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# NBER *Reporter*

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## In This Issue

|  |    |
|--|----|
| Program Report:<br>International Trade<br>and Investment     | 1  |
| Research Summaries:<br>Recent Research on<br>Economic Growth | 6  |
| Financial Conditions and<br>Macroeconomic Behavior           | 10 |
| Retirement Analysis, Social<br>Security, and Pensions        | 14 |
| NBER Profiles  | 18 |
| Conferences  | 19 |
| Bureau News  | 27 |
| Bureau Books   | 33 |
| Current Working Papers                                       | 35 |

## Program Report

### International Trade and Investment

Robert C. Feenstra

Research activities of the NBER's Program in International Trade and Investment can be grouped into four broad areas: trade patterns (static and dynamic); trade policy; regional and multilateral trade agreements; and foreign direct investment. Much of the research is motivated by the policy experience of the United States and other countries, and one goal of the program is to evaluate the outcome of these international policies. Another goal is to understand the determinants of trade policies and trade patterns. To this end, members of the program are engaged actively in developing models of endogenous growth, economic geography, and political economy, applied to questions of international (or regional) trade.

### Trade Patterns

Current research has moved beyond resource endowments as a determinant of static trade patterns, and has introduced monopolistic competition and product diversity as an explanation for trade flows. Elhanan Helpman has shown that when countries are fully specialized in unique product varieties, and tastes are the same across nations, then a relatively simple equation relating trade flows to country sizes can be obtained.<sup>1</sup> This equation fits the data well for the OECD countries. David Hummels and James A. Levinsohn have reconsidered this empirical evidence, and have shown that the same equation also fits well for a group of non-OECD countries, including various South American and African nations.<sup>2</sup> Since we do not expect that the trade patterns of the latter countries are determined by monopolistic competition, there is a puzzle as to what is being explained by this equation.

Along with Tzu-Han Yang and the sociologist Gary G. Hamilton, I provided further evidence on the link between market structure and trade patterns.<sup>3</sup> Hamilton's firm-level data on business groups in Japan, Korea, and Taiwan show dramatic differences in the type of vertical and horizontal integration within these countries. We argue that these market structures should correspond to different trade patterns, and in particular, that greater vertical integration (and resulting economies of scale) should lead to less product diversity. We confirm this hypothesis by comparing

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Taiwan and Korea, in that Korea has less diversity in its exports to the United States. Japan has greater product variety than either of these countries, and that is explained by its substantial size. Dani Rodrik, and later we, provided evidence on the composition or "quality" of export from these countries (measured by a comparison of unit-values and price indexes).<sup>4</sup>

The dynamics of trade have been extensively analyzed in theory by Gene M. Grossman and Helpman,<sup>5</sup> and various researchers have begun to test these models. David T. Coe and Helpman find that both a country's R and D stock and the R and D stock of its trade partners affect the country's total factor productivity, supporting the idea that knowledge diffuses across borders through trade.<sup>6</sup> James R. Markusen and I have developed empirical measures of product variety that could be applied to growth accounting.<sup>7</sup> In ongoing work, Jonathan Eaton and Sam Kortum test for international technological diffusion using data on patents within the OECD countries. Magnus Blomström, Robert E. Lipsey, and Mario Zejan have examined the determinants of developing country growth, finding that inflows of direct investment, along with secondary education and labor force participation, are major factors.<sup>8</sup> The empirical evidence linking trade and growth will be the topic of an upcoming NBER-CEPR International Seminar on International Trade, organized by Robert E. and Richard E. Baldwin, to be reviewed in a future *NBER Reporter*.

Dynamic patterns of regional trade play a central role in recent models of economic geography, as developed especially by Paul R. Krugman.<sup>9</sup> Kiminori Matsuyama and Takaaki Takahashi have inves-

tigated the welfare properties of the equilibrium in which one region dominates, and show that such concentration can reduce welfare.<sup>10</sup> Jonathan Eaton and Zvi Eckstein present evidence that cities in France and Japan have grown in a parallel manner, with little tendency for divergence to the largest centers.<sup>11</sup> James E. Rauch uses data on the growth of industrial parks in the United States to argue that these allowed developers to internalize agglomeration economies; he also has analyzed the impact of bureaucracies on the historical growth of cities in the United States.<sup>12</sup> J. David Richardson is engaged in developing a database and analyzing trade between states within the United States. Finally, Gordon H. Hanson uses data on the garment industry in Mexico to study the impact of trade liberalization on the regional structure of wages and locational choice.<sup>13</sup>

