Taxation: Monitoring Costs, Expectations, and the Cost of Capital"

Discussants: Marcel Gerard, Catholic Faculty of Mons, and Kevin Hassett, Columbia University

James R. Hines, Jr., NBER and Harvard University, "Credit and Deferral as International Investment Incentives"

Discussants: Rosanne Altshuler, and Kai Konrad, University of Munich

Roger H. Gordon and Jeffrey K. MacKie-Mason, NBER and University of Michigan, "Tax Distortions to the Choice of Organizational Form" (NBER Working Paper No. 3781)

Discussants: Dominique Demougin, University of Quebec, and Wolfram Richter, University of Dortmund

Dietmar Wellisch, University of Tübingen, "Decentralized Provision of Public Goods with Spillovers in the Presence of Perfect and Imperfect Household Mobility"

Discussants: John D. Wilson, Indiana University, and Harris Schlesinger, University of Alabama

Annette Gehrig and Klaus F. Zimmermann, University of Munich, and Christoph M. Schmidt, "Mass Migration, Unions, and Fiscal Migration Policy"

Discussants: James M. Poterba, NBER and MIT, and James R. Hines, Jr.

Dominique Demougin, and Hans-Werner Sinn, "Risk-Taking, Privatization, and the Communist Firm"

Discussants: Jack Mintz, and Michelle J. White, University of Michigan

John Flemming, European Bank for Reconstruction and Development, "Relative Price Shocks and Unemployment: Arguments for Temporarily Reduced Payroll Taxes or Protection"

Discussants: Martin Feldstein, NBER and Harvard University, and Roger H. Gordon

## **Roundtable on German Unification:**

### **Problems and Prospects**

Richard Portes, Center for Economic Policy Research, "The Economic Transformation of Eastern Europe: Results and Lessons"

Michael Burda, INSEAD, Paris, "East Germany and Czechoslovakia Compared: Different Approaches to a Common Problem"

Horst Siebert, University of Kiel, "The German Unification: Two Years Later"

Manfred Wegner, Institute for Economic Research, Halle, "Prospects for East German Recovery"

Mintz and Tsiopoulos find that many of the tax incentives that Central-Eastern European (CEE) countries could provide to attract foreign investment are offset by

provisions of the U.S. tax code. Since the United States does not allow "tax-sparing" like other capital exporting countries do, tax holiday incentives granted in CEE countries are only half as valuable to the U.S. investor as owing no U.S. tax on foreign-source income. A cash flow tax in CEE countries is neutral in taxing capital at a zero effective rate. But for a U.S. multinational in a deficient tax credit position, the incentive value of the cash flow tax is reduced by about two-thirds for investments in CEE countries. Corporate tax rate reductions in CEE countries have a similar impact on the effective tax rates faced by U.S. firms. However, investment tax allowances added to annual capital cost allowances would have a much smaller impact in increasing U.S. foreign investment for U.S. multinationals in a deficient tax credit position than for other U.S. multinationals.

When firms and households try to evade taxes, they may engage in activities that are less productive than more visible endeavors, but in which income is easier to hide. Fullerton and Karayannis estimate the effect of tax evasion and government efforts to increase compliance in the United States. If there were no tax evasion and no statutory tax differences among different investments, there would be an estimated efficiency gain of almost \$16 billion per year, or 0.71 percent of national income in the United States. If 20 percent of noncorporate capital income were evaded, and statutory tax differences were removed, the efficiency gain would be almost \$22 billion, or 0.97 percent of national income. A 20 percent increase in the audit rate would yield a net gain of \$0.4 billion; a 20 percent increase in the penalty would yield a net gain of only \$0.15 billion. Fullerton and Karayannis also estimate that the efficiency gain from the Tax Reform Act of 1986 was \$3.6 billion (0.16 percent of national income) if evasion is ignored, and \$7.2 billion (0.32 percent of national income) if evasion is taken into account.

Using U.S. tax return information for a large sample of U.S. corporations and their foreign subsidiaries, Altshuler and Newlon find that the tax prices of dividend repatriations from foreign subsidiaries to their U.S. parent corporations fluctuate considerably over time. Some of this variation is caused by changes in average tax rates of subsidiaries and in foreign tax credit positions of parent corporations. Such substantial fluctuations in the tax cost of dividend repatriations provide incentives for firms to manipulate their timing. In fact, Altshuler and Newlon find considerable variation over time in the dividend payout behavior of the foreign subsidiaries in their sample.

Kanninen and Södersten prove that the effective profits tax rate is tied to current and expected future profitability, reflected in the marginal valuation of equity. Moreover, they suggest a new tax neutrality result, providing for the first time a choice-theoretical explanation for why corporations in the Nordic countries do not maximize their interest-free tax debt.

Hines shows that the U.S. corporate tax system of granting credits for foreign taxes paid and permitting tax deferrals for unrepatriated income encourages firms to use debt instead of equity to finance their new foreign investments. It also encourages financing these new investments with considerable debt. The incentives are strongest for U.S. investments in low-tax foreign countries, and they exist even when transfer price regulation effectively limits the profit rates that foreign subsidiaries can earn. The behavior of U.S. multinationals in 1984 appears to reflect these tax incentives, Hines concludes.

Using data from 1979–86, Gordon and MacKie-Mason estimate the efficiency costs that result from tax-induced changes in the forms of organization chosen by firms. They conclude that the relative tax treatment of corporate versus noncorporate income varies depending on the tax bracket of the individual investor. In addition, the importance of tax considerations as a whole depends on the degree to which a firm generates taxable income (or tax-deductible losses).

Wellisch finds that, if households are perfectly mobile across regions, the decentralized provision of public goods generating spillovers is socially efficient; there is no need for a higher level of government intervention. If households are attached to particular regions for cultural or nationalistic reasons, though, then only a relatively well-endowed region will internalize all benefit spillovers perfectly.

Gehrig, Zimmermann, and Schmidt focus on the mechanism of wage determination in a country receiving immigrants. If one large monopoly union acts on behalf of the whole work force, then, depending on the union's goals, and on whether labor is heterogeneous, there may be an optimal size of immigration. The authors analyze the effects of unemployment benefits, tax rates on labor and capital, and the rate of immigration on employment and output.

Demougin and Sinn study alternative methods of privatizing a formerly communist firm in the presence of imperfect risk markets. The methods include cash sales, a giveaway scheme, and a participation contract in which the government retains a fractional ownership in the firm. They show that, with competitive bidding, the participation contract generates both more private restructuring investment and a higher present value for the government than the other schemes do. The participation contract also may induce more investment than the giveaway scheme does.

Flemming discusses how recent reforms in CEE countries, including freeing prices, eliminating subsidies, and opening trade, can change radically the relative prices facing enterprises. Such large price shocks may reduce the market-clearing real wage. If there is a minimum wage, price reform may generate unemployment. In this case, an employment subsidy could be cheaper than unemployment compensation; also, it could raise output

more than consumption, thus increasing the resources available for investment. Flemming also argues that temporary trade barriers may ease the transition to a market economy.

According to Portes, certain pragmatic measures could lower the economic and political costs of reform programs substantially in central and eastern Europe: a consistent exchange rate policy, with an initial pegging of the exchange rate after stabilization, followed by a crawling peg; tariff protection, to ease the transition and to permit adjustment; immediate commercialization of state firms, giving them strong management before privatization; an active policy for industrial restructuring; and recapitalizing the banks, canceling the debts of firms that are privatized, and giving open, cash-limited fiscal subsidies (rather than hidden credits) to the others.

Burda observes that the ex-GDR and the Czech and Slovak Republics (CSFR) had similar populations, industrial structures, and standards of living both before and after World War II. In their transformation to market economies, though, they have taken radically different approaches. Through monetary and economic union with West Germany, East Germany benefited from an established legal and social infrastructure as well as a well-endowed partner willing to make transfer payments of 50 to 100 percent of GDP. On the other hand, the economy sustained a crippling appreciation of the real exchange rate and the collapse of demand for domestic output. In contrast, the CSFR was able to devalue sharply in real terms and has delayed considerably, if not averted, the 50 to 60 percent collapse of industrial output seen in its northern neighbor. Privatization has been managed differently as well, with the Treuhandanstalt entirely bypassing any implicit ownership claims by the local (East German) population in favor of swift placement in the hands of those willing to undertake new investment. In the CSFR, a more "democratic" and possibly riskier privatization process is now underway.

Siebert notes that, as a result of German unification, production in the former East Germany is down by 30 percent, productivity stands at only 30 percent of West German levels, but wages are at 70 percent of West German levels and rising. Providing the eastern region with a modern capital stock with the same capital per worker as in West Germany will require an investment of roughly 120 billion Deutschmarks per year for the next ten years, he estimates. This will mean continuing government transfers of around 5 to 6 percent of West German GNP. One possibility would be to finance one-third of those transfers through tax increases, one-third through debt issues, and one-third through a cut in government expenditures in Western Germany.

Wegner explains that rapid productivity growth was expected in the former GDR immediately after German unification. However, the economic transition proved to be longer and more painful than expected. But Wegner

believes that, at this point, the economy of the former GDR has bottomed out. In particular, the construction and service sectors are starting to grow. His estimates suggest GNP growth at a rate of roughly 4.5 percent to 6.5 percent during the rest of 1992 and 1993, with production growing at a rate of about 7 percent. With this growth, unemployment should stabilize. But continuing growth will depend on large transfers from western Germany throughout the decade, and complete reconstruction will take a generation, Wegner concludes.

The TAPES conference proceedings will be published in a special issue of the *Journal of Public Economics*.

## International Seminar on Macroeconomics

The fifteenth annual International Seminar on Macroeconomics (ISOM) was held in London, England on June 15–16. ISOM is cosponsored by the NBER, the European Economic Association, and La Maison des Sciences de l'Homme. This year's conference was hosted by the Bank of England. ISOM is jointly organized each year by Robert J. Gordon, NBER and Northwestern University, and Georges de Ménéil of the Ecole des Hautes Etudes en Sciences Sociales. The papers and their discussants were:

Ricardo J. Caballero, NBER and MIT, and Eduardo M. R. A. Engel, University of Chile, "Microeconomic Rigidities and Aggregate Price Dynamics" (NBER Working Paper No. 4162)

Discussants: Charles Bean, London School of Economics, and John B. Taylor, NBER and Stanford University

Wolfgang Franz, Konstanz University, and Robert J. Gordon, "German and American Wage and Price Dynamics: Differences and Common Themes"

Discussants: David Coe, International Monetary Fund, and Michael Funke, Free University, Berlin

Orazio P. Attanasio, NBER and Stanford University; Luigi Guiso, Bank of Italy; Tullio Jappelli, IUN, Naples; and Guglielmo Weber, University College, London, "The Consumption Boom in the United Kingdom and Italy in the Late 1980s: Aggregate Implications of Microeconomic Evidence"

Discussants: John Y. Campbell, NBER and Princeton University, and Francesco Giavazzi, NBER and Italian Treasury

Jürgen von Hagen, Mannheim University, "Money Demand and Money Supply After German Monetary Union"

Discussants: Martin Klein, University of Bonn, and Frederic S. Mishkin, NBER and Columbia University

Charles Bean and Chris Pissarides, London School of Economics, "Demand, Unemployment, and Growth"  
Discussants: Philippe Aghion, European Bank for Reconstruction and Development, and Ricardo J. Caballero

Gilles Saint-Paul, DELTA, "Productivity Growth and the Structure of the Business Cycle"

Discussants: Antoine d'Autume, University of Paris, and Mervyn A. King, NBER and Bank of England

Lars E. O. Svensson, NBER and Stockholm University, "Assessing Target Zone Credibility: Mean Reversion and Devaluation Expectations in the EMS, 1973–92" (NBER Working Paper No. 3795)

Discussants: Philippe Moutot, Bank of France, and Kenneth S. Rogoff, NBER and Princeton University

Caballero and Engel analyze the sluggish behavior of the aggregate price level. Using only aggregate data, they infer that the probability that a firm will adjust its price depends on both the sign and the magnitude of the deviation of the price from its target level. In the aggregate, the price level responds less to negative shocks than to positive shocks, and the number of firms changing their prices—and therefore the flexibility of the price level to aggregate shocks—varies over time in response to changes in economic conditions.

Franz and Gordon find numerous differences between Germany and the United States in aggregate wage and price dynamics. In contrast to the stable U.S. natural rate of unemployment (NAIRU) in the range of 6 percent, the German NAIRU increased sharply in the 1970s and 1980s. The authors also find that the U.S. Phillips curve is not uniquely flat: the response of American wages and prices to a change in output or unemployment is at least as great as the response of German wages and prices to a change in output or unemployment in Germany. Further, there is no evidence that union weakness slowed wage increases in the United States or that union strength raised wage increases in Germany; slow American wage growth in the 1980s was a productivity problem, not a wage negotiation problem.

Attanasio, Guiso, Jappelli, and Weber analyze the increase in both the U.K. and the Italian average propensity to consume. They show that there are plausible combinations of taste and technology that will induce a short-run decrease, and a long-run increase, in aggregate saving as a consequence of a positive shock to perceived permanent income.

Von Hagen presents an empirical analysis of German money demand, money supply, and monetary policy after German monetary union in 1990. He shows that the demand for "narrow money" but not "broad money" was stable. East German portfolio adjustment, in terms of the structure of monetary portfolios, occurred quite rapidly. However, the increase in monetary control uncertainty caused by these adjustments did not impede monetary targeting with reasonable precision.

Bean and Pissarides highlight certain links between unemployment, savings, and growth. They show that the cross-country correlations between unemployment and growth can be either positive or negative, depending on the source of the differences in economic structure across countries. Also, an increase in the relative bargaining power of workers, which tends to reduce employment (and hence saving), nevertheless may increase growth because the associated redistribution toward those who save produces an increase in total saving. A reduction in the propensity to save leads to an expansion in the market for consumption goods, an increase in competition as new firms enter, and a fall in the relative price of consumption goods. This tends to expand employment. If entry costs into consumption goods production are sufficiently large, this expansion in employment can produce an increase in total saving, even though the propensity to save has decreased.

Saint-Paul questions recent opportunity cost models of growth that argue that, in recessions, firms engage in productivity-improving activities because of intertemporal substitution. He finds that demand shocks have a negative impact on productivity, both in the short run and in the long run. The short-run impact is stronger in those countries where fluctuations are more transitory. Research and development does not respond significantly to demand shocks.

Svensson estimates devaluation expectations for six ERM currencies relative to the Deutschmark, for March 1979 to April 1992. He finds that expected rates of devaluation generally have fallen during the period, and have fluctuated more than interest rate differentials.

The conference concluded with a panel discussion on the economics of the European Monetary Union. The participants were Georges de Ménil, Martin Feldstein, Francesco Giavazzi, Mervyn A. King, and Jürgen von Hagen.

This report was prepared by Robert J. Gordon. Selected papers from the conference will be published in the *European Economic Review* in Spring 1993.