## Trade Policy

Research on trade policy can be divided into work on import quotas and export subsidies; on antidumping and countervailing duties; and on the political economy of trade policy. In the first area, Dani Rodrik and Barbara J. Spencer are challenging the conventional wisdom that quotas and subsidies will lead to high inefficiency and rent-seeking costs, by providing examples where these regimes (arguably) seem to have worked.<sup>14</sup> Kala Krishna and Ling Hui Tan have examined in detail the workings of the Hong Kong market for quota licenses in textiles.<sup>15</sup> Recently I have calculated the deadweight loss associated with the quality upgrading that occurred in U.S. imports of Japanese automobiles in the 1980s.<sup>16</sup>

In the second area, Thomas Prusa and Wendy L. Hansen are inves-

tigating the impact of the "cumulation provision," introduced into U.S. trade laws in 1984, on the outcome of antidumping determination.<sup>17</sup> Under this provision, the imports from all source countries are summed by the International Trade Commission (ITC) to determine potential injury. Robert W. Staiger and Frank A. Wolak examine the trade impacts of U.S. antidumping law and determinants of suit filing activity from 1980-5, identifying several channels through which a suit can affect trade even if duties are not levied.<sup>18</sup> Robert E. Baldwin and Jeffrey W. Steagall provide a general empirical analysis of the factors influencing ITC decisions in antidumping, countervailing duty, and safeguard cases.<sup>19</sup>

The political economy of trade policy is an area of growing research interest. Grossman and Helpman have been modeling how trade policies are determined as political outcomes in representative democracies.<sup>20</sup> They focus on the interactions between incumbent politicians, who are in a position to set trade policy, and special interest groups, who make political contributions to these politicians. Their solutions for the political equilibrium allow a vector of tariffs to be determined over many industries, balancing the politician's concern for campaign financing and social welfare. The idea that declining industries may experience a collapse of protection has been studied by S. Lael Brainard and Thierry Verdier.<sup>21</sup> The actual experience of various industries was discussed at the conference "Political Economy of Trade Protection," organized by Anne O. Krueger, and summarized in the Spring 1994 *NBER Reporter*.<sup>22</sup>

A final area that has implications for trade policy are the links between exchange rates, international

prices, and wages. Michael M. Knetter, Joseph E. Gagnon, and I have explored the extent to which firms pass-through changes in exchange rates to their prices, particularly in the automobile industry.<sup>23</sup> In a quite different context, Sebastian Edwards has examined the link between exchange rates, trade policy, and growth for developing countries.<sup>24</sup> Robert Z. Lawrence and Paul R. Krugman have recently critiqued the popular opinion that trade competition accounts for the drop in the relative wages of blue collar workers in the United States. They find that this belief is not supported by the evidence, and that the sources of U.S. economic difficulties are overwhelmingly domestic. This is a controversial conclusion that is bound to lead to further research in the near future.<sup>25</sup>

## Regional and Multilateral Trade Agreements

The successful conclusion of the North American Free Trade Agreement (NAFTA), as well as the Uruguay Round of GATT negotiations, underscores the importance of these international agreements in reducing barriers to the flow of goods and services across borders. A number of researchers have been actively involved in studying the political determinants of these agreements and their economic impact. Grossman and Helpman have extended their work on the political economy of protection to investigate the viability of free trade agreements.<sup>26</sup> They find that an agreement between two countries is most likely to be politically viable when the potential trade between the members is sufficiently close to being balanced, and when the agreement would generate substantial trade diversion rather than

creation. Unfortunately, this result implies that political support for the agreement is likely to be greatest exactly when the agreement would reduce trade efficiency.

Kyle Bagwell and Staiger have focused on the implications of a regional agreement for further multilateral trade liberalization.<sup>27</sup> They find that in the early stages, regional negotiations likely will be associated with less multilateral cooperation, because the expectations of future trade diversion reduces the fear of future trade wars across blocs. However, once a regional agreement is fully implemented and the trade diversion has occurred, then more liberal multilateral trade policies can be restored. Staiger has investigated in more detail how the flow of resources out of import-competing sectors affect the incentives for multilateral cooperation.<sup>28</sup> Further research on regional and multilateral trade agreements has been undertaken by Richard E. Baldwin, and Carsten Kowalczyk with Ronald J. Wonnacott and Tomas Sjostrom.<sup>29</sup>

Because regional free trade agreements do not harmonize the tariffs levied by member countries on imports from outside the bloc, they require extensive "rules of origin" or domestic-content provisions to prevent imports from entering through the lowest tariff country. These rules play an important role in the NAFTA legislation, and have quite dramatic effects on the efficiency of production. These effects are discussed in general by Krueger, and in the context of empirical simulations by Florencio Lopez-de-Silanes, Markusen, and Thomas F. Rutherford.<sup>30</sup> Additional simulation results concerning the incentives for countries of different sizes to enter into regional agreements are provided by Carlo Perroni and John Whalley.<sup>31</sup>