## Third Annual East Asian Seminar Held in Sapporo

The Third Annual NBER East Asian Seminar on Economics, "Macroeconomic Linkage: Saving, Exchange Rates, and Capital Flows," was held in Sapporo, Japan on June 17–19. This year's meeting was sponsored jointly by the NBER, the Tokyo Center for Economic Research (TCER), the Korea Development Institute (KDI), and the Chung-Hua Institution for Economic Research (CIER), and organized by NBER Research Associates Takatoshi Ito, Hitotsubashi University, and Anne O. Krueger, Duke University. This seminar included:

Takatoshi Ito, "On Recent Movements of Current Accounts and Capital Flows of Japan"

Discussants: Maria Gochoco, University of the Philippines, and Naohiro Yashiro, Japan Center for Economic Research

John F. Helliwell, NBER and University of British Columbia, "International Growth Linkages: Evidence for Asia and the OECD"

Discussants: Shinichi Fukuda, Yokohama National University, and Gee San, CIER

Sung-Hee Jwa, KDI, "Capital Mobility in Korea since the Early 1980s"

Discussants: Pochih Chen, National Taiwan University, and Kazuo Ueda, University of Tokyo

Rachel McCulloch, NBER and Brandeis University, "An Asian Capital Crunch?"

Discussants: Kazumi Asako, Yokohama National University, and Chong-Hyun Nam, Korea University

Kazuo Nishimura, Kyoto University, and Michihiro Ohyama, Keio University, "Dynamics of External Debt and Trade"

Discussants: Yoshiyasu Ono, Osaka University, and Naosumi Sagara, Hitotsubashi University

Bon Ho Koo, Hahn-Yang University, and Won Am Park, KDI, "Perspectives on Korea's External Adjustment in Comparison with Japan and Taiwan"

Discussants: Bih Jane Liu, National Taiwan University, and Hiroo Taguchi, Bank of Japan

Bih Jane Liu, "Cost Externality and Exchange Rate Pass-Through: Some Evidence from Taiwan"

Discussants: Serguey Braguinsky, Yokohama City University, and Won Am Park

Jin-Lung Lin and Chung-Shu Wu, Academia Sinica, "Money, Output, Exchange Rate, and Price: The Case of Taiwan"

Discussants: Tan Khee Giap, University of Singapore, and Maria Gochoco

Shinichi Fukuda, "Endogenous Exchange Rate Fluctuations and the Desirable Exchange Rate Regime"

Discussants: Michihiro Ohyama, and Shang-Jin Wei, University of California, Berkeley

Gee San, "The Effects of NT Dollar Variations on Taiwan's Trade Flows"

Discussants: Chong-Hyun Nam, and Ryosuke Wada, Otaru University of Commerce

Kasumi Asako and Yoshiyasu Ono, "Tariffs, Quota, and Inventory Adjustment"

Discussants: John F. Helliwell and Kazuo Nishimura

Jeffrey A. Frankel, NBER and University of California, Berkeley, and Shang-Jin Wei, "Yen Bloc or Dollar Bloc: Exchange Rate Policies of the East Asian Economies"

Discussants: Koichi Hamada, NBER and Yale University, and Sung-Hee Jwa

Hiroo Taguchi, "On the Internationalization of the Japanese Yen"

Discussants: Cheng Chung Chu, National Taiwan University, and Kazuo Ueda

Junichi Goto, Kobe University, and Koichi Hamada, "Economic Preconditions for Asian Regional Integration"

Discussants: Masao Satake, Otaru University of Commerce, and Toshiaki Tachibanaki, Kyoto University

In 1991, the Japanese current account surplus increased sharply, and there were net inflows of long-term capital to Japan. Ito suggests that the increase in the current account was partly a result of such transitory factors as the Gulf War and the popularity of investing in gold. After he corrects for these transitory factors, he finds that the trend decrease in the current account surplus that began in 1987 was reversed in 1991, but by much less than the official statistics show. Ito also shows that the Japanese surplus in long-term capital accounts occurred partly as a result of strong demand for Japanese assets by nonresidents, and partly because of a reduction in short-term debts by Japanese residents.

The Asian economies typically have relied on an outward-looking trade strategy for growth and they have adopted, and sometimes leapfrogged, technical advances developed and originally applied in other countries. Helliwell assesses the extent to which comparative growth models apply to the Asian experience and then asks whether differing openness among the Asian economies helps to explain their relative growth rates. He finds that the faster-growing Asian economies had lower tariffs, fewer nontariff barriers, and less difference between official and black market exchange rates. For given levels of openness and investment, the initially more democratic of the Asian countries have had slower growth. All of the countries become more democratic as they grow richer, though.

Jwa reviews Korea's experience with capital controls since the early 1980s, and compares the degree of capital mobility in Korea with that of other Asian countries. He observes that, during the first half of the 1980s, Korea limited capital outflows to solve its problems with foreign debt and a current account deficit. In the latter half of the decade, Korea restrained capital inflows to mitigate excess liquidity problems caused by the current account surplus. Jwa argues that the slow pace of liberalization of capital flows is partly a result of delayed domestic financial liberalization, but Korea's capital mobility has been increasing gradually since the early 1980s.

The strong growth of the developing regions of East Asia in recent years has been fueled by huge inflows of foreign, especially Japanese, capital. However, dramatic changes in Japan and elsewhere, perhaps even a global shortage of capital, are sure to affect saving and investment. McCulloch reviews the evidence for a world capital shortage and assesses the implications for East

Asia of increased competition for international investment. She focuses on the role of direct foreign investment as a vehicle for international transfer of advanced technology and manufacturing organization. She concludes that a regime of high capital costs may provide further encouragement for the already rapid growth of direct investments from the Asian newly industrialized countries into other Asian nations.

Nishimura and Ohyama analyze the optimal borrowing or lending plan of a small open economy with some market power in the world capital market. The country's external debt in the long-run stationary equilibrium is an increasing function of the rate of time preference. The optimal borrowing or lending path may become monotonic or oscillatory, depending on the nature of the interest cost schedule the country faces. The authors also examine the dynamic response of the economy to various exogenous disturbances.

Koo and Park provide an overview of Korea's current account compared to that of Japan and Taiwan. They consider Korea's various policy responses since 1986 and agree that the conventional adjustment policy of expanding and switching expenditures did not work well in Korea. The authors also emphasize the role of real asset speculation in external adjustment.

Liu studies the effects of cost externality on the degree of exchange rate pass-through. She shows that, in addition to market structure, demand elasticities, and the number of firms, cost externality plays an important role in determining the degree of pass-through in the long run but not in the short run.

Lin and Wu examine the relationship between money supply, real output, exchange rate, and price. They find that increases in the money supply and depreciation of the exchange rate have positive effects on price, while increases in real output have negative effects. This may explain why the high growth rates of the money supply in Taiwan during the 1980s did not cause high inflation rates.

Fukuda notes that, under flexible exchange rates, if the monetary authority commits to fixing the nominal exchange rate, then expectations will converge to those of a steady-state equilibrium with a constant money supply. Thus, once the commitment is credible, the monetary authority can achieve the steady-state equilibrium without any intervention in the foreign exchange market.

San finds that the new Taiwan (NT) dollar was seriously undervalued, particularly during 1982 to early 1987. This eventually led to the accumulation of huge foreign exchange reserves in Taiwan. In addition, when the NT dollar appreciated considerably against the U.S. dollar, the German mark and Japanese yen also appreciated against the dollar, but at a faster pace. As a result, the NT dollar actually *depreciated* against the German mark and Japanese yen, which had an enormous effect on trade diversification for Taiwan's exports. The U.S. mar-

ket share of Taiwan's exports shrank from 49 percent in the mid-1980s to 20 percent in 1991, while the European market share grew from 10 percent in 1985 to 18 percent in 1991.

Asako and Ono examine the short-run dynamic behavior of a firm selling to both the domestic and export markets. They focus on the adjustment of inventories, and examine the differential consequences of tariffs and quotas to both exporting and importing countries.

Frankel and Wei find little evidence that East Asian countries are assigning increased weight to the yen in their exchange rate policies. They also find that all of the increase in intraregional trade in the 1980s can be attributed to rapid growth in East Asia; there is no evidence of an intensifying bias toward intraregional trade, as there is in Europe and the Western Hemisphere. The authors do find a strong correlation throughout the world between bilateral variability of exchange rates and bilateral trade flows. But they do not conclude that a loosening of the links between East Asian currencies and the dollar will divert trade away from North America.

Taguchi discusses the potential international role of the Japanese yen, especially in Asia. He first reviews the use of the yen as an international currency and then examines the economic linkage between Japan and other Asian countries. While the yen is not likely to become the dominant currency in Asia in the traditional sense—that is, the unit of account, means of transaction, and store of value—it does have the potential to become the nominal anchor for achieving price stability in Asia, he concludes.

Goto and Hamada assess economic conditions in the Asian nations as a prerequisite for the creation of a free trade area or currency union in East Asia. They find that the degree of interdependence among Asian nations is even greater than among EC countries. Thus, the preconditions for both a free trade area and a currency union are satisfied. However, they suggest that a free trade area that hinders trade with the United States or Japan is unlikely. In terms of a currency union, it is not clear whether the common currency should be linked to the dollar or the yen.

Other conference participants were: Hideki Funatsu, Otaru University of Commerce; Yoshihiro Kobayashi, Hokkaido University; Yung Chul Park, Korea University; and Chi Schive, National Taiwan University.

A conference volume will be published by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.

## Labor Economists Discuss Changes in Wage Structures Around the World

The NBER is undertaking a major study of employ-

ment and income maintenance in Europe and North America, directed by Richard B. Freeman, Harvard University. As part of this project, Freeman and Lawrence F. Katz, also of NBER and Harvard, led a group of U.S. and European economists in studying changes in various aspects of the wage structure around the world. These researchers met in Cambridge in July 1992 to present their findings. The following papers were discussed:

David G. Blanchflower, NBER and Dartmouth College, Lawrence F. Katz, and Gary Loveman, Harvard University, "A Comparison of Changes in the Structure of Wages in Four OECD Countries"

Discussant: Janet Currie, NBER and MIT

John M. Abowd, NBER and Cornell University, and Michael Bagnanno, Temple University, "International Differences in Executive and Managerial Compensation"

Discussant: Kevin J. Murphy, Harvard University

Francine D. Blau, NBER and University of Illinois, Urbana-Champaign, and Lawrence M. Kahn, University of Illinois, Urbana-Champaign, "The Gender Earnings Gap: Some International Evidence"

Discussant: Claudia Goldin, NBER and Harvard University

Richard B. Freeman, and Robert S. Gibbons, NBER and Cornell University, "How Stable Are Centralized Wage-Setting Systems?"

Discussant: Francis Kramarz, Institut National de la Statistique et des Etudes Economiques

John Schmitt, London School of Economics, "The Changing Structure of Male Earnings in Britain"

Discussant: David Card, NBER and Princeton University

David G. Blanchflower, and Andrew J. Oswald, London School of Economics, "International Wage Curves"

Discussant: George E. Johnson, NBER and University of Michigan

Dae-Il Kim, University of Chicago, and Robert H. Topel, NBER and University of Chicago, "Labor Markets and Economic Growth: Lessons from Korea's Industrialization, 1970-90"

Discussant: Jeffrey G. Williamson, NBER and Harvard University

Christopher L. Erickson, University of California, Los Angeles, and Andrea C. Ichino, Bocconi University, "Wage Differentials in Italy: Market Forces, Institutions, and Inflation"

Discussant: Lisa M. Lynch, NBER and MIT

Per-Anders Edin and Bertil Holmlund, Uppsala University, "The Swedish Wage Structure: The Rise and Fall of Solidarity Wage Policy"

Discussant: Kevin Lang, NBER and Boston University

Katharine G. Abraham, NBER and University of Maryland, and Susan N. Houseman, W. E. Upjohn Institute, "Earnings Inequality in Germany"

Discussant: Michael Piore, MIT

Alan B. Krueger, NBER and Princeton University, and Jörn-Steffen Pischke, Center for European Economic Research, "A Comparative Analysis of East and West German Labor Markets Before and After Unification" (NBER Working Paper No. 4154)

Discussant: Rebecca M. Blank, NBER and Northwestern University

Robert G. Gregory, Australian National University, and Frank Vella, Rice University, "Aspects of Real Wage and Employment Changes in the Australian Male Labor Market"

Discussant: Steven J. Davis, NBER and University of Chicago

Blanchflower, Katz, and Loveman find that wage differentials among education and occupation groups (skill differentials) narrowed substantially in France, Great Britain, Japan, and the United States in the 1970s. During the 1980s, though, overall wage inequality and skill differentials expanded dramatically in Great Britain and the United States, and moderately in Japan. In contrast, wage inequality did not increase much in France through the mid-1980s. The authors show that industrial and occupational shifts favored more educated workers in all four countries throughout the last 20 years. A reduced rate of growth in the relative supply of college-educated workers, coupled with persistent increases in the relative demand for more-skilled labor, explain much of the increase in educational wage differentials in the United States, Britain, and Japan in the 1980s. Sharp increases in the national minimum wage, and the ability of French unions to extend contracts even in the face of declining membership, helped prevent wage differentials from expanding in France.

Abowd and Bagnanno review existing estimates of the level and structure of executive and managerial compensation in 12 developed countries. The highest-level executives are paid significantly more in long-term compensation in the United States than in the other developed countries. French and American managers are similar in terms of the effects of age on salary, and the amount of salary variability related to individual differences.

Blau and Kahn find that the gender pay gap is wider in the United States than in most industrialized countries. Wage differences between high- and low-skilled workers also are much greater in the United States than in other industrialized countries. Blau and Kahn conclude that the large U.S. gender gap is the result of greater pay differentials by skill group and the concentration of women in low-skilled jobs. They estimate that the U.S. gender gap would be more like Sweden, Italy, and Australia's (the countries with the smallest gaps) if

the United States had their level of wage inequality among skill groups.

Freeman and Gibbons note that centralized wage-setting systems have been eroding in much of the western world. They argue that centralization offers potential economic gains by internalizing the costs of inefficient wage inflation. With this potential benefit, however, comes a cost: centralized decisions are not sufficiently responsive to local labor market conditions. Freeman and Gibbons note that, in Sweden, the traditional archetype of centralized collective bargaining, this system flourished when the blue collar workers dominated the work force, but began to wane as public-sector and white collar unions grew in strength, as skill differentials in decentralized labor markets grew in size, and as product-market competition intensified.

Using data from the annual British General Household Survey for full-time male employees aged 16 to 64 during 1974–88, Schmitt finds that: 1) earnings inequality fell slightly in the second half of the 1970s, only to grow sharply during the 1980s; 2) rising financial returns to education and labor market experience in the 1980s accounted for between one-third and one-half of the growth in earnings inequality during the 1980s; and 3) the earnings of low-skilled workers increased over 10 percent in real terms between 1974 and 1988. Rising returns to skills, in the face of large increases in the supply of skilled labor, suggest a substantial shift in labor demand toward skilled workers. Changes in British labor market institutions, particularly the decline in trade union density, also may help to explain the rise in inequality during the 1980s.

Blanchflower and Oswald show that average pay in a region declines as its unemployment rate rises. Using data for Austria, Britain, Canada, Germany, Holland, Italy, Korea, Norway, Switzerland, and the United States, they estimate that the average unemployment elasticity of pay is approximately  $-0.1$ .

Kim and Topel analyze labor market performance in Korea between 1970 and 1990. Driven mainly by rapid productivity growth in tradable goods, the demand for industrial labor increased dramatically during that period. Real wages tripled, as did productivity and the share of exports in GNP. Workers left farms in droves, and the share of agriculture in total Korean employment fell by 30 percent in less than 20 years. Yet Kim and Topel find no evidence that agricultural workers migrated to manufacturing. Instead, the growth of manufacturing employment was accomplished solely by hiring new entrants to the labor force. Further, wage inequality fell during the period to the extent that wages are now more equally distributed in Korea than in the United States. Growth of demand in certain industries raised aggregate wages, while relative wages changed because of shifting relative supplies, the authors conclude.

During the 1970s Italy experienced an impressive



compression of wage differentials. Most evidence suggests that this compression ended around 1982–3, coincident with major institutional, economic, technological, and political changes. There is some slight evidence of a reopening of differentials since then, but the degree of inequality is still generally below the level of the early to mid-1970s. Erickson and Ichino analyze skill level differentials in the Italian metal manufacturing sector and compare them with the more laissez-faire system of the United States. They find that egalitarian wage-setting institutions have had an important influence on Italian wage outcomes. In particular, the indexed minimum wage (*Scala Mobile*), together with inflation, bears great responsibility for the compression in the 1970s, while demand and supply forces had more room for action in the 1980s.

Edin and Holmlund find that Swedish wage differentials across gender, experience, and education categories fell dramatically from the late 1960s to the early 1980s. This was followed by a period of widening wage differentials, including a rebound of the returns to higher education. Edin and Holmlund suggest that movements in the college premium may be the outcomes of fluctuations in the rate of growth of the supply of university graduates. The growth of the supply of more-educated workers stopped in the mid-1980s, which was the outcome of past enrollment decisions driven by falling returns to investment in higher education.

In contrast to recent trends in the United States, Abraham and Houseman find, there is virtually no evidence of growth in earnings inequality in the former West Germany. Instead, the overall distribution of earnings in Germany has narrowed somewhat. The authors find little evidence of widening earnings differentials across skill groups, but some narrowing of differentials across education groups, and no widening of differentials within education and age/experience groups.

Krueger and Pischke analyze wage structures in East and West Germany before and after unification. In 1988, the wage distribution in East Germany was much more compressed than in West Germany or in the United States. Since the collapse of communism and unification with West Germany, though, East Germany's wage variation has increased, the payoff to education has decreased slightly, industry differentials have expanded, and the white collar premium has increased. Although average wage growth has been remarkably high in eastern Germany, individual variation in wage growth is similar to typical western levels. The wage structure of eastern Germans who work in western Germany resembles the wage structure of native western Germans in some respects, but the experience–earnings profile is flat.

Gregory and Vella note that real wages increased 35 percent in Australia relative to wages in the United States in the mid-1970s; since then, Australian unemployment has increased fivefold. Australia has a central-

ized wage-fixing system, around 90 percent of the work force there is unionized, and the earnings distribution is more compressed than in the United States. Despite these differences, though, Australia also has experienced widening wage dispersion in the public and private sectors, and among men and women. The rate of return to more skilled labor has not increased significantly in Australia, however, perhaps because the increase in supply was greater there than in the United States.

There will be an NBER conference volume of these proceedings published by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.

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## Bureau News

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### 1992 Summer Institute

Over 620 economists from 148 universities and organizations around the world attended the NBER's 14th annual Summer Institute. This year's program was funded primarily by a grant from the Lynde and Harry Bradley Foundation, with additional support from the National Science Foundation and the Ford Foundation.

There were 270 papers presented at 26 different sessions covering a wide variety of topics. A catalogue of all papers and work in progress can be obtained by writing to: Summer Institute Catalogue, NBER, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398.

### Becker Wins '92 Nobel

Gary S. Becker, a professor at the University of Chicago who was an NBER associate from 1957 to 1979, won the 1992 Nobel Prize in Economics. The award cited his work on such concerns as investment in human capital, family behavior, crime, and discrimination.

During his tenure with the Bureau, Becker conducted much of the research for which he won his prize. His Bureau books include *Essays in the Economics of Crime and Punishment* (1974), edited with William Landes, and *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (1975). His groundbreaking *A Treatise on the Family* also was published by the NBER in 1981.

Becker received his Ph.D. at the University of Chicago and has taught there continuously since 1969.

# 1992-3 Research Associates

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# Economic Fluctuations Research Meeting

NBER associates Ben S. Bernanke and Guiseppe Bertola, both of Princeton University, organized a research meeting on economic fluctuations this summer. The July 11 program was:

Marjorie Flavin, NBER and University of Virginia, "The Joint Consumption/Asset Demand Decision: A Case Study in Robust Estimation"

Discussant: David Runkle, Federal Reserve Bank of Minneapolis

Andrew G. Atkeson, NBER and University of Chicago, and Masao Ogaki, University of Rochester, "Wealth-Varying Intertemporal Elasticities of Substitution: Evidence from Panel and Aggregate Data"

Discussant: Orazio Attanasio, Stanford University

Laurence M. Ball, NBER and Princeton University, and David H. Romer, NBER and University of California, Berkeley, "Inflation and Informativeness of Prices"

Discussant: Roland Bénabou, NBER and MIT

David K. Backus, New York University; Patrick Kehoe, University of Minnesota; and Finn E. Kydland, Carnegie-Mellon University, "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve Revisited"

Discussant: Michael Gavin, Columbia University

Steven N. Durlauf, NBER and Stanford University, and Paul Johnson, University of Oregon, "Local Versus Global Convergence Across National Economies" (NBER Working Paper No. 3996)

Discussant: James D. Hamilton, University of Virginia

Robert J. Barro and N. Gregory Mankiw, NBER and Harvard University, and Xavier Sala-i-Martin, NBER and Yale University, "Capital Mobility in Neoclassical Models of Growth"

Discussant: Alwyn Young, NBER and MIT

Flavin uses the Michigan Survey of Consumer Finances to investigate whether borrowing constraints explain the fact that consumption tracks current income more closely than the permanent income hypothesis suggests. She finds that households do use asset stocks to smooth their consumption, although this smoothing is far from complete. However, there is no evidence that the excess sensitivity of consumption to current income is caused by borrowing constraints.

Atkeson and Ogaku estimate a model in which the intertemporal elasticity of substitution of consumption expenditure (IES) rises with the level of wealth and affects aggregate consumption expenditure. After testing the model with Indian panel data on the consumption of individual households, and with aggregate time-series

data from India and the United States, the authors find economically significant differences in the IES between rich and poor households.

Ball and Romer study the welfare effects of the relative price variability that arises from inflation. When agents interact in anonymous markets, with customers buying from new suppliers each period, relative price variability benefits customers, and cannot harm suppliers substantially. But if customers and suppliers form long-term relationships, prices have an informational role: a potential customer uses current prices as signals of future prices. Inflation reduces the informativeness of current prices, causing customers to make costly mistakes about which relationships to enter. In addition, the reduced informativeness of prices makes demand less price elastic, thereby increasing markups.

Backus, Kehoe, and Kydland provide a new interpretation of the J-curve, which they define as the tendency for the trade balance to be negatively correlated with current movements in the terms of trade and positively correlated with past movements. They find this pattern in a two-country growth model in which trade fluctuations reflect, in large part, the dynamics of investment and capital formation.

Durlauf and Johnson examine the ability of the Solow-type growth models to explain the pattern of cross-country growth rates. They argue that economies with similar initial conditions tend to converge. However, there is little evidence of convergence across economies with substantially different initial conditions, as measured by per capita output or literacy rates. Further, the impact of capital formation on aggregate output increases with the level of economic development. These results suggest that the Solow growth model should be supplemented with a theory of differences in the aggregate production function in order to explain international growth patterns fully.

Economies grow faster per capita if they start further below their steady-state positions. For a homogeneous group of economies—such as the U.S. states, the regions of western European countries, and the OECD countries—the convergence is unconditional: the poor economies grow faster than the rich ones. Barro, Mankiw, and Sala-i-Martin show that an open-economy model conforms with this evidence if an economy can only use foreign debt to finance a portion of its capital, even 50 percent or more of the total.

## Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the NBER Reporter list titles 1-1730 and contain abstracts of the Working Papers cited below.)

These reprints are free of charge to corporate associates. **For all others there is a charge of \$5.00 per reprint requested. (Outside of the United States, add \$10.00 per order for postage and handling.) Advance payment is required on all orders. 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 02138-5398.

1731. "Money, Income, Prices, and Interest Rates," by Benjamin M. Friedman and Kenneth N. Kuttner, 1992 (NBER Working Paper No. 2852)
1732. "Foreign Investment and Technology Transfer: A Simple Model," by Jian-Ye Wang and Magnus Blomström, 1992 (NBER Working Paper No. 2958)
1733. "Long-Run Policy Analysis and Long-Run Growth," by Sergio T. Rebelo, 1991 (NBER Working Paper No. 3325)
1734. "Explaining the Variance of Price-Dividend Ratios," by John H. Cochrane, 1992 (NBER Working Paper No. 3157)
1735. "Treasury Bill Rates in the 1970s and 1980s," by Patric H. Hendershott and Joe Peek, 1992 (NBER Working Paper No. 3036)
1736. "The Reincarnation of Keynesian Economics," by N. Gregory Mankiw, 1992 (NBER Working Paper No. 3885)
1737. "Causes and Consequences of the 1980s Commercial Construction Boom," by Patric H. Hendershott and Edward J. Kane, 1992
1738. "Which Households Own Municipal Bonds? Evidence from Tax Returns," by Daniel R. Feenberg and James M. Poterba, 1991 (NBER Working Paper No. 3900)
1739. "The Optimal Probability and Magnitude of Fines for Acts That Definitely Are Undesirable," by Louis Kaplow, 1992 (NBER Working Paper No. 3008)
1740. "Economic Transition in Eastern Germany," by Rudiger Dornbusch and Holger Wolf, 1992
1741. "Hunting for *Homo Sovieticus*: Situational versus Attitudinal Factors in Economic Behavior," by Robert J. Shiller, Maxim Boycko, and Vladimir Korobov, 1992
1742. "The Success of Acquisitions: Evidence from Divestitures," by Steven N. Kaplan and Michael S. Weisbach, 1992 (NBER Working Paper No. 3484)
1743. "Social Security Rules and Marginal Tax Rates," by Martin Feldstein and Andrew Samwick, 1992 (NBER Working Paper No. 3962)
1744. "The Influence of Probability on Risky Choice: A Parametric Examination," by Joanna R. Baker, Pamela K. Lattimore, and Ann D. Witte, 1992 (NBER Technical Paper No. 81)
1745. "Characterizing Predictable Components in Excess Returns on Equity and Foreign Exchange Markets," by Geert Bekaert and Robert J. Hodrick, 1992 (NBER Working Paper No. 3790)
1746. "Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence," by Robert S. Gibbons and Kevin J. Murphy, 1992 (NBER Working Paper No. 3792)
1747. "Where Does the Meteor Shower Come From? The Role of Stochastic Policy Coordination," by Takatoshi Ito, Robert F. Engle III, and Wen-Ling Lin, 1992 (NBER Working Paper No. 3504)
1748. "Does Unmeasured Ability Explain Interindustry Wage Differentials?" by Robert S. Gibbons and Lawrence F. Katz, 1992 (NBER Working Paper No. 3182)
1749. "Some Theoretical Aspects of the Privatization: Applications to Eastern Europe," by Joseph E. Stiglitz, 1991
1750. "Private versus Socially Optimal Provisions of Ex Ante Legal Advice," by Louis Kaplow and Steven Shavell, 1992 (NBER Working Paper No. 3868)
1751. "Macroeconomic Models with Equity and Credit Rationing," by Bruce C. Greenwald and Joseph E. Stiglitz, 1990 (NBER Working Paper No. 3533)
1752. "Government Policy and Personal Retirement Savings," by Steven F. Venti and David A. Wise
1753. "Anatomy of a Financial Crisis," by Frederic S. Mishkin, 1992 (NBER Working Paper No. 3934)
1754. "Optimal Sanctions When Individuals Are Imperfectly Informed About the Probability of Apprehension," by Lucian Arye Bebchuk and Louis Kaplow, 1992 (NBER Working Paper No. 4079)

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1755. "Introducing Risky Housing and Endogenous Tenure Choice into a Portfolio-Based General Equilibrium Model," by Patric H. Hendershott and Yunhi Won, 1992 (NBER Working Paper No. 3114)

1756. "Tax Neutrality Under Parallel Tax Systems," by Andrew B. Lyon, 1992 (NBER Working Paper No. 2912)

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"The Council of Economic Advisers and Economic Advising in the United States," by Martin Feldstein (Forthcoming in *Economic Journal*, September 1992)

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"A Theory of the Nominal Term Structure of Interest Rates," by George M. Constantinides (Forthcoming in C. Spatt, ed., *The Review of Financial Studies*)

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## Bureau Book

### NBER Macroeconomics Annual 1992

The *NBER Macroeconomics Annual 1992*, the seventh volume in a series, is now available from the MIT Press. The clothbound edition is \$35.00; the paperback sells for \$16.95.

This volume, edited by NBER Research Associates Olivier J. Blanchard and Stanley S. Fischer, includes papers on: the operation of monetary policy, by Ben S. Bernanke, NBER and Princeton University, and Frederic S. Mishkin, NBER and Columbia University; a comparison of economic growth in Hong Kong and Singapore, by Alwyn Young, NBER and MIT; and a postmortem on the debt crisis, by Daniel Cohen, CEPREMAP.

In addition to their NBER affiliations, Blanchard and Fischer are professors of economics at MIT.

This volume should be ordered directly from the MIT Press, 55 Haywood Street, Cambridge, MA 02142; (617) 253-2884.

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## Current Working Papers

Individual copies of NBER Working Papers, Historical Factors in Long-Run Growth Papers, and Technical Papers are available free of charge to corporate associates. **For all others, there is a charge of \$5.00 per paper requested. (Outside of the United States, add \$10.00 per order for postage and handling.) Advance payment is required on all orders. Please do not send cash.** For further information or to order, please write: National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398.

Multiple authors are listed alphabetically. *Journal of Economic Literature* (JEL) subject codes, when available, are listed after the date of the paper, followed by the NBER program(s) of research represented by each paper. Papers not associated with an NBER program are listed as Miscellaneous. All Historical Factors in Long-Run Growth Papers are in the Development of the American Economy program.

Abstracts of all papers issued since June 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.

## NBER Working Papers

### CORRECTION

In the Summer 1992 issue of the *NBER Reporter*, the author of Working Paper No. 4096, "Investment and Research and Development at the Firm Level: Does the Source of Financing Matter?" was identified incorrectly. Authorship of the paper should have been attributed to Bronwyn H. Hall.

### A Reconsideration of the Uncovered Interest Parity Relationship

**Bennett T. McCallum**

NBER Working Paper No. 4113

July 1992

JEL Nos. F31, E52

International Finance and Macroeconomics,  
Monetary Economics

This paper first suggests why the uncovered interest parity (UIP) relationship may be more important, in terms of economic analysis, than the unbiasedness of forward rates as predictors of future spot exchange rates. The two hypotheses are related closely, so that rejections of the latter tend to cast doubt on the former, but they are not identical, so rejections of biasedness are not conclusive for UIP.

Next, I present some representative evidence pertaining to alternative versions of the unbiasedness test, and I reject unbiasedness.

Finally, I find that two explanations involving systematically irrational expectations and an additional relationship that reflects monetary policy are consistent with UIP. The hypothesis that monetary authorities manage interest rate differentials so as to resist rapid changes in exchange rates and in these differentials explains several notable features of the data.

### Accounting for Growth with New Inputs

**Robert C. Feenstra and James R. Markusen**

NBER Working Paper No. 4114

July 1992

JEL Nos. O4, F4

International Trade and Investment, Productivity

This paper examines how to account for growth when new inputs are being created. In particular, we decompose growth into that caused by a *higher quantity* of existing inputs and that caused by a *greater range* of inputs. We first obtain this decomposition for a single firm with a CES production function. Then we generalize to the GNP function of an economy, and again show how to obtain decomposition of growth in GNP. We present an example of a two-sector economy, in which new inputs are created endogenously each period, and there is a simple aggregate production function. We simulate data for this economy, and estimate the GNP function using various measures of the factor inputs.