Jeffrey A. Frankel also has been working on the regionalization of world trade. He has investigated the hypothesis that Japan is coming to dominate East Asia.<sup>32</sup> The common view that the countries in the region have been intensifying intra-regional trade can be explained by "natural factors," such as distance, transportation costs, country size, and per capita incomes. In work with Shang-Jin Wei and Ernesto Stein, Frankel then addresses what the trend toward regionalization of trade implies for world efficiency.<sup>33</sup> Given the estimated range of intra-continental transportation costs, they find that the formation of regional free trade areas is likely to distort trade and reduce economic welfare. They call such blocs "super-natural," in contrast to the "natural" trade blocs that would arise from the proximity of countries under free trade. Barry Eichengreen and Douglas A. Irwin apply a similar methodology to analyze the disintegration of world trade in the 1930s.<sup>34</sup> Considerations of distance and transportation costs also are used by Edward E. Leamer to estimate the future structure of trade between Mexico and the United States.<sup>35</sup>

## Foreign Direct Investment

Research on the decisions of multinational firms to invest abroad, and resulting implications for trade flows, also is included within the program. Traditional explanations of multinationals emphasize differences in factor proportions or wages across nations as the motivation for overseas expansion. However, in recent years, over 80 percent of foreign direct investment has been between industrialized countries. Accordingly, Brainard has developed and tested

a model that explains horizontal integration across borders by considerations of market access.<sup>36</sup> She finds substantial empirical support for the model using bilateral data on U.S. trade and overseas production for 27 countries and 64 industries. In particular, overseas production is found to increase relative to exports when trade barriers, transport costs, or advertising intensity are high, and when plant economies and investment barriers are low. Brainard also finds that the volume of intraindustry affiliate sales increases as countries are more similar in their factor proportion or per capita incomes, contradicting the factor proportions explanation for multinational sales.<sup>37</sup>

In joint work with Keith Head and John Ries, Deborah Swenson proposes an additional explanation for foreign direct investment.<sup>38</sup> They test whether agglomeration economies—whereby benefits are obtained from locating in the same region as other foreign firms in the same industry—are a factor in the locational choice of firms. Using data on Japanese manufacturing plants built in the United States, they find that firms are more likely to locate in regions where other Japanese firms operate (especially those in the same business group), after controlling for the presence of U.S. firms in that industry. Aizenman examines the implications of foreign direct investment.<sup>39</sup> He argues that overseas investment will reduce the likelihood of managed trade between the countries, but potentially increase the incidence of cyclical dumping; both these outcomes are welfare improving for the countries involved.

Lipsev examines the long-term trends in foreign investment activity within the United States, as well as in outward direct investment.<sup>40</sup>

One of his conclusions is that foreign production has been a means by which American firms have retained foreign market shares even as their shares in the U.S. economy have declined, and that foreign direct investment has served the same function for firms from other countries. He finds little support for the idea that direct investment "exports jobs." More evidence points to a shift in the composition of home country employment toward managerial and technical occupations. The implications of foreign investment for the division of labor at home, as well as for domestic investment, also are being considered by Blomström and Ari Kokko, using evidence from Swedish multinationals.<sup>41</sup>

<sup>1</sup>E. Helpman, "Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries," *Journal of the Japanese and International Economies* 1 (March 1987), pp. 62-81.

<sup>2</sup>D. Hummels and J. A. Levinsobn, "Monopolistic Competition and International Trade: Reconsidering the Evidence," NBER Working Paper No. 4389, June 1993.

<sup>3</sup>R. C. Feenstra, T.-H. Yang, and G. G. Hamilton, "Market Structure and International Trade: Business Groups in East Asia," NBER Working Paper No. 4536, November 1993.

<sup>4</sup>D. Rodrik, "Industrial Organization and Product Quality: Evidence from South Korean and Taiwanese Exports," in *Empirical Studies of Strategic Trade Policy*, P. R. Krugman and A. M. Smith, eds. Chicago: University of Chicago Press, 1994, pp. 195-210.

<sup>5</sup>G. M. Grossman and E. Helpman, *Innovation and Growth in the Global Economy*, Cambridge: MIT Press, 1991.

<sup>6</sup>D. T. Coe and E. Helpman, "International R and D Spillovers," NBER Working Paper No. 4444, August 1993.

<sup>7</sup>R. C. Feenstra and J. R. Markusen, "Accounting for Growth with New Inputs," NBER Working Paper No. 4114,

July 1992, and *International Economic Review* 35(2) (May 1994), pp. 429-447.

<sup>8</sup>M. Blomström, R. E. Lipsey, and M. Zeman, "What Explains Developing Country Growth?" in *Convergence and Productivity: Cross-National Studies and Historical Evidence*, W. Baumel, R. Nelson, and E. Wolff, eds. Oxford: Oxford University Press, 1994, and "Is Fixed Investment the Key to Economic Growth?" NBER Working Paper No. 4436, August 1993.

<sup>9</sup>P. R. Krugman, "A Dynamic Spatial Model," NBER Working Paper No. 4219, November 1992, and "Fluctuations, Instability, and Agglomeration," NBER Working Paper No. 4616, January 1994.

<sup>10</sup>K. Matsuyama and T. Takahashi, "Self-Defeating Regional Concentration," NBER Working Paper No. 4484, October 1993.

<sup>11</sup>J. Eaton and Z. Eckstein, "Cities and Growth: Theory and Evidence from France and Japan," NBER Working Paper No. 4612, January 1994.

<sup>12</sup>J. E. Rauch, "Does History Matter Only When It Matters Little? The Case of City-Industry Location," in *The Quarterly Journal of Economics* 108(3) (August 1993), pp. 843-867, and "Bureaucracy, Infrastructure, and Economic Growth: Theory and Evidence from U.S. Cities During the Progressive Era," University of California, San Diego, 1993.

<sup>13</sup>G. H. Hanson, "Localization Economies, Vertical Organization, and Trade: Theory and Evidence from Mexico," and "Increasing Returns and the Regional Structure of Wages," Department of Economics, University of Texas, Austin, 1993.

<sup>14</sup>D. Rodrik, "Taking Trade Policy Seriously: Export Subsidization as a Case Study in Policy Effectiveness," in *Tax Policy and the Economy*, Volume 8, J. M. Poterba, ed. Cambridge: MIT Press, 1994; and B. J. Spencer, "Quota Licenses for Imported Capital Equipment: Could Bureaucratic Allocation Ever Do Better Than the Market?" University of British Columbia, 1994.

<sup>15</sup>K. Krisbna and L. H. Tan, "License Price Paths: I. Theory, II. Evidence from Hong Kong," NBER Working Paper No. 4237, December 1992.

<sup>16</sup>R. C. Feenstra, "Measuring the Welfare Effect of Quality Change: Theory

and Application to Japanese Autos," NBER Working Paper No. 4401, July 1993.

<sup>17</sup>T. Prusa and W. L. Hansen, "Measuring the Impact of Cumulation on ITC Injury Determinations: Evidence from Antidumping and Countervailing Duty Cases," State University of New York at Stony Brook, 1994.

<sup>18</sup>R. W. Staiger and F. A. Wolak, "Measuring Industry-Specific Protection: Antidumping in the United States," NBER Working Paper No. 4646, April 1994.

<sup>19</sup>R. E. Baldwin and J. W. Steagall, "An Analysis of Factors Influencing ITC Decisions in Antidumping, Countervailing Duty, and Safeguard Cases," NBER Working Paper No. 4282, February 1993.

<sup>20</sup>G. M. Grossman and E. Helpman, "Protection for Sale," NBER Working Paper No. 4149, August 1992, and "Trade Wars and Trade Talks," NBER Working Paper No. 4280, February 1993.

<sup>21</sup>S. L. Brainard and T. Verdier, "The Political Economy of Declining Industries: Senescent Industry Collapse Revisited," NBER Working Paper No. 4606, December 1993.

<sup>22</sup>See also A. O. Krueger, "The Political Economy of Controls: Complexity," in *Global Change and Transformation*, L. Stetting, K. E. Svendsen, and F. Yndgaard, eds. Copenhagen: Handelskøllens Forlag, pp. 193-210.

<sup>23</sup>J. E. Gagnon and M. M. Knetter, "Markup Adjustment and Exchange Rate Fluctuations: Evidence from Panel Data on Automobile Exports," NBER Working Paper No. 4123, July 1992; M. M. Knetter, "Exchange Rates and Corporate Pricing Strategies," NBER Working Paper No. 4151, August 1992, and "Is Price Adjustment Asymmetric? Evaluating the Market Share and Marketing Bottlenecks Hypothesis," NBER Working Paper No. 4170, September 1992; and R. C. Feenstra, J. E. Gagnon and M. M. Knetter, "Market Share and Exchange Rate Pass-Through in World Automobile Trade," NBER Working Paper No. 4399, July 1993.

<sup>24</sup>S. Edwards, "Trade Policy, Exchange Rates, and Growth," NBER Working Paper No. 4511, October 1993.

<sup>25</sup>P. R. Krugman and R. Z. Lawrence, "Trade, Jobs, and Wages," NBER Working Paper No. 4478, September 1993.

<sup>26</sup>G. M. Grossman and E. Helpman, "The Politics of Free Trade Agreements," NBER Working Paper No. 4597, December 1993.