### The Housing Wealth of the Aged

**Louise M. Sheiner and David N. Weil**

NBER Working Paper No. 4115

July 1992

JEL No. J14

Aging

This paper examines how much the elderly reduce homeownership as they age, and what factors influence this process. We find that average levels of homeownership decline significantly with age, even when we take cohort effects into consideration. The amount of housing held by people near death is quite low compared to what we see in cross sections. We estimate that 42 percent of households will leave a house behind when the last member dies.

We also find that the degree to which households reduce homeownership between age 65 and death does not differ greatly between the upper and lower income halves of our sample. People who do not have children reduce their homeownership more slowly than those who do, however. Increases in house prices in a state make it more likely that the elderly in that state will reduce their home equity, and the value of houses sold by elderly people tends not to remain in their portfolios after the house is sold.

### Trends in Expected Returns in Currency and Bond Markets

**Martin D. D. Evans and Karen K. Lewis**

NBER Working Paper No. 4116

July 1992

Asset Pricing, International Finance  
and Macroeconomics

In this paper, we describe how small departures from conventional notions of rational expectations and market efficiency can produce trends in excess returns. These

trends are additional to those typically found in the level of asset prices themselves. We report the presence of additional trends in excess returns on both foreign exchange and bonds. We also estimate the additional trend component in excess returns on foreign exchange and find that it varied between  $-0.8$  percent and 1 percent for one-month returns and between  $-6$  percent and 8 percent for three-month returns.

## **Toward a Reformulation of Monetary Theory: Competitive Banking**

**Bruce C. Greenwald and Joseph E. Stiglitz**

NBER Working Paper No. 4117

July 1992

JEL No. E40

Monetary Economics

After providing a critique of standard monetary theory based on the transactions demand for money, this paper examines the effect of monetary policy (that is, changes in reserve requirements and open market operations) in a model with competitive, risk-averse banks. We also analyze the effects of changes in banks' net worth and risk perceptions. In deep recessions, monetary policy may be ineffective because banks are unwilling to lend. At most, the effects of monetary policy are mediated only partially through changes in the interest rate.

## **The Carnegie Conjecture: Some Empirical Evidence**

**Douglas Holtz-Eakin, David Joulfaian, and Harvey S. Rosen**

NBER Working Paper No. 4118

July 1992

JEL No. J2

Labor Studies, Public Economics

This paper examines data generated from tax returns on the labor force behavior of people who have received inheritances. Our results are consistent with Andrew Carnegie's century-old assertion that large inheritances decrease a person's labor force participation. For example, a single person who receives an inheritance of over \$150,000 is roughly four times more likely to leave the labor force than a single person with an inheritance below \$25,000. Additional, albeit weaker, evidence suggests that large inheritances depress labor supply, even when participation is unaltered.

## **Traded Goods Consumption Smoothing and the Random Walk Behavior of the Real Exchange Rate**

**Kenneth Rogoff**

NBER Working Paper No. 4119

July 1992

JEL Nos. F31, F40

International Finance and Macroeconomics

Conventional explanations of the near "random walk" behavior of real exchange rates rely on similar behavior in the underlying fundamentals (for example, tastes and

technology). This paper offers an alternative rationale: The basic idea is that, with open capital markets, agents can smooth their consumption of tradables in the face of transitory productivity shocks to traded goods. Agents cannot smooth productivity shocks to nontraded goods, but if these shocks are relatively small (as is often argued to be the case), then consumption smoothing of traded goods will lead to smoothing the intratemporal price of both traded and nontraded goods.

## **Race and Gender Pay Differentials**

**Francine D. Blau and Lawrence M. Kahn**

NBER Working Paper No. 4120

July 1992

JEL Nos. J3, J7

Labor Studies

We review research findings from the 1980s and early 1990s on race and gender pay gaps. In addition, we present some evidence from the Current Population Surveys (1972, 1982, and 1989) regarding the impact of shifts in the industrial composition of employment, and in interindustry wage differentials, on these gaps.

The gender gap in pay was stable in the 1970s but fell steadily in the 1980s. The opposite patterns were observed for black-white wage differentials: a trend toward convergence in the 1970s and stability in the 1980s. Existing studies suggest that changes in wage structure, changing relative skill levels by race and sex, and possibly changes in the implementation of government policies all played a role in producing the observed outcomes, although impacts sometimes were countervailing. Our own results indicate that total industry effects had little impact on the male-female pay gap during the 1970s, but accounted for a small portion of the closing of the male-female pay gap for both blacks and for whites in the 1980s. In contrast, we found no evidence that total industry effects contributed to black-white wage trends in either period.

## **Rational Asset Price Movements Without News**

**David H. Romer**

NBER Working Paper No. 4121

July 1992

JEL Nos. G12, G14

Asset Pricing

This paper argues that some movements in asset prices may be caused by neither external news nor irrationality, but by the revelation of information through the trading process itself. I develop two models that illustrate this general idea. One is based on investor uncertainty about the quality of other investors' information; the other is based on widespread dispersion of information and small costs to trading. I use the analysis to suggest a possible rational explanation for the October 1987 crash.



## **Public-Sector Capital and the Productivity Puzzle**

**Douglas Holtz-Eakin**

NBER Working Paper No. 4122

July 1992

JEL Nos. E62, H54, H72, O47

Public Economics

A number of studies have suggested a quantitatively important relationship between public-sector capital accumulation and private-sector productivity, with the most compelling evidence derived from analyses of state-level data. My estimates of production functions that use standard techniques to control for unobserved, state-specific characteristics reveal essentially no role for public-sector capital in affecting private-sector productivity, however. Only estimates of state production functions that do not include such controls find substantial impacts on productivity. This result reconciles existing econometric estimates with the findings of Hulten and Schwab based on growth accounting techniques, as such techniques effectively control for state-specific effects. Region-level estimates are essentially identical to those from state data, suggesting no quantitatively important spillover effects across states.

## **Markup Adjustment and Exchange Rate Fluctuations: Evidence from Panel Data on Automobile Exports**

**Joseph E. Gagnon and Michael M. Knetter**

NBER Working Paper No. 4123

July 1992

JEL Nos. F12, F14, L62

International Finance and Macroeconomics;

International Trade and Investment

We use bilateral automobile export unit values from the United States, Germany, and Japan to measure the importance of markup adjustment that is associated with exchange rate changes across export destination markets. Japanese auto export prices exhibit a high degree of markup adjustment with the effect of stabilizing prices in units of the buyer's currency. There is weak evidence of this behavior in German auto exports, and none for U.S. auto exports. Where it exists, markup adjustment is very persistent, not merely a short-run phenomenon. The dynamic pattern of adjustment is consistent with invoicing in the exporter's currency, except for exports to the United States and Canada.

## **Foreign Direct Investment in the United States: Changes Over Three Decades**

**Robert E. Lipsey**

NBER Working Paper No. 4124

July 1992

JEL Nos. F21, F23

International Trade and Investment

U.S. inflows of direct investment in the 1980s were almost half of the world's total. Even this large amount

leaves foreign firms employing less than 5 percent of the U.S. labor force, but having twice that share in manufacturing. The increase in foreign investment is related to the internationalization of production by foreign firms, rather than to the competitive weakness of U.S. firms.

Foreign affiliates import more relative to their exports than U.S. firms do, but they are moving closer to the behavior of U.S. firms. The trade balances of both are sensitive to exchange rates.

The financing of foreign direct investment from retained earnings dropped to almost zero in the 1980s. One reason was the rapid growth of this investment; another was its low profitability.

## **Robin-Hooding Rents: Exploring the Pecuniary Effects of In-Kind Programs**

**Steve Coate, Stephen Johnson,**

**and Richard J. Zeckhauser**

NBER Working Paper No. 4125

July 1992

JEL Nos. H42, H21, H23

Public Economics

The pecuniary effects of cash and in-kind programs differ. A program that builds housing for the poor, for example, is likely to result in a lower price of existing low-income housing than an equally costly cash transfer program would. Low-income renters in general would benefit; landlords would lose. The process we label Robin-Hooding rents employs in-kind programs to transfer rents from one group in society to another.

Direct taxation of "donor" groups may not be feasible because their incomes cannot be monitored, they are engaged in illegal activities, they are foreign, or the government's administrative apparatus is ineffective. Without the ability to target taxation, Robin-Hooding may be a valuable second-best transfer instrument.

But Robin-Hooding also has drawbacks. Its incentive effects are significant, for today's rents flow from yesterday's investment activities. Moreover, even when Robin-Hooding is undesirable, parochial government agencies may be tempted to employ it as a means to escape the scrutiny of the budget process.

## **The Savings of Ordinary Americans: The Philadelphia Saving Fund Society in the Mid-Nineteenth Century**

**George Alter, Claudia Goldin, and Elyce Rotella**

NBER Working Paper No. 4126

July 1992

JEL Nos. N21, N31

Development of the American Economy

We explore the savings behavior and saving rates of ordinary Americans through their accounts at the Philadelphia Saving Fund Society, the oldest mutual savings bank in the United States, founded in 1816 to encourage thrift among the working poor. Our sample contains the 2374 accounts opened in 1850, of which one-quarter

ter were linked to the 1850 Census manuscripts. Savings accounts generally were brief affairs: only 30 percent lasted more than five years. But median balances mounted to about three-quarters of annual income in three to four years. Deposits and withdrawals were infrequent, but substantial. The median deposit was about one to two months of gross income, whereas the median withdrawal represented about two to three months' income, but occurred far less often. Account holders generally did not use their accounts for the short-run fluctuations in income that we suspect they experienced. Only female servants, as a group, used their accounts for life-cycle savings, eventually amassing large nest eggs through steady but slow accumulation. Men often used their accounts to hold funds en route to acquiring physical property. Estimated saving rates ranged from a low of 12 percent to a more sensible rate of 21 percent among only active accounts.

### **International Transmission Under Bretton Woods**

**Alan C. Stockman**

NBER Working Paper No. 4127

July 1992

JEL Nos. F31, F33

International Finance and Macroeconomics

This paper explores the main channels of international transmission of economic disturbances under the Bretton Woods System and presents evidence on the short-run international transmission of inflation under that system. There appears to have been little short-run international transmission of inflation. Countries with 1 percent higher money growth rates subsequently had 0.25 to 0.5 percent higher inflation and a (predictably) lower real interest rate. This probably reflects effects of money growth on inflation and interest rates rather than reverse causation: the natural interpretation of the evidence is that countries had some scope for monetary policy independence under Bretton Woods, despite pegged exchange rates, and exercised that independence in ways that limited international transmission.

### **Office Market Values During the Past Decade: How Distorted Have Appraisals Been?**

**Patric H. Hendershott and Edward J. Kane**

NBER Working Paper No. 4128

July 1992

JEL Nos. E22, G18

Corporate Finance

We develop evidence that, in a declining market, appraisal values may lag notably behind analytical measures of the discounted present value of commercial property cash flows. For 1982–92, we construct alternative measures of the economic value of constant-quality office buildings using two benchmark projections designed to bracket expected future vacancy rates and

real rents. Until 1992, the time path for both series lies consistently below what was developed from the appraisal-based Russell/NCREIF office market index. This divergence implies that the rate of price appreciation reported by the Russell/NCREIF index is distorted: slow to register price declines when markets first weaken, and then overstating the rate of decline, once the market begins to bottom out. The distortion may reflect incentives for investment managers and appraisers to smooth potentially temporary price volatility, as well as systematic differences in the character and condition of the properties that tend to trade at different stages of the real estate cycle.

### **Liquidity Effects, Monetary Policy, and the Business Cycle**

**Lawrence J. Christiano and Martin S. Eichenbaum**

NBER Working Paper No. 4129

August 1992

JEL Nos. E32, E52

Monetary Economics

We present new empirical evidence that positive money supply shocks drive down short-term interest rates. Then we lay out a quantitative, general equilibrium model with two key features: 1) money shocks have a heterogeneous impact on agents; and 2) ex post inflexibilities in production give rise to a very low short-run interest elasticity of money demand. Together, these imply that a positive money supply shock generates a large drop in the interest rate, comparable to what we find in the data. In sharp contrast to sticky nominal wage models, our model implies that positive money supply shocks lead to increases in the real wage. This is consistent with the U.S. data. Finally, we show that our model can rationalize a version of the Real Bills Doctrine in which the monetary authority accommodates technology shocks, thereby smoothing interest rates.

### **Interindustry Mobility and the Cyclical Upgrading of Labor**

**Mark Bills and Kenneth J. McLaughlin**

NBER Working Paper No. 4130

August 1992

JEL No. E24

Economic Fluctuations

We show that a market-clearing model of the labor market can be consistent with the cyclical upgrading of labor: that is, that workers tend to move to higher-paying industries in expansions and to lower-paying industries in contractions. Applying the model to interindustry mobility patterns in panel data, we find substantial selection by comparative advantage. However, the panel data reveal a selection process that is consistent with cyclical upgrading. Thus, the model does not account simultaneously for interindustry mobility in panel data and for cyclical upgrading.

## **Host Country Competition and Technology Transfer by Multinationals**

**Magnus Blomström, Ari Kokko, and Mario Zejan**

NBER Working Paper No. 4131

August 1992

JEL Nos. F23, O3

International Trade and Investment

We examine whether rivalry in host country markets may force multinational firms to increase the technology transfer to their foreign affiliates. Such technology flows should be interesting from the perspective of the host country and its firms, since they would increase the potential for "spillovers." Using detailed (unpublished) industry data from Mexican manufacturing, we find that indicators for local competition are related positively to the technology imports of foreign-owned affiliates. The effects appear to be strong in consumer goods industries, which suggest that foreign multinationals are especially sensitive to the local market environment when barriers to entry, in the form of complex technology or high capital requirements, are relatively low.

## **What Explains Developing Country Growth?**

**Magnus Blomström, Robert E. Lipsey, and Mario Zejan**

NBER Working Paper No. 4132

August 1992

JEL Nos. O3, F23

Growth, International Trade and Investment

Among developing countries, there was no relationship between real income per capita in 1960 and subsequent growth in per capita income. However, once other significant influences—such as education, changes in labor force participation rates, inflows of foreign investment, price structures, and fixed investment ratios—are taken into account, it turns out that the lower the 1960 income level, the faster the country's income growth. This "conditional" convergence was particularly strong among the poorest half of the developing countries, contradicting the idea of a "convergence club" confined to relatively well-off countries.

Inflows of direct investment were an important influence on growth rates for higher-income developing countries, but not for lower-income ones. For the lower-income countries, secondary education, changes in labor force participation rates, and initial distance behind the United States were all major factors.

## **The Effects of Labor Market Experience, Job Seniority, and Job Mobility on Wage Growth**

**Joseph J. Altonji and Nicolas Williams**

NBER Working Paper No. 4133

August 1992

Labor Studies

We study the returns to seniority and experience, and

their effects on changes in the job-match-specific component of wages at the time of a quit or layoff. We show that these returns are not identified in widely used regression models that relate quits, layoffs, and the wage changes of stayers to tenure and experience. We deal with the identification problem in two ways. First, we obtain theoretical bounds on key unidentified parameters using a simple model of wages and mobility. Second, we check the implications of assumptions about the linear tenure slope for the estimates of the returns to tenure, experience, and the effect of tenure on job match gains.