<sup>27</sup>K. Bagwell and R. W. Staiger, "Multilateral Tariff Cooperation During the Formation of Regional Free Trade Areas," NBER Working Paper No. 4364, May 1993, and "Multilateral Tariff Cooperation During the Formation of Customs Unions," NBER Working Paper No. 4543, November 1993.

<sup>28</sup>R. W. Staiger "A Theory of Gradual Trade Liberalization," NBER Working Paper No. 4620, January 1994.

<sup>29</sup>R. E. Baldwin, "A Domino Theory of Regionalism," NBER Working Paper No. 4465, September 1993; C. Kowalczyk and R. J. Wonnacott, "Hubs and Spokes, and Free Trade in the Americas," NBER Working Paper No. 4198, October 1992; and C. Kowalczyk and T. Sjöström, "Bringing GATT into the Core," NBER Working Paper No. 4343, April 1993.

<sup>30</sup>A. O. Krueger, "Free Trade Agreements as Protectionist Devices: Rules of Origin," NBER Working Paper No. 4352, April 1993; F. Lopez-de-Silanes, J. R. Markusen, and T. F. Rutherford, "Anti-Competitive and Rent-Shifting Aspects of Domestic Content Provisions in Regional Trade Blocs," NBER Working Paper No. 4512, October 1993; J. R. Markusen and T. F. Rutherford, "Discrete Plant-Location Decisions in an Applied General Equilibrium Model of Trade Liberalization," NBER Working Paper No. 4513, October 1993.

<sup>31</sup>C. Perroni and J. Whalley, "The New Regionalism: Trade Liberalization or Insurance?" NBER Working Paper No. 4626, January 1994.

<sup>32</sup>J. A. Frankel, "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" in *Regionalism and Rivalry: Japan and the United States in Pacific Asia*, J. A. Frankel and M. Kahler, eds., Chicago: University of Chicago Press, 1993, pp. 53-85.

<sup>33</sup>J. A. Frankel and S.-J. Wei, "Trade Blocs and Currency Blocs," NBER Working Paper No. 4335, April 1993; J. A. Frankel, E. Stein, and S.-J. Wei "Continental Trading Blocs: Are They Natural, or Super-Natural?" NBER Working Paper No. 4588, December 1993, and "Trading Blocs: The Natural, the Unnatural, and the Super-Natural," presented at the NBER Sixth InterAmerican Seminar in Economics, Caracas, Venezuela, May 28-29, 1993, forthcoming in the *Journal of Development Economics*.

<sup>34</sup>B. Eichengreen and D. A. Irwin, "Trade Blocs, Currency Blocs, and the Disintegration of World Trade in the 1930s," NBER Working Paper No. 4445, August 1993.

<sup>35</sup>E. E. Leamer and C. J. Medberry, "U.S. Manufacturing and an Emerging Mexico," NBER Working Paper No. 4331, April 1993.

<sup>36</sup>S. L. Brainard, "A Simple Theory of Multinational Corporations and Trade with a Trade-Off Between Proximity and Concentration," NBER Working Paper No. 4269, February 1993, and

"An Empirical Assessment of the Proximity-Concentration Trade-Off Between Multinational Sales and Trade," NBER Working Paper No. 4580, December 1993.

<sup>37</sup>S. L. Brainard, "An Empirical Assessment of the Factor Proportions Explanation of Multinational Sales," NBER Working Paper No. 4583, December 1993.

<sup>38</sup>K. Head, J. Ries, and D. Swenson, "Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States," University of British Columbia and University of California, Davis.

<sup>39</sup>J. Aizenman, "Foreign Direct Investment as a Commitment Mechanism in the Presence of Managed Trade," NBER Working Paper No. 4102, June 1992, and "Foreign Direct Investment, Employment Volatility, and Cyclical Dumping," NBER Working Paper No. 4683, March 1994.

<sup>40</sup>R. E. Lipsey, "Foreign Direct Investment in the United States: Changes Over Three Decades," NBER Reprint No. 1851, February 1994, and in *Foreign Direct Investment*, K. A. Froot, ed. Chicago: University of Chicago Press, 1993, pp. 113-170, and "Outward Direct Investment and the U.S. Economy," NBER Working Paper No. 4691, March 1994.

<sup>41</sup>M. Blomström and A. Kokko, "Home Country Effects of Foreign Direct Investment: Evidence from Sweden," NBER Working Paper No. 4639, February 1994.

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## Research Summaries

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### Recent Research on Economic Growth

Robert J. Barro

Economic growth has been a lively area of research since the mid-1980s. Important advances have been made in both theory and empirical analyses, and much of this progress has been reported on at NBER conferences on growth, which first took place in 1989.