Our three main empirical findings are: 1) there is a large return to general labor market experience that is independent of job shopping; 2) the return to tenure is probably above Altonji and Shakotko's (1987) estimate but far below OLS estimates; and 3) quits result in substantial job match gains for inexperienced workers. Layoffs are associated with substantial job match losses for workers who have been on the job for over a year.

## **Do Expected Shifts in Inflation Policy Affect Real Rates?**

**Martin D. D. Evans and Karen K. Lewis**

NBER Working Paper No. 4134

August 1992

JEL No. E4

Asset Pricing, Monetary Economics

This paper presents a new explanation for the negative correlation between ex post real interest rates and inflation. We begin by showing that there is a strong negative correlation between permanent movements in ex post real interest rates and inflation. We argue that such a correlation can arise when people incorporate anticipated shifts in inflation policy into their expectations. Under these circumstances, a shift to lower (higher) inflation will lead to systematically higher (lower) ex post real rates. Using new time-series techniques, we reject the hypothesis that nominal interest rates in the postwar era were unaffected by anticipated switches in inflation policy. To evaluate the impact of these switches, we then calculate the effects of inflationary expectations on real rates using a Markov switching model of inflation. Inflation forecasts based on the estimates of this rational model behave similarly to inflation forecasts from the Livingston survey. When ex ante real interest rates are identified with the Markov models of inflation, we find that they do not contain permanent shocks, nor are they related to permanent shocks in inflation.

## **Does Executive Compensation Affect Investment?**

**Robert S. Gibbons and Kevin J. Murphy**

NBER Working Paper No. 4135

August 1992

JEL Nos. J30, E20, G31

Corporate Finance, Labor Studies

Investment decisions require trading off current ex-

penditures against future revenues. If revenues extend far enough into the future, then the executives responsible for designing long-run investment policy may no longer be in office by the time all the revenues are realized. We show that: 1) on average, executives are close to leaving office (relative to the payout period of many investments); 2) bonuses based on accounting earnings constitute an important part of compensation for the typical executive; and 3) executives respond in predictable ways to compensation plans based on accounting measures of earnings. Based on these facts, we hypothesize that existing compensation policy induces executives to reduce investments during their last years in office. In our empirical work, however, we find that investment expenditures on research and development and on advertising tend to be *largest* in the final years of a CEO's term. We offer several possible explanations for this surprising finding.

### **Arbitration in International Trade**

**Alessandra Casella**

NBER Working Paper No. 4136

August 1992

JEL Nos. F15, H41

International Trade and Investment

The great majority of international contracts provides that any disputes that may arise will be decided by arbitration. Legal scholars argue that international arbitration is leading to the development of legal doctrine attuned to the needs of business and independent of national laws. This paper studies international arbitration as a beautiful example of the role of private trade in shaping international institutions.

We review the provisions and the practice of international arbitration, and present a general equilibrium model of the relationship between the expansion of trade and the adoption of arbitration. The model focuses on the heterogeneity among economic agents in terms of their legal needs. It shows how arbitration alters the size and composition of markets, while at the same time responding to exogenous change in trade. In addition, it shows how the legal services provided by the courts deteriorate in the presence of arbitration, and predicts that the share of traders using arbitration should rise as markets expand. Overall, the model does remarkably well in generating results commonly discussed in the legal literature.

### **Wealth Mobility in America: A View from the National Longitudinal Survey**

**Javanthi Krishnan and Richard H. Steckel**

NBER Working Paper No. 4137

August 1992

JEL No. D31

Development of the American Economy, Labor Studies

We analyze wealth mobility in a national sample of nearly 4000 households interviewed by the National Longitudinal Survey over a ten-year period from the

mid-1960s to the mid-1970s. We use a transition matrix, the Shorrocks measure, average decile position for various subgroups, and wealth in period two compared with wealth in period one to describe patterns of wealth mobility. These results and regression models of change in percentile position, persistence in the top, movement into the top, persistence in the bottom, and movement into the bottom, identify winners and losers. The losers include single people, blacks, and those who experienced marital disruption, while the winners were the skilled and more educated. These findings have implications for the interpretation of cross-sectional measures of inequality, the explanation of long-term trends in wealth mobility, and the consequences of recent trends in the wage structure.

### **Do Gasoline Prices Respond Asymmetrically to Crude Oil Price Changes?**

**Severin Borenstein, A. Colin Cameron,**

**and Richard Gilbert**

NBER Working Paper No. 4138

August 1992

JEL Nos. L10, L16, L92

Industrial Organization

We confirm that retail gasoline prices react more quickly to increases than to decreases in crude oil prices. Nearly all of the response to a crude oil price increase shows up in the pump price within four weeks, while decreases are passed along gradually over eight weeks. This asymmetry could indicate market power of some producers or distributors, or it could result from inventory adjustment costs. By analyzing price transmission at different points in the distribution chain, we find that some asymmetry occurs at the level of the competitive spot market for gasoline, perhaps reflecting inventory costs. However, wholesale gasoline prices exhibit no asymmetry in responding to crude oil price changes, indicating that refiners who set wholesale prices are not the source of the asymmetry. The most significant asymmetry appears in the response of retail prices to wholesale price changes. We argue that this probably reflects short-run market power among retail gasoline sellers.

### **Determinants of Interest Rates on Tax-Exempt Hospital Bonds**

**Fred Goldman, Michael Grossman, Pamela Mobilia,**  
**and Susan W. Nesbitt**

NBER Working Paper No. 4139

August 1992

JEL No. I18

Health Economics

This paper examines the determinants of interest rates on tax-exempt hospital bonds. The results highlight the potential and actual roles of federal and state policy in the determination of these rates. The shift to a Prospective Payment System under Medicare has subsidized the borrowing costs of some hospitals at the expense of oth-

ers. The selection of underwriters by negotiation rather than by competitive bidding results in higher interest rates. It is cheaper for hospitals in states with relatively high income tax rates to issue debt. The federal tax act of 1986 raised the cost of hospital debt by encouraging bond issues to contain call features. Are the interest rate effects associated with these policies desirable or undesirable? This question cannot be answered in the absence of estimates of the optimal subsidy that an average hospital should receive via its participation in tax-exempt markets, how this subsidy should vary among hospitals with different characteristics, and how the welfare costs associated with this subsidy can be minimized. Our results do not include these estimates, but they underscore that the differentials at issue are substantial.

### **Global versus Country-Specific Productivity Shocks and the Current Account**

**Reuven Glick and Kenneth Rogoff**

NBER Working Paper No. 4140

August 1992

JEL No. F32

International Finance and Macroeconomics,  
International Trade and Investment

The intertemporal approach to the current account often is regarded as theoretically elegant but of limited empirical significance. We derive highly tractable current account and investment specifications that we estimate without resorting to calibration or simulation methods. In time-series data for eight industrialized countries, we find that country-specific productivity shocks tend to worsen the current account, whereas global shocks have little effect. Both types of shock raise investment. It remains a puzzle, however, that long-lasting local productivity shocks have a larger impact on investment than on current account.

### **Three Perspectives on the Bretton Woods System**

**Barry J. Eichengreen**

NBER Working Paper No. 4141

August 1992

JEL No. F33

International Finance and Macroeconomics

The 20 years that have passed since the collapse of the Bretton Woods system provide sufficient distance for assessing the operation of the post-World War II international monetary system. This paper considers the history and historiography of Bretton Woods from three perspectives. I ask first how the questions posed today about the operation of Bretton Woods differ from those asked 20 years ago. Second, I explore how today's answers to familiar questions differ from the answers offered in the past. Third, I examine the implications of the Bretton Woods experience for international monetary reform.

### **The Effects of High School Curriculum on Education and Labor Market Outcomes**

**Joseph G. Altonji**

NBER Working Paper No. 4142

August 1992

Labor Studies

There is much public discussion but almost no evidence on the effects of high school curriculum on post-secondary education and on success in the labor market. I use the large variation in curriculum across U.S. high schools to identify the effects on wages and educational attainment of specific courses of study. My main finding is that the return to additional courses in academic subjects is small. One cannot account for the value of a year of high school with estimates of the value of the courses taken by the typical student during the year.

### **Estimates of the Economic Return to Schooling from a New Sample of Twins**

**Orley C. Ashenfelter and Alan B. Krueger**

NBER Working Paper No. 4143

August 1992

Labor Studies

This paper uses a new survey to contrast the wages of identical twins who have different levels of schooling. We also collected multiple measurements of schooling levels to assess the effect of reporting error on the estimated economic returns to schooling. The data indicate that omitted ability variables do not bias upward the estimated return to schooling, but that measurement error does bias that return downward. Adjustment for measurement error indicates that an additional year of schooling increases wages by 16 percent, a higher estimate of the economic returns to schooling than has been found previously.

### **Solow and the States: Capital Accumulation, Productivity, and Economic Growth**

**Douglas Holtz-Eakin**

NBER Working Paper No. 4144

August 1992

JEL Nos. E62, O40, H3

Growth, Public Economics

National, state, and local policymakers increasingly have focused their attention on policies toward economic growth, especially on efforts to raise the rate of investment. Recent studies of economic growth have started a debate over the role of the investment rate in the long-run performance of the economy. Evidence from the states suggests that the effects of capital accumulation are consistent with the predictions of the neoclassical growth model. At the same time, the estimates indicate a substantial role for human capital accumulation in raising productivity, in contrast to the neoclassical focus on physical capital investment.

## **Discouraging Rivals: Managerial Rent-Seeking and Economic Inefficiencies**

**Aaron S. Edlin and Joseph E. Stiglitz**

NBER Working Paper No. 4145

August 1992

JEL Nos. D82, D92

Corporate Finance

Management has enormous discretion in choosing the form of a firm's investment. We ask: what sort of investments will management make in order to entrench itself, minimizing the probability of being ousted and maximizing its rents? We analyze a number of managerial entrenchment activities. In our main model, we explain how making risky investments—and particularly those whose risks are resolved sooner or more fully for insiders than for outsiders—leads to managerial entrenchment. We identify a number of complementary reasons that such investments will be favored by management seeking its own rents over firm value. We adapt the model to rationalize management touting itself, independent of other egoistic explanations. Finally, we present a simple model that illustrates the entrenching value of idiosyncratic investments and organizational structure that can motivate the creation of standard operating procedures.

## **Ivory Tower versus Corporate Lab: An Empirical Study of Basic Research and Appropriability**

**Rebecca Henderson, Adam B. Jaffe, and Manuel Trajtenberg**

NBER Working Paper No. 4146

August 1992

JEL No. O30

Productivity

We explore the use of patent citations to measure the "basicness" and appropriability of inventions. We propose that the basicness of *research* underlying an invention can be characterized by the nature of the previous patents cited by an invention. The basicness of *research outcomes* relates to the subsequent patents that cite an invention. The fraction of citing patents that are assigned to the same organization as is the original invention is one measure of appropriability.

We test the validity of these presumptions by comparing the value of our measures for university and corporate patents. We find that many of the measures confirm that university research and research outcomes are more basic and harder to appropriate than those of corporations. We also find that basicness of outcomes is correlated with basicness of research, and that appropriability is lower for basic outcomes.

## **The Risk and Duration of Catastrophic Health Care**

**Daniel R. Feenberg and Jonathan S. Skinner**

NBER Working Paper No. 4147

August 1992

JEL Nos. I1, H51

Aging, Health Care, Public Economics

Catastrophic medical expenses are an important economic risk facing the elderly, but little is known about the persistence of such out-of-pocket medical costs. We measure the time-series property of medical costs using information on medical deductions from a panel of tax returns. During the period of analysis, 1968–73, taxpayers could deduct medical expenses above 3 percent of income.

The data suggest that the burden of out-of-pocket medical expenses is substantially larger for lower-income families. Furthermore, we find that out-of-pocket medical care costs persist over time: a \$1 increase in out-of-pocket medical spending increases future spending by an additional \$2.80. These results may shed light both on the social value of catastrophic health insurance and on aggregate saving behavior.

## **General Purpose Technologies: "Engines of Growth?"**

**Timothy F. Bresnahan and Manuel Trajtenberg**

NBER Working Paper No. 4148

August 1992

Productivity

Whole eras of technical progress and economic growth appear to be driven by a few key technologies, which we call General Purpose Technologies (GPTs). Thus, the steam engine and the electric motor may have played such a role in the past, whereas semiconductors and computers may be doing so in our era. GPTs are characterized by pervasiveness (they are used as inputs by many downstream sectors), inherent potential for technical improvements, and "innovational complementarities," meaning that the productivity of R and D in downstream sectors increases as a consequence of innovation in the GPT. Thus, as GPTs improve, they spread throughout the economy, bringing about generalized productivity gains.

Our analysis shows that the characteristics of GPTs imply increasing returns to scale, and that this may have a large role to play in determining the rate of technical advance. On the other hand, this phenomenon makes it difficult for a decentralized economy to fully exploit the growth opportunities offered by evolving GPTs. In particular, if the relationship between the GPT and its users is limited to arms-length market transactions, then there will be "too little, too late" innovation in both sectors. Likewise, difficulties in forecasting the technological developments of the other side may lower the rate of technical advance of all sectors. Finally, we show that the analysis of GPTs has testable implications in the context of R and D and productivity equations, that in principle can be estimated.

## **Protection for Sale**

**Gene M. Grossman and Elhanan Helpman**

NBER Working Paper No. 4149

August 1992

JEL No. F13

International Trade and Investment

We develop a model in which special interest groups make political contributions in order to influence an incumbent government's choice of trade policy. In the political equilibrium, the interest groups bid for protection, and each group's offer is optimal given the offers of the others. The politicians maximize their own welfare, which depends on the total amount of contributions collected and on the aggregate welfare of voters.

We study the structure of protection that emerges in political equilibrium and the equilibrium contributions that are made by the different industry lobby groups. We show why, in some cases, these groups may prefer to have the government use trade policy to transfer income rather than more efficient means. We also discuss how our framework might be extended to include endogenous formation of lobby groups, political competition between incumbents and challengers, and political outcomes in a multicountry trading system.

## **Remeasuring Business Cycles**

**Christina D. Romer**

NBER Working Paper No. 4150

August 1992

JEL No. E32

Development of the American Economy,  
Economic Fluctuations

This paper evaluates the consistency of the NBER business cycle reference dates over time. Analysis of the NBER methods suggests that the early turning points are derived from detrended data, while the dates after 1927 are derived from data in levels. To evaluate the importance of this and other changes in technique, I derive a simple algorithm that matches the postwar NBER peaks and troughs closely. When I apply this algorithm to data for 1884–1940, the new dates systematically place peaks later and troughs earlier than the NBER dates do. Using the new business cycle chronology shows that recessions have not become shorter, less severe, or less persistent between the pre–World War I and the post–World War II eras. However, expansions have become longer.

## **Exchange Rates and Corporate Pricing Strategies**

**Michael M. Knetter**

NBER Working Paper No. 4151

August 1992

JEL Nos. F12, F14, L60

International Finance and Macroeconomics,  
International Trade and Investment

This paper reviews the recent literature on pass-

through and pricing-to-market. I estimate pricing-to-market behavior for a new, larger dataset with 60 German and 20 U.S. seven-digit industries. The results conform closely to what has been found elsewhere in smaller detailed datasets and at higher levels of aggregation. German exporters have more of a tendency to price-to-market than U.S. exporters do for the sample of industries I study, but there is much variation across the industries. Surprisingly, pricing-to-market is more pronounced in German exports of steel and chemicals than in consumer goods.