My research over the last five years has focused on growth; the

main results are included in *Economic Growth*, coauthored with Xavier Sala-i-Martin and forthcoming this fall from McGraw-Hill.<sup>1</sup> Aimed at the level of first-year graduate students in economics, the book combines new results with expositions of theories from the 1950s through the 1990s.

To appreciate the importance of growth rates, start with the observation that the U.S. real per capita

GDP, measured in 1985 dollars, grew from \$2244 in 1870 to \$18,258 in 1990, or by 1.75 percent per year. This performance gave the United States the highest real per capita GDP in the world in 1990 (with the possible exception of the United Arab Emirates, an oil producer with a small population). If the U.S. growth rate had been just one percentage point per year less—that is, 0.75 percent per year—then the real per capita GDP in 1990 would have been \$5519, only

30 percent of the actual value. Then, instead of ranking first in the world in 1990, the United States would have ranked 37th out of 127 countries with data available. To put it another way, the U.S. real per capita GDP in 1990 would have been close to that in Mexico and Hungary, and would have been about \$1000 less than that in Portugal and Greece.

Alternatively, if the U.S. growth rate had been one percentage point per year higher—that is, 2.75 percent per year—then the real per capita GDP in 1990 would have been \$60,841, or 3.3 times the actual value. A real per capita GDP of \$60,841 is well outside the historical experience of any country and may, in fact, be infeasible. But, in any event, a continuation of the long-term U.S. growth rate of 1.75 percent per year implies that the United States would not attain a real per capita GDP of \$60,841 until the year 2059.

For 114 countries between 1960 and 1990 the average growth rate of real per capita GDP was 1.8 percent per year—nearly the same as the long-term U.S. rate. The range is -2.1 percent per year for Iraq to 6.7 percent per year for South Korea. Thirty-year differences in growth rates of this magnitude have enormous consequences for standards of living. South Korea raised its real per capita GDP from \$883 in 1960 (rank 83 out of 118 countries) to \$6578 in 1990 (rank 35 of 129), while Iraq lowered its real per capita GDP from \$3320 in 1960 (rank 23 of 118) to \$1783 in 1990 (rank 82 of 129).

In 1990, the mean of real per capita GDP for 118 countries was \$2737. The highest value—\$18,399 for the United States—was 65 times the lowest value—\$285 for Ethio-

pia. To understand why countries differ this much in standards of living requires knowing why they experience correspondingly sharp divergences in long-term growth rates. Even small differences in these growth rates, when cumulated over a generation or more, have much greater consequences for standards of living than the kinds of short-term business fluctuations that typically have occupied most

“Economic growth is the part of macroeconomics that really matters.”

of the attention of macroeconomists. To put it another way, if we can learn about government policy options that have even small effects on the long-term growth rate, then we can contribute much more to improvements in standards of living than has been provided by the entire history of macroeconomic analysis of countercyclical policy and fine-tuning. Economic growth is the part of macroeconomics that really matters.

Modern growth theory begins with the neoclassical model, as developed by Frank Ramsey (1928), Robert M. Solow (1958), Trevor W. Swan (1956), David Cass (1965), and Tjalling C. Koopmans (1965). A key prediction of these models—which has been exploited seriously as an empirical hypothesis only in recent years—is *conditional convergence*. The lower the starting level of real per capita GDP, relative to the long-run or steady-state position, the faster the growth rate.

The convergence property derives in the standard neoclassical model from the assumption of diminishing returns to capital: that is, economies that have less capital per worker (relative to their long-run capital per worker) tend to

have higher rates of return and higher growth rates. In other theories, which recognize the openness of economies, the convergence property reflects gradual diffusion of technology across economies, costs of adjustment for stocks of physical and human capital, and gradual flows of capital and labor across economies in response to differences in factor returns.

In the neoclassical model, convergence is conditional on country characteristics that affect the steady-state levels of capital and output per worker. For example, if a country has a greater willingness to save, a lower growth rate of population, or a higher level of the production function, then it grows faster for a given initial level of real per capita GDP. Extended versions of the theory and recent empirical studies demonstrate the importance of other sources of cross-country variation, such as government policies and starting stocks of human capital. The key point, however, is that the concept of conditional convergence—a basic property of the neoclassical growth model—has considerable explanatory power for economic growth across economies.

An absolute form of convergence applies if economies start from different positions but are otherwise similar. This pattern appears in the regional data for developed countries, such as the U.S. states, provinces of Canada, regions of several European countries, and prefectures of Japan (see Chapter 11 of *Economic Growth*; subsequent chapter citations also refer to this book). The poorer regions tend to grow faster than the rich ones, but the estimated speed of convergence is only 2–3 percent per year. As a consequence, it takes about a generation to elimi-

nate one-half of an initial gap in per capita incomes; for example, it took nearly a century for the per capita income of the typical U.S. southern state to come close to that of the other states.

A conditional form of convergence applies when economies are more heterogeneous: the growth rate of real per capita GDP is related negatively to the starting level after holding constant such variables as government policies, initial levels of human capital, the propensities to save and have children, and so on. This pattern applies for a sample of around 100 countries in 1960–90 (see Chapter 12),<sup>2</sup> but the estimated rate of convergence is only about 2 percent per year. This rate implies that it takes 35 years for a country to eliminate one-half of the gap between its initial real per capita GDP and its own long-run target value.

The empirical results (discussed in Chapter 12) show that a number of variables are significantly related to a country's per capita growth rate, once the starting level of real per capita GDP is held constant. Growth depends positively on the initial quantity of human capital in the form of educational attainment and health, negatively on the ratio of government consumption spending to GDP, and negatively on measures of distortions of markets and political instability. Although the ratio of gross investment to GDP is strongly positively correlated with the growth rate, much of this association appears to reflect the reverse impact of growth prospects on the attractiveness of investment, rather than the favorable effect on growth from exogenous variations in the willingness to save.

The cross-country evidence brings out a number of ways in which the government affects an economy's growth rate. Negative influences include the volume of consumption spending (and the associated level of taxation), distortions of international trade, and political instability. Positive influences involve the maintenance of institutions that sustain the rule of law, possibly policies that promote the development of financial institutions, and perhaps spending on some forms of public infrastructure. The empirical work shows that the overall package of policies matters a lot for growth and therefore can explain a good deal of the wide variations in standards of living across countries.

The neoclassical growth model also predicts that, in the absence of continuing improvements in technology, per capita growth eventually must cease. This prediction, which resembles those of Malthus and Ricardo, conflicts with empirical observation over the last century. The neoclassical growth theorists of the late 1950s and 1960s recognized this modeling deficiency and usually patched it up by assuming that technological progress

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“Growth depends positively on the initial quantity of human capital in the form of educational attainment and health, negatively on the ratio of government consumption spending to GDP, and negatively on measures of distortions of markets and political instability.”

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occurred in an exogenous manner. The obvious shortcoming of this approach is that the long-run per capita growth rate is then determined entirely by an element that is outside of the model: the rate of technological progress.

Recent theories of growth usually are referred to as *endogenous growth models* because, in one way or another, the long-run growth rate is determined by elements considered within the model. One line of this research—attributable to Paul M. Romer (1986), Robert E. Lucas, Jr. (1988), and Sergio T. Rebelo (1991)—built on work of Kenneth J. Arrow (1962) and did not really include a theory of technological change. In these models, discussed and extended in Chapters 4 and 5, growth may go on indefinitely because the returns to investment in a broad class of capital goods—which includes human capital—may not diminish as an economy develops.

The incorporation of theories of R and D and imperfect competition into the growth framework began with Romer (1990), and includes significant contributions by Philippe Aghion and Peter Howitt (1992) and Gene M. Grossman and Elhanan Helpman (1991, Chapters 3 and 4).<sup>3</sup> In these models, described and extended in Chapters 6 and 7, technological advance results from purposive R and D activity, and this activity is rewarded by some form of *ex post* monopoly power. If there is no tendency for the economy to run out of ideas, then the growth rate can remain positive in the long run. However, the rate of growth and the underlying amount of inventive activity tend not to be Pareto optimal, because of distortions related to the creation of new goods and methods of production. In these frameworks, the long-term growth rate depends on governmental actions, such as taxation, regulation, maintenance of law and order, provision of infrastructure services, and protection

of intellectual property rights. Therefore, the government has great potential for good or ill through its influence on the long-term rate of growth.

The recent research also includes models of the diffusion of technology. Whereas the analysis of discovery relates to the rate of technological progress in leading economies, the study of diffusion pertains to the manner in which follower economies share by imitation in these advances. Since imitation tends to be cheaper than innovation, the diffusion models—discussed and extended in Chapter 8—predict a form of conditional convergence that resembles the predictions of the neoclassical growth model.

Another key exogenous element in the neoclassical growth model is the growth rate of population. A higher rate of population growth lowers the steady-state level of capital and output per worker, and thereby tends to reduce the per capita growth rate for a given initial level of per capita output. However, the standard model does not consider the effects of per capita income and wage rates on population growth—the kinds of effects stressed by Malthus—and also does not take account of the resources used up in the process of childrearing. Another line of recent research, initiated by Gary S. Becker and Barro (1988) and discussed in Chapter 9, makes population growth endogenous by incorporating an analysis of fertility choice into the neoclassical model. The results are consistent, for example, with the empirical regularity that fertility rates tend to fall with per capita income over the main range of experience, but may rise with per capita income for the poorest countries. Chapter 9 also includes

analyses of migration and labor-leisure choice in the context of growth and convergence.