## **The Automobile Industry and the Mexico–U.S. Free Trade Agreement**

**Steven T. Berry, Vittorio U. Grilli,**

**and Florencio López-de-Silanes**

NBER Working Paper No. 4152

August 1992

Industrial Organization,  
International Trade and Investment

This paper considers the likely effect on the automobile industry of a free trade agreement between the United States and Mexico. As there are currently large restrictions on imports into Mexico, one important outcome of a free trade agreement would be the opening of the Mexican market to U.S. producers. This is consistent with the history of the international auto industry and the fact that the U.S.–Canada Auto Pact opened a new, large market to U.S. manufacturers.

We consider the current state of the Mexican auto industry in great detail and suggest that the Mexican industry will continue to prosper, increasing output, but also relying heavily on production from U.S.-owned plants and on inputs imported from the United States and Canada. However, much of the existing domestically oriented industry is likely to be replaced by other North American producers. Finally, we find that economic growth together with declines in prices to world levels could rapidly expand the size of the Mexican auto market. The free trade agreement represents an opportunity for product diversification and rationalization in the auto industry.

## **Black Market for Currency, Hoarding Activity, and Policy Reform**

**Linda S. Goldberg and Il'dar Karimov**

NBER Working Paper No. 4153

August 1992

International Finance and Macroeconomics

In the former Soviet Union and throughout Eastern Europe, black market exchange rates and second-economy prices often are interpreted by policymakers as indicative of post-reform levels. However, these exchange rates and prices can provide highly biased signals for policymaking. These biases are especially important when exchange rates, fixed on the basis of these signals, are expected to serve as nominal anchors during stabilizations.



This paper traces the paths and biases in black market exchange rates, second-economy prices, hoarding stocks, and privately held dollar balances after policy initiatives or other changes in the economic environment are implemented. We consider official exchange rate adjustments, price reforms, foreign aid packages, altered risks of monetary confiscation or currency reforms, and goods-supply-related initiatives. We provide the conditions under which announcements of reform lead short-run prices or exchange rates to overshoot or to undershoot their long-run equilibrium levels.

### **A Comparative Analysis of East and West German Labor Markets: Before and After Unification**

**Alan B. Krueger and Jörn-Steffen Pischke**

NBER Working Paper No. 4154

August 1992

JEL No. J31

Labor Studies

In 1988, the wage distribution in East Germany was much more compressed than in West Germany or the United States. Since the collapse of communism and the unification of Germany, however, the wage structure in eastern Germany has changed considerably. In particular, wage variation has increased, the payoff to education has decreased somewhat, industry differentials have expanded, and the white collar premium has increased. Although average wage growth has been remarkably high in eastern Germany, individual variation in wage growth is similar to typical western levels. The wage structure of former East Germans who work in western Germany resembles the wage structure of native West Germans in some respects, but their experience-earnings profile is flat.

### **An Economic Analysis of Life Care**

**Jonathan S. Feinstein and Edward J. Keating**

NBER Working Paper No. 4155

September 1992

Health Economics

Life care communities offer long-term care to the elderly in a residential setting. Residents move into a life care community while still relatively young (although typically after age 65), initially occupying an independent living unit in a complex that is similar to a retirement community. Later, if the resident requires more intensive care, he or she can move to an on-site nursing facility.

Using extensive computer simulations, we show that life care offers two main advantages to the elderly compared to stand-alone nursing homes: 1) reduced mobility costs and proximity to spouse and friends when sick; and 2) insurance, linked to a rebate paid to the couple's heirs. We also investigate regulation of life care and the effects of the risk of bankruptcy by the operator.

### **Testing Long-Run Neutrality**

**Robert G. King and Mark W. Watson**

NBER Working Paper No. 4156

September 1992

JEL Nos. E40, E50, E32

Economic Fluctuations, Monetary Economics

In this paper we show that, in spite of the Lucas-Sargent critique, long-run neutrality can be tested without specifying a complete model of economic activity. We test four long-run neutrality propositions: 1) the neutrality of money, 2) the superneutrality of money, 3) a vertical long-run Phillips curve, and 4) the Fisher effect. In each application, our a priori knowledge consists of a range of plausible values for the relevant impact, and long-run multipliers. We find that the U.S. postwar data are consistent with the neutrality of money and a vertical long-run Phillips curve, but not with the superneutrality of money and the long-run Fisher relationship. The sign of the estimated effect of money growth on output depends on the particular identifying assumption used. We also find that, for a wide range of plausible identifying restrictions, nominal interest rates move less than one-for-one with inflation in the long run.

### **The Efficiency of a Group-Specific Mandated Benefit: Evidence from Health Insurance Benefits for Maternity**

**Jonathan Gruber**

NBER Working Paper No. 4157

September 1992

Health Economics, Public Economics

I consider the effects of "group-specific mandated benefits," such as maternity leave, which raise the cost of employing a demographically identifiable group. I study several 1976 state mandates stipulating that childbirth be covered comprehensively in health insurance plans; these regulations increased the cost of insuring women of childbearing age by as much as 5 percent of their wages. I find substantial shifting of the costs of these mandates to the wages of the targeted group. Correspondingly, I find little effect on total labor input for the group that benefited from these mandates: hours rise and employment falls, as may be expected from an increase in the fixed costs of employment. I confirm these results using a 1978 federal mandate as a "reverse experiment."

### **Income Distribution, Communities, and the Quality of Public Education: A Policy Analysis**

**Raquel Fernandez and Richard Rogerson**

NBER Working Paper No. 4158

September 1992

JEL Nos. E62, H52, I22, J24

Public Economics

This paper analyzes the effects of several policies

that affect the financing of public education. In our model: 1) individuals differ with respect to income; 2) individuals choose which community to reside in; 3) communities are characterized by a proportional tax on income and by the quality of public education; and 4) a community's tax rate is chosen by majority vote. We examine three types of policies: subsidies for residency of specific income groups in particular communities; ceilings or floors on community-level educational spending; and income redistribution. We identify several policies that make all individuals better off and increase the quality of education in all communities.

### **Taxes and the Form of Ownership of Foreign Corporate Equity**

**Roger H. Gordon and Joosung Jun**

NBER Working Paper No. 4159

September 1992

Public Economics

Investors can achieve international diversification in their portfolios not only through purchasing foreign equity directly, but also through investing in domestic firms that then invest abroad. Yet these alternative approaches are taxed very differently. A number of countries also have imposed various forms of capital controls restricting direct purchases of foreign equity. This paper estimates the degree to which these tax and nontax factors have affected the relative use of the two alternative methods of international diversification. We use data on investment in the United States by investors from each of ten other countries during 1980–9.

While the composition of equity flows differs dramatically across countries, taxes do not play an important role in explaining this variation. In part, tax distortions adjust endogenously to avoid large-scale portfolio investments abroad. With the increasing integration of capital markets and the easing of capital controls in many countries, we have seen and expect to continue to see reductions in the tax distortions affecting the form of international capital flows.

### **Uncertainty, Investment, and Industry Revolution**

**Ricardo J. Caballero and Robert S. Pindyck**

NBER Working Paper No. 4160

September 1992

JEL Nos. D92, E22

Economic Fluctuations

We study the effects of uncertainty on the entry of firms, total investment, and prices in a competitive industry with irreversible investment. First we determine firms' entry decisions, and then we describe the resulting industry equilibrium, emphasizing the effects of different sources of uncertainty. We then show how the conditional distribution of prices can be used as an alternative means of determining and understanding the behavior of firms and the resulting industry equilibrium. Finally, we use four-digit U.S. manufacturing data to examine some implications of the model.

### **R and D Investment and International Productivity Differences**

**Frank R. Lichtenberg**

NBER Working Paper No. 4161

September 1992

JEL Nos. O4, O3, H5, E21

Growth, Productivity

This paper extends previous research on the effect of investment on labor productivity at the country level by accounting for investment in R and D and in fixed and human capital. I find that privately funded R and D investment has a significant positive effect on productivity. Moreover, this effect appears to be quite large. The estimated social (national) rate of return to private R and D investment is about seven times as large as the return to investment in equipment and structures. The elasticity of GNP with respect to the privately funded research capital stock is about 7 percent—about one-third as large as the physical capital elasticity (which is substantially lower when R and D is accounted for). However, there are not complete nor instantaneous international R and D spillovers. The social marginal product of government-funded research capital appears to be much lower than that of private research capital.

### **Microeconomic Rigidities and Aggregate Price Dynamics**

**Ricardo J. Caballero and Eduardo M. R. A. Engel**

NBER Working Paper No. 4162

September 1992

JEL Nos. E00, E3

Economic Fluctuations

Using only aggregate data, we infer that the probability that a firm adjusts its price depends on the sign and the magnitude of the deviation of the price from its target level. We also find that the aggregate price responds less to negative shocks than to positive shocks, that the size of this asymmetry increases with the size of the shock, and that the number of firms changing their prices—and therefore the flexibility of the price level to aggregate shocks—varies over time in response to changes in economic conditions.

### **Conspicuous Consumption, Pure Profits, and the Luxury Tax**

**Laurie Simon Bagwell and B. Douglas Bernheim**

NBER Working Paper No. 4163

September 1992

JEL Nos. D11, H20

Public Economics

We examine a model of conspicuous consumption and explore the nature of competition in markets for conspicuous goods. We assume that individuals seek status, and that perceptions of wealth affect status. Under identifiable conditions, utility is related positively to the price of the good consumed. "Budget" brands are

sold at a price equal to marginal cost, while "luxury" brands are sold above marginal cost, despite the fact that producers are perfectly competitive. Luxury brands are not intrinsically superior to budget brands, but are purchased by consumers who seek to signal high levels of wealth. In our model, an appropriately designed luxury tax is a nondistortionary tax on pure profits.

### **Economic Foundations of Cost-Effectiveness Analysis**

**Alan M. Garber and Charles E. Phelps**

NBER Working Paper No. 4164

September 1992

JEL No. I18

Health Care

In order to address several controversies in the application of cost-effectiveness analysis, we investigate the principles underlying the technique and discuss the implications for the evaluation of medical interventions. We show how a cost-effectiveness criterion can be derived to guide resource allocation decisions. We investigate its relationship to age, gender, income level, and risk aversion. Cost-effectiveness analysis can be a useful and powerful tool for resource allocation decisions, but in the presence of heterogeneous preferences and personal characteristics, a cost-effectiveness criterion that is applied at the population level is unlikely to yield optimal allocations of resources.

### **The Accuracy of Reports of Foreign Exchange Intervention**

**Michael W. Klein**

NBER Working Paper No. 4165

September 1992

JEL No. F31

International Finance and Macroeconomics

Daily foreign exchange operations by the Federal Reserve are not revealed to the public contemporaneously or, up until recently, even years after the fact. With the recent release of daily intervention data, it is now possible to gauge the accuracy of the market's perceptions of the Fed's foreign exchange intervention. In this paper, I look at both qualitative and quantitative evidence on the accuracy of press reports of foreign exchange intervention by the Federal Reserve between the beginning of January 1985 and the end of December 1989. The evidence shows that the likelihood of intervention being reported, given that it actually occurred, was 72 percent, and that the likelihood of intervention actually occurring, given that it was reported, was 88 percent. Interventions that were reported by the newspaper were larger on average than those that were not reported, and this difference is statistically significant. The likelihood of intervention being reported also increased with the size of the intervention.

### **Greenback Resumption and Silver Risk: The Economics and Politics of Monetary Regime Change in the United States, 1862–1900**

**Charles W. Calomiris**

NBER Working Paper No. 4166

September 1992

JEL Nos. N11, N12, G12, G15

Development of the American Economy,  
Monetary Economics

I begin by developing a framework for price and interest rate determination under suspension of convertibility during the national banking period. I apply my model to unanticipated price level shocks and expected deflation during the period of greenback inconvertibility (1862–79), and to forward discounts on the dollar in the 1890s, during which there was a substantial risk of a return to suspension of convertibility. Special features of dollar value risk during the 1890s, including an endogenous supply of government-licensed money (national bank notes) and a time-varying probability of a long-run switch to silver, require a different model of speculative attack from the standard approach that assumes a government-controlled supply of money.

I find that: 1) Ex ante real interest rates were higher than nominal interest rates during the 1870s, and lower than nominal interest rates during the silver-risk episodes of the mid-1890s. 2) Runs on the dollar in the 1890s mainly reflected concerns about short-run convertibility, and small depreciation of the dollar contingent on suspension, rather than a likely immediate switch from gold to a permanently depreciated silver standard. 3) Expected deflation in the 1870s accounts for the apparent weakness of the procyclicality of prices, using annual data for the national banking period. After taking account of shifting expectations of inflation, unanticipated movements in prices and output are related much more closely.

### **Determinants of Short-Term Real Interest Differentials Between Japan and the United States**

**Richard C. Marston**

NBER Working Paper No. 4167

September 1992

JEL No. F31

International Finance and Macroeconomics

Many past studies of relative financing costs in the United States and Japan have relied on interest rates from the 1970s and earlier, when Japanese financial markets were subject to numerous regulations and controls and were shielded by capital controls from financial markets abroad. Interest rates on bank loans, the most important source of financing in Japan, systematically underestimated the true costs of borrowing. In the United States, capital controls were being dismantled by the early 1970s, but the prime loan rate used in past studies

by then had become an unreliable measure of the true cost of borrowing in the United States.

This study shows that most of the reported gap in short-term financing costs between the two countries can be traced to past features of the national markets that largely have disappeared. Now that markets have been deregulated and international capital flows liberalized, national interest rates are related closely to those in the unregulated Eurocurrency markets. And, as this study shows, average real interest differentials in the Eurocurrency markets have been close to zero over the last 20 years.

### **Relative-Price Changes as Aggregate Supply Shocks**

**Laurence M. Ball and N. Gregory Mankiw**

NBER Working Paper No. 4168

September 1992

JEL No. E30

Economic Fluctuations, Monetary Economics

This paper proposes a theory of supply shocks, or shifts in the short-run Phillips curve, based on relative-price changes and frictions in nominal price adjustment. When price adjustment is costly, firms adjust to large shocks but not to small shocks, and large shocks have disproportionate effects on the price level. Therefore, aggregate inflation depends on the distribution of relative-price changes: inflation rises when the distribution is skewed to the right, and falls when the distribution is skewed to the left. We show that this theoretical result explains a large fraction of movements in postwar U.S. inflation. Moreover, our model suggests measures of supply shocks that perform better than traditional measures, such as the relative prices of food and energy.

### **Macroeconomic Adjustment Under Bretton Woods and the Post-Bretton Woods Float: An Impulse-Response Analysis**

**Tamim Bayoumi and Barry J. Eichengreen**

NBER Working Paper No. 4169

September 1992

JEL Nos. F0, F4

International Finance and Macroeconomics

We analyze the comparative performance of fixed and flexible exchange rate systems and test competing hypotheses designed to explain shifts between exchange rate regimes. The paper provides a coherent explanation of the causes and consequences of the shift from the Bretton Woods system of pegged exchange rates to the post-Bretton Woods float. The shift from fixed to floating was associated with a modest increase in the cross-country dispersion of supply shocks but not with an increase in their average magnitude. In contrast, there was little change in either the cross-country dispersion or the average magnitude of demand shocks. More important in explaining the collapse of Bretton

Woods were factors that heightened the impact of shocks on the external accounts, forcing governments to respond to supply shocks with changes in demand that stabilized prices and the exchange rate at the expense of increased output volatility.

### **Is Price Adjustment Asymmetric? Evaluating the Market Share and Marketing Bottlenecks Hypotheses**

**Michael M. Knetter**

NBER Working Paper No. 4170

September 1992

JEL Nos. F12, F14, L60

International Finance and Macroeconomics,

International Trade and Investment

The theoretical literature on pricing-to-market has identified two possible reasons why the elasticity of prices to exchange rate changes may be asymmetric across appreciations and depreciations. If firms are attempting to increase market shares in foreign markets subject to the possibility of trade restrictions, then more pricing-to-market may occur during appreciations of the exporter's currency. If firms face capacity constraints in their distribution networks, then pricing-to-market may be exaggerated during periods of depreciation of the exporter's currency. This paper uses panel data on German and Japanese seven-digit industry exports to compare these competing explanations for asymmetries in pricing-to-market behavior. Some industries, notably automobiles, support the market share model. Only a pooled regression with Japanese data supports the marketing bottlenecks model.

### **Firms' Responses to Anticipated Reductions in Tax Rates:**

#### **The Tax Reform Act of 1986**

**Myron S. Scholes, G. Peter Wilson, and Mark A. Watson**

NBER Working Paper No. 4171

September 1992

JEL Nos. H2, L2

Public Economics

The 1986 Tax Act in the United States gradually reduced corporate tax rates from 46 percent to 34 percent by the middle of 1988. This reduction gave firms an incentive, in 1986 and 1987, to shift taxable income to future years when tax rates would be lower. There are substantial impediments, however, to shifting taxable income across periods (notably, offsetting tax consequences to other contracting parties and a host of non-tax costs), and it becomes an empirical question as to whether the benefits of shifting taxable income are sufficient to overcome the impediments. This paper examines whether firms deferred income recognition and/or accelerated expense recognition in anticipation of these declining tax rates. We find that firms shifted gross mar-

gin from the quarter immediately preceding an anticipated decrease in tax rates to the next quarter. We estimate that, on average, the 812 firms in our sample saved approximately \$500,000 in taxes by deferring sales. At a gross margin rate of one-third, this amounts to nearly \$20 billion of shifted sales for our sample firms.

## **Endogenous Creditor Seniority and External Debt Values**

**Michael Dooley and Mark Stone**

NBER Working Paper No. 4172

September 1992

JEL Nos. E62, F34

International Finance and Macroeconomics

There was a fundamental improvement in the seniority of domestic debt at the expense of foreign bank debt during the late 1980s. This was the revenue-maximizing response of governments to internal and external capital flight that drained the domestic financial "tax base" subject to indirect taxation. The profile of the sources of fiscal financing influenced external debt values. Previous studies have neglected an important reason for the decline in loan values from 1985 to 1989: the increase in international interest rates.

## **Political Instability and Economic Growth**

**Alberto Alesina, Sule Özler, Nouriel Roubini, and Phillip Swagel**

NBER Working Paper No. 4173

September 1992

Growth, International Finance and Macroeconomics, International Trade and Investment

This paper investigates the relationship between political instability and per capita GDP growth in a sample of 113 countries for 1950–82. We define "political instability" as the propensity of a government to collapse, and we estimate a model in which political instability and economic growth are determined jointly. Our main result is that, in countries and time periods with a high propensity of government collapse, growth is significantly lower than otherwise. This effect remains strong when we restrict our definition of "government change" to cases of substantial changes of the government.

## **Employment and Unemployment in the 1930s**

**Robert A. Margo**

NBER Working Paper No. 4174

September 1992

JEL No. N32

Development of the American Economy

This paper surveys recent research on employment and unemployment in the 1930s. Unlike earlier studies, it focuses on disaggregated data. Disaggregated evidence provides many more degrees of freedom than the

decade of annual observations associated with the Depression, and thus can prove helpful in discriminating between macroeconomic models. Second, and more importantly, disaggregation has revealed aspects of labor market behavior that are hidden in the time series and are important in their own right. In particular, my findings dispute the view that representative-agent models are useful for interpreting shifts in employment and unemployment over the course of the Depression.

## **Investments of Uncertain Cost**

**Robert S. Pindyck**

NBER Working Paper No. 4175

September 1992

JEL Nos. G31, C61, E22

Industrial Organization, Productivity

I study irreversible investment decisions when projects take time to complete and are subject to two types of uncertainty over the cost of completion. The first is technical uncertainty (that is, uncertainty over the amount of time, effort, and materials that ultimately will be required to complete the project) that is resolved only as the investment proceeds. The second is input cost uncertainty (that is, uncertainty over the prices and quantities of labor and materials required) and is external to the firm's investment activity. I derive a simple decision rule that maximizes the firm's value, and I use it to show how these two types of uncertainty have very different effects on investment decisions. As an example, I analyze the decision to start or to continue building a nuclear power plant during the 1980s.

## **Optimal Cleanup and Liability After Environmentally Harmful Discharges**

**A. Mitchell Polinsky and Steven Shavell**

NBER Working Paper No. 4176

September 1992

JEL No. K32

Law and Economics

How does liability for environmentally harmful discharges affect the incentives of firms to engage in cleanup and invest in precautions, as well as the incentives of consumers to purchase the goods whose production leads to discharges? We conclude that making firms responsible for cleanup and strictly liable for any remaining harm will lead to the socially optimal outcome. We also show that under the negligence approach—whereby a firm is liable for damages only if it fails to take appropriate precautions or to engage in proper cleanup—the outcome will not be optimal: too much of the good will be purchased.

## **Incidence and Allocation Effects of a State Fiscal Policy Shift: The Florio Initiatives in New Jersey**

**William T. Bogart, David F. Bradford,  
and Michael G. Williams**

NBER Working Paper No. 4177

October 1992

Public Economics

We calculate the incidence of recent changes to the New Jersey state tax system on a sample of homeowners. Our analysis distinguishes between business-as-usual responses to an evolving fiscal situation and tax changes that constitute a surprise: the latter have incidence effects, while the former do not. We conclude that, if the changes carried out by New Jersey Governor Jim Florio are regarded as permanent, they will effect a one-time wealth redistribution from higher-income homeowners toward lower-income homeowners and from owners of suburban residential property toward owners of urban residential property. Although effects on the averages for identifiable groups are clear and significant, there is very considerable variation in the effects on individual homeowners within groups. We also estimate the allocation effects of the tax changes and find that they will induce a sizable migration of wealthy and high-income people out of the state.

## **Industrial Development in Cities**

**J. Vernon Henderson, Ari Kuncoro,  
and Matthew Turner**

NBER Working Paper No. 4178

October 1992

Growth, International Trade and Investment

Using extensive data on 1970 and 1987 urban characteristics, we analyze changes in employment in specific manufacturing industries in cities. We ask: What present or past characteristics of a city's economic environment are critical in determining current employment levels in different industries? And, how much persistence is there in employment patterns over time, and what is the source of that persistence? Then we explore what inferences can be made about the nature of externalities in urban markets, depending upon the diversity of suppliers to firms, and on spillovers of information concerning current market conditions and the spread of technology.

While the literature assumes that employment levels in individual industries in individual cities show strong mean reversion (or "convergence"), in fact that is not the case in 1970 to 1987. The raw data show strong persistence, because of persistence in local demand conditions (that is, persistence in regional comparative advantage), as opposed to other measured or unmeasured urban characteristics. Retention of employment also is helped strongly by the historical degree of local specialization in the industry, perhaps indicating a form of dynamic externality. Other historical conditions are not important.

## **Complementarity and Increasing Returns in Intermediate Inputs: A Theoretical and Applied General-Equilibrium Analysis**

**Florencio Lopez-de-Silanes, James R. Markusen,  
and Thomas F. Rutherford**

NBER Working Paper No. 4179

October 1992

International Trade and Investment

The trade-industrial organization literature suggests that when a country has some market power over an imported good, some small level of protection must improve welfare. This argument is reinforced if the imported goods are substitutes for domestic goods produced with increasing returns to scale and initially underproduced in free trade equilibrium. This result may not hold when: 1) the imports are intermediates used in a domestic increasing-returns industry; and/or 2) the intermediates are complements for domestic inputs produced with increasing returns. We demonstrate such an outcome with respect to Mexican protection against imported auto parts using an applied general-equilibrium model of the North American auto industry.

## **Projecting the Number of New AIDS Cases in the United States**

**David E. Bloom and Sherry Glied**

NBER Working Paper No. 4180

October 1992

Health Economics

This paper reviews the two leading methods used to project the number of AIDS cases: back calculation and extrapolation. We assess these methods in light of key features of the HIV/AIDS epidemic and in terms of the quality of the projections they yield.

Our analysis shows that both methods have tended to overproject, often by sizable amounts, the number of AIDS cases in the United States, especially among homosexual/bisexual males and users of blood and blood products. Our results provide no evidence that the use of AZT and other prophylaxis accounts for these projection errors. Rather, the overprojections appear to be mainly the result of a considerable reduction in the rate of new HIV infection among the gay community starting in 1983-5.

We propose a new method for projecting AIDS cases that exploits knowledge about the process generating AIDS cases and incorporates readily available information about rates of new HIV infection. This method is far less sensitive to estimates of the incubation distribution than the method of back calculation. For the two transmission categories studied, it generates far more accurate AIDS case projections through 1990 than those based on the method of extrapolation. Relative to extrapolation, this method projects 22,000 fewer new AIDS cases for 1995 (a 36 percent difference). This method also projects that intravenous drug users will replace homosexual/bisexual men as the dominant transmission category for AIDS.

## **401(k) Plans and Tax-Deferred Saving**

**James M. Poterba, Steven F. Venti,  
and David A. Wise**

NBER Working Paper No. 4181

October 1992

JEL Nos. H31, D12, J14

Aging, Public Economics

This paper examines the role of 401(k) plans in retirement saving by U.S. households. It charts the rapid growth of these plans during the 1980s; more than 15 million workers now participate in 401(k)s. We use data from the Survey of Income and Program Participation to calculate 401(k) eligibility and participation rates by detailed age and income categories. For virtually all groups, 401(k) participation rates conditional on eligibility are much higher than take-up rates for IRAs, suggesting some important differences between these saving vehicles. We consider the interaction between 401(k)s and IRAs, and show that, since 1986, only one-fifth of 401(k) contributors have also made IRA contributions. Some 401(k) eligibles who make limited contributions to their IRAs do not make 401(k) contributions. We also explore whether contributions to 401(k) plans represent "new saving." Comparing the net worth of households that are eligible for 401(k)s with that of households that are not eligible, and comparing the net worth of households that have been eligible for 401(k)s for many years with those who have been eligible for short periods, suggests that 401(k) saving has a negligible effect in displacing other private saving.

## **The Increasing Annuitization of the Elderly—Estimates and Implications for Intergenerational Transfers, Inequality, and National Saving**

**Alan J. Auerbach, Laurence J. Kotlikoff,  
and David N. Weil**

NBER Working Paper No. 4182

October 1992

JEL Nos. E21, H55

Aging

This paper examines changes over time in the degree to which the resources (both human and wealth) of the elderly have been annuitized. Using data from the 1962 and 1983 Federal Reserve Surveys of Consumer Finances, we find an increase in annuitization that is particularly pronounced among the older elderly (those over 75) and among women. The estimated 1983 flow of aggregate bequests to children and grandchildren would have been 20 percent larger were it not for this increase in annuitization. The change in annuitization may have contributed significantly to the recent decline in the U.S. national saving rate.

## **Exchange Rates, Country Preferences, and Gold**

**Michael Dooley, Peter Isard, and Mark Taylor**

NBER Working Paper No. 4183

October 1992

JEL No. F31

International Finance and Macroeconomics

This paper tests the hypothesis that exchange rate movements may be largely coterminous with changes in preferences for holding claims on different countries. We argue that changes in country preferences will be reflected systematically in the price of gold; hence, gold price movements should have explanatory power with respect to exchange rate movements, over and above the effects of monetary shocks.

## **Hyperinflation with Currency Substitution: Introducing an Indexed Currency**

**Federico Sturzenegger**

NBER Working Paper No. 4184

October 1992

JEL Nos. F41, E31

International Finance and Macroeconomics,  
Monetary Economics

Currency substitution (CS) and financial adaptation in general are believed to increase the equilibrium rate of inflation. This result derives from a setup in which the government finances a certain amount of real resources through printing money and in which CS reduces the base of the inflation tax. I show that this intuition is wrong when the hyperinflation is driven by expectations. Incorporating CS reduces the inflation rates along the hyperinflationary equilibrium. If agents have an easy way of substituting away from domestic currency, then the inflation rates required to sustain a path on which real balances disappear necessarily are lower.

## **The Role of Information in U.S. Offshore Oil and Gas Lease Auctions**

**Robert H. Porter**

NBER Working Paper No. 4185

October 1992

JEL Nos. D8, L1, Q3

Industrial Organization

This paper describes the U.S. offshore oil and gas lease sales conducted by the Department of the Interior since 1954. I discuss bidding for leases, the government's decision whether to accept the highest bid, the incidence and timing of exploratory drilling, and the formation of bidding consortiums. I argue that equilibrium models that emphasize informational and strategic issues, and that account for institutional features of the leasing program, provide accurate predictions of outcomes.



## **Transfers**

**Xavier Sala-i-Martin**

NBER Working Paper No. 4186

October 1992

Growth

I develop a positive theory of intergenerational transfers, arguing that transfers induce retirement (that is, buy the elderly out of the labor force). Societies choose to do this because aggregate output is higher if the elderly do not work. I model this idea through *positive* externalities in the average stock of human capital: because skills depreciate with age, one implication of these externalities is that the elderly have a negative effect on the productivity of the young. When the difference between the skill levels of the young and the old is large enough, aggregate output in an economy is higher when the elderly do not work. In this case, retirement will be a good thing; pensions are just the means by which retirement is induced.

Unlike other theories of transfers, the theory in this paper is consistent with a number of regularities: transfers appear to be a luxury good that societies buy only after they reach a certain level of development and income; transfers are the only component of public spending that appears to be positively correlated with growth in a cross-section of countries; and transfers are linked to retirement and to the employment history of the worker.

One key prediction of the model is that, if the dependency ratio keeps rising, then the social security system will collapse, and this will be optimal.

Finally, a strict interpretation of the model suggests that transfers to poor people, minimum wage laws, minimum working age requirements, and other types of public welfare serve the same purpose as old age social security: they keep workers with low human capital out of the labor force.

## **The Effect of Illicit Drug Use on the Labor Supply of Young Adults**

**Robert Kaestner**

NBER Working Paper No. 4187

October 1992

Health Economics

Using data from the National Longitudinal Survey of Youth, this paper analyzes the effects of illicit drug use on the labor supply of a sample of young adults. The paper investigates whether the frequency and timing of marijuana and cocaine use are related systematically to labor supply. The cross-sectional results are consistent with those of previous researchers and suggest that illicit drug use has large, negative effects on labor supply. The longitudinal results, however, suggest that illicit drug use does not have a significant adverse impact on labor supply.

## **Inspecting the Mechanism: An Analytical Approach to the Stochastic Growth Model**

**John Y. Campbell**

NBER Working Paper No. 4188

October 1992

JEL No. E32

Economic Fluctuations

I argue that a clear understanding of the stochastic growth model can be achieved best by working out an approximate analytical solution. My proposed solution method replaces the true budget constraints and Euler equations of economic agents with loglinear approximations. Then the model becomes a system of loglinear expectational difference equations, which can be solved by the method of undetermined coefficients. I use this technique to study shocks to technology and government consumption, emphasizing that the persistence of shocks is an important determinant of their macroeconomic effects.

## **Optimal Distribution and Taxation of the Family**

**Louis Kaplow**

NBER Working Paper No. 4189

October 1992

JEL No. H24

Public Economics

Income tax burdens on family units are adjusted to reflect differences in ability to pay attributable to whether the unit consists of a single individual or a married couple, and how many dependents are present. There is substantial controversy over the appropriate forms of adjustment, and existing approaches to taxation of the family vary greatly across jurisdictions. I derive equitable relative tax burdens for different family configurations. My analysis considers how relative burdens should depend on the extent to which resources are shared among family members, the existence of economies of scale, the presence of altruism among family members, whether expenditures on children should be viewed as part of parents' consumption, and the possibility that some family members (children) have utility functions different from others.

## **The Effect of Price Shopping in Medical Markets: Hospital Responses to PPOs in California**

**Jonathan Gruber**

NBER Working Paper No. 4190

October 1992

Health Care, Public Economics

The last ten years have seen the introduction of price shopping in medical markets that previously were dominated by consumers who were insensitive to price. Price shopping has been facilitated by the advent of the Preferred Provider Organization (PPO), which coordinates

the demand of a large number of individual health care buyers, thereby gaining market power that it uses to obtain steep discounts off list prices from providers.

I study hospital responses to the advent of price competition in California over 1984–8. I note that, because of the nature of hospital bargaining with PPOs, hospitals should face more competitive pressure in markets that are more competitive *ex ante*. Instead, hospital net prices declined in more *ex ante* competitive areas in California after the arrival of PPOs. Hospital average costs did not decline in more competitive areas, though, indicating that there was a reduction in hospital markups. Care to the uninsured by hospitals, which is financed out of markups, fell substantially as competitive pressure grew; there was a 50 cent reduction in uncompensated care for every dollar rise in discounts to private payers.

### **Credit and Deferral as International Investment Incentives**

**James R. Hines, Jr.**

NBER Working Paper No. 4191

October 1992

JEL Nos. H87, F23

International Trade and Investment, Public Economics

The U.S. government taxes the foreign income of American firms, using a system that grants credits for foreign taxes paid and permits tax deferral for unrepatriated income. This paper shows that the tax system encourages firms to restrict their equity stakes in new foreign investments, and to finance their new investments with considerable debt. These incentives are strongest for U.S. investments in low-tax foreign countries, and exist even when transfer price regulation effectively limits the profit rates that foreign subsidiaries can earn. The behavior of U.S. multinationals in 1984 appears to reflect these tax incentives.

### **The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth versus Relative Wage Effects**

**Michael W. Klein and Eric Rosengren**

NBER Working Paper No. 4192

October 1992

JEL No. F21

International Finance and Macroeconomics,  
International Trade and Investment

There has been a significant correlation between U.S. inward foreign direct investment (FDI) and the U.S. real exchange rate since the 1970s. Two alternative reasons for this relationship are that the real exchange rate affects the relative cost of labor, and that the real exchange rate alters relative wealth across countries. We explore these alternatives by examining the determinants of four measures of inward FDI to the United States from seven industrial countries over 1979–91. We find strong evidence that relative wealth significantly affects U.S. inward FDI. We find no evidence that relative wages

have a significant impact on the determination of U.S. FDI. These results do not depend on the choice of countries in our sample or changes in tax codes.

### **Trading Volume and Serial Correlation in Stock Returns**

**John Y. Campbell, Sanford J. Grossman, and Jiang Wang**

NBER Working Paper No. 4193

October 1992

JEL No. G12

Asset Pricing

This paper investigates the relationship between stock market trading volume and the autocorrelations of daily stock index returns. We find that stock return autocorrelations tend to decline with trading volume. We explain this phenomenon using a model in which risk-averse “marketmakers” accommodate buying or selling pressure from “liquidity” or “noninformational” traders. Changing expected stock returns rewards marketmakers for playing this role. The model implies that a stock price decline on a high-volume day is more likely than a stock price decline on a low-volume day to be associated with an increase in the expected stock return.

### **Market Conditions and Retirement of Physical Capital: Evidence from Oil Tankers**

**Iain Cockburn and Murray Frank**

NBER Working Paper No. 4194

October 1992

Productivity

We study the endogeneity of capital retirements for the particular case of oil tankers from 1979–89. We examine the effect of changes in market conditions on the price and scrappage of tankers and find that energy price rises had a major impact on the value of ships and on which ships were scrapped. We use the information implicit in secondhand prices to ease the computational burden for the model that we estimate.

### **The Effect of Unions on the Distribution of Wages: Redistribution or Relabeling?**

**David Card**

NBER Working Paper No. 4195

October 1992

JEL Nos. J30, J51

Labor Studies

This paper reexamines the connection between unions and wage inequality, focusing on three questions: 1) How does the union wage effect vary across the wage distribution? 2) What is the effect of unionism on the overall variance of wages at the end of the 1980s? 3) How much of the increase in the variance of wages during the 1970s and 1980s can be attributed to changes in the level and distribution of union coverage?

Estimates of the union wage gap vary over the wage distribution, ranging from over 30 percent for lower-wage workers to 10 percent for higher-wage workers. I find that this variation represents a combination of a truly larger wage effect for lower-paid workers and differential selection biases.

The estimated effect of unions on the variance of wages in the late 1980s is relatively modest. Nevertheless, changes in the level and pattern of unionism—particularly the decline of unions among lower-wage workers—have been an important component of the growth in wage inequality. Changes in unionization account for one-fifth of the increase in the variance of adult male wages between 1973 and 1987.

## **Patterns and Determinants of Metropolitan House Prices, 1977–91**

**Jesse M. Abraham and Patric H. Hendershott**

NBER Working Paper No. 4196

October 1992

Miscellaneous

Real metropolitan house prices have been quite volatile during 1977–91, with half of 30 sample areas showing annual increases of above 15 percent in a single year and one-third of them experiencing decreases greater than 7.5 percent. Drawing on Capozza and Helsley's models of real land prices, we express changes in real house prices as a function of the rate of change in employment, real income growth, real construction cost inflation, and changes in real aftertax interest rates.

Our ability to explain prices varies widely by region. We do quite well for the half of our cities in the more stable Upper Midwest and Southeast, less well for the coastal cities, and dismally for the two Texas cities.

## **Policy Lessons from the U.S.**

### **Unemployment Insurance Experiments**

**Bruce D. Meyer**

NBER Working Paper No. 4197

October 1992

JEL No. H53

Labor Studies, Public Economics

Recently, there has been extensive experimental evaluation of reforms of the unemployment insurance (UI) system. The UI experiments fall into two main areas: reemployment bonuses, and job search programs. The four reemployment bonus experiments offered payments to UI recipients who found jobs quickly and kept them for a specified period of time. The six job search experiments evaluated combinations of services, including additional information on job openings, more job placements, and more extensive checks of UI eligibility.

The bonus experiments show that economic incentives do affect the speed with which people leave the UI rolls. They also show that speeding claimants' return to work appears to increase total earnings following the claim, but the evidence is less strong. Further, they sug-

gest that the rate of pay on the new job is not affected adversely by an earlier return to work. Despite these encouraging results, I argue that the experiments do not show that permanent adoption of a reemployment bonus would be beneficial, as they cannot account for the effect of a reemployment bonus on the size of the claimant population.

The job search experiments test several reforms that appear more promising. Nearly all of the combinations of services and increased enforcement reduce receipt of UI, and have benefits that exceed costs. The treatments, which mainly increase enforcement of work search rules, have small but often statistically significant effects. The experiments that focus more on providing services induce much larger reductions in receipt of UI, but at a higher cost of services per claimant. Nevertheless, these experiments have very favorable ratios of benefits to costs.

## **Hubs and Spokes, and Free Trade in the Americas**

**Carsten Kowalczyk and Ronald J. Wonnacott**

NBER Working Paper No. 4198

October 1992

International Trade and Investment

This paper compares two possible formats for free trade in the Americas: a system of spokes surrounding a U.S. hub, and a free trade area. We identify the sources of welfare change and argue that a country's attitude toward a system depends on whether the arrangement is a complement or a substitute trading club. We also argue that rent-seeking activities, and costs of administration and transportation, are likely to be higher in a hub-and-spoke system than in a free trade area.

## **Participation in and Contributions to 401(k) Pension Plans: Evidence from Plan Data**

**Leslie E. Papke**

NBER Working Paper No. 4199

October 1992

JEL No. J26

Aging

401(k) plans differ from traditional employer-sponsored pension plans in that employees are permitted to make pretax contributions and the employer may match part of the contribution. Since participation in these plans is voluntary, the sensitivity of participation and contributions to plan characteristics—notably the employer matching rate—will play a critical role in retirement saving.

Using plan-level data from Form 5500s filed annually with the Internal Revenue Service, I find that there is potential for expanding retirement saving through 401(k) plans, although there is evidence that the Tax Reform Act of 1986 reduced their attractiveness. Annual employee contributions were reduced by about 4 percent compared to the prior year, after controlling for employer match rates.

A simple model of employee contributions predicts that participation should increase with the match rate, and that, under reasonable assumptions, contributions will increase as well, but eventually can fall at higher match rates. I find evidence of both of these effects. A 0.05 increase in the matching rate is associated with a 1 to 5 percent increase in employee contributions.

### **International Wage Curves**

**David G. Blanchflower and Andrew J. Oswald**

NBER Working Paper No. 4200

October 1992

Labor Studies

This paper provides evidence for the existence of a negatively sloped locus linking the level of pay to the rate of regional (or industry) unemployment. We estimate this "wage curve" using microeconomic data for Britain, the United States, Canada, Korea, Austria, Italy, Holland, Switzerland, Norway, and Germany. The average unemployment elasticity of pay is approximately  $-0.1$ .

### **Pension Plan Provisions and Retirement: Men and Women, Medicare, and Models**

**Robin L. Lumsdaine, James H. Stock, and David A. Wise**

NBER Working Paper No. 4201

October 1992

JEL Nos. J14, J26

Aging

This paper tests the validity of models previously developed and estimated with data from a *Fortune* 500 company, using data from a second large company. The evidence confirms that changes in retirement rates by age correspond closely to provisions of the firm's pension plan. Further, there is essentially no difference in the retirement behavior of men and women. Here, as in previous work, we find that the simpler "option value model" of retirement yields very similar results to the considerably more complex stochastic dynamic programming specification. Both fit the data well and are fairly good at predicting the effect on retirement of a special retirement window plan. We also consider the effects of firm health insurance and median coverage on retirement.

## **Historical Factors in Long-Run Growth**

### **Tall but Poor: Nutrition, Health, and Living Standards in Prefamine Ireland**

**S. Nicholas and Richard H. Steckel**

NBER Historical Paper No. 39

August 1992

JEL No. N33

This paper uses data on height recorded on Convict Indents to study temporal patterns and regional differences in living standards in pre-famine Ireland. The approach is explicitly comparative and uses information from America and other parts of Europe. The Irish attained roughly the 16th centile of modern height standards and, although smaller than contemporary North Americans, were among the tallest in Europe, including the wealthier English. We suggest that a nutritious diet and epidemiological isolation were important factors in the high nutritional living standards of the Irish.

### **The Labor Force in the Nineteenth Century**

**Robert A. Margo**

NBER Historical Paper No. 40

August 1992

JEL No. N31

This paper surveys recent research on the nineteenth-century labor force. I examine: trends in the aggregate and demographic, occupational, and industrial composition of the labor force; short- and long-run movements in nominal and real wages; hours of work; the development of the factory system; the growth of unions; and government regulation of labor markets, specifically protectionist legislation. Although my survey is deliberately broad, it has an underlying emphasis on those aspects of change that had direct bearing on the evolution of the labor force in the twentieth century. In keeping with this theme, the paper concludes with a brief comparison of turn-of-the-century labor markets with labor markets today.

### **International Migration and World Development: A Historical Perspective**

**Timothy J. Hatton and Jeffrey G. Williamson**

NBER Historical Paper No. 41

September 1992

The 1920s marked the end of a century of mass migration from Europe to the New World. This paper analytically examines this pre-quota experience. First we consider the character and dimensions of overseas emigration from Europe, chiefly from the mid-19th century to World War I. Then we discuss the effects of these migrations on both sending and receiving countries. We

deal with the evolution of global labor markets, as they were influenced directly by the migrations and as they interacted with the evolution of world commodity and capital markets. We argue that the impressive economic convergence that took place between 1870 and World War I can be explained largely by these forces of economic integration, rather than by technological convergence or differential human capital growth.

## Technical Papers

### **Testing Volatility Restrictions on Intertemporal Marginal Rates of Substitution Implied by Euler Equations and Asset Returns**

**Stephen G. Cecchetti, Pok-sang Lam, and Nelson C. Mark**

NBER Technical Paper No. 124

July 1992

JEL Nos. E44, G12

Asset Pricing

The Euler equations derived from a broad range of intertemporal asset pricing models, together with the first two unconditional moments of asset returns, imply a lower bound on the volatility of the intertemporal marginal rate of substitution. We develop and implement statistical tests of these lower bound restrictions. We conclude that the availability of relatively short time series of consumption data undermines the ability of tests that use the restrictions implied by the volatility bound to discriminate among different utility functions.

### **The "Window Problem" in Studies of Children's Attainments:**

#### **A Methodological Exploration**

**Chong-Bum An, Robert H. Haveman, and Barbara Wolfe**

NBER Technical Paper No. 125

July 1992

Health Economics

Numerous studies of the determinants of children's attainments rely on observations of circumstances and events at age 14 as proxies for information over the en-

tire childhood period. Using 21 years of panel data from the Michigan PSID on 825 children who were 14–16 years old in 1979, we evaluate the effects of using truncated or "window" (for example, age 14) information in models of the determinants of attainments (for example, education, nonmarital fertility) of young adults. We present correlations between truncated and full-childhood variables, along with five tests of the reliability of estimates based on "window" measurements. The tests are designed to evaluate the differential effects of data accuracy, multiple occurrence of events, duration of circumstances, and the timing of events or circumstances during childhood between "window" and full-childhood information. We conclude that most of the standard truncated variables serve as weak proxies for multiyear information in such models, and draw the implications of these findings for future data collection and research.

### **Seasonal Unit Roots in Aggregate U.S. Data**

**J. Joseph Beaulieu and Jeffrey A. Miron**

NBER Technical Paper No. 126

August 1992

JEL Nos. C1, C4

Economic Fluctuations

We provide evidence on the presence of seasonal unit roots in aggregate U.S. data, and use the approach developed by Hylleberg, Engle, Granger, and Yoo (HEGY) (1990). First we derive the mechanics and asymptotics of the HEGY procedure for monthly data and use Monte Carlo methods to compute the finite-sample critical values of the associated test statistics. Then we apply quarterly and monthly HEGY procedures to aggregate U.S. data. The data reject the presence of unit roots at most seasonal frequencies in a large fraction of the series we consider.

### **Average Causal Response with Variable Treatment Intensity**

**Joshua D. Angrist and Guido W. Imbens**

NBER Technical Paper No. 127

September 1992

Labor Studies

In evaluation research, an average causal effect usually is defined as the expected difference between the outcomes of the treated and what these outcomes would have been in the absence of treatment. In this paper, we extend the definition of average causal effects to the case of variable treatments, such as drug dosage, hours of exam preparation, cigarette smoking, and years of schooling.

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