The clearest distinction between the growth theory of the 1960s and that of the 1980s and 1990s is that the recent research—included in *Economic Growth*—pays close attention to empirical implications and to the relationship between theory and data. Some of this applied perspective involves amplification of the empirical implications of the older theory, including the prediction of conditional convergence. Other analyses apply more directly to the recent theories of endogenous growth, including the roles of increasing returns, R and D activity, human capital, and the diffusion of technology.

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<sup>1</sup>The book incorporates the findings from NBER Working Papers, including: R. J. Barro, "A Cross-Country Study of Growth, Saving, and Government," No. 2855, February 1989; R. J. Barro and X. Sala-i-Martin, "Public Finance in Models of Economic Growth," No. 3362, May 1990, "Economic Growth and Convergence Across the United States," No. 3419, June 1990, "Economic Growth and Migration: A Japan—U.S. Comparison," No. 4038, March 1992, and "Quality Improvements in Models of Growth," No. 4610, January 1994; R. J. Barro, N. G. Mankiw, and X. Sala-i-Martin, "Capital Mobility in Neoclassical Models of Growth," No. 4206, November 1992; R. J. Barro and J.-W. Lee, "Losers and Winners in Economic Growth," No. 4341, April 1993, and "International Comparisons of Educational Attainment," No. 4349, April 1993; X. Sala-i-Martin, "Lecture Notes

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<sup>2</sup>The various datasets are discussed in Chapter 10. The national accounts figures, adjusted for deviations from purchasing power parity, are the R. Summers and A. Heston (1991) values (updated to version 5.5), which are distributed by the NBER. A more comprehen-

sive dataset, which includes the detailed figures on educational attainment constructed by R. J. Barro and J.-W. Lee (1993), are available from Ingrid Sayied, Economics Department, Harvard University.

<sup>3</sup>G. M. Grossman and E. Helpman's book incorporates results from several of their NBER Working Papers: "Endogenous Product Cycles," No. 2913, March 1989, "Growth and Welfare in a Small Open Economy," No. 2970, May 1989, and "Quality Ladders and Product Cycles," No. 3201, December 1989. Their book also incorporates results from several of their NBER Reprints: "Product Development and International Trade," No. 1458, October 1990, "Comparative Advantage and Long-Run Growth," No. 1494, January 1991, "Trade, Knowledge Spillovers, and Growth," No. 1566, August 1991, and "Quality Ladders in the Theory of Growth," No. 1567, August 1991.

## Financial Conditions and Macroeconomic Behavior

Mark Gertler

What role do financial factors play in business cycles? Many business economists and policymakers, including the chairman of the Federal Reserve Board, have cited "balance sheet conditions" as a contributing factor in both the 1990–1 recession and the extended period of stagnant growth that surrounded it. Underlying this view is the belief that unusually weak balance sheets of nonfinancial companies, depository institutions, and households were constraining spending. When Alan Greenspan spoke repeatedly of a "50-mile-an-hour headwind" that was interfering with the recovery, he had in mind these kinds of financial factors.

Much of my research has been aimed at trying to understand the links between financial conditions and macroeconomic performance. Eight years ago, Ben S. Bernanke and I developed a simple business

cycle framework in which endogenous fluctuations in borrowers' financial positions served to propagate the impact of exogenous disturbances to the economy.<sup>1</sup> We began with the idea that, for a significant class of borrowers, information and enforcement problems may drive the cost of uncollateralized external funds above the price of internal funds. Under these circumstances, borrowers' available supplies of collateral (broadly defined) and internal funds influence their spending and production decisions. In the aggregate, swings in borrowers' balance sheets over the cycle amplify fluctuations in spending and output. We referred to this propagation mechanism as a "financial accelerator."

One by-product of having financial conditions play a key role in the model is that the output dynamics are inherently nonlinear. Because the credit frictions bind across a wider cross section of bor-

rowers in bad times (when balance sheets are relatively weaker on average) than in good times, contractions are typically sharper than expansions. Broadly speaking, this kind of nonlinearity appears consistent with the data.

In addition to rationalizing a new kind of business cycle propagation mechanism, the model provides a formal basis for Irving Fisher's "Debt Deflation" theory of the Great Depression. To explain the severity of the Depression, Fisher cited the sharp decline in prices—largely unanticipated, in his view—that greatly reduced the net worth of the borrowing class by raising the real value of outstanding debts. In our framework, a contraction in borrower net worth curtails borrowers' access to credit, inducing a persistent downturn.

Our early paper emphasized how financial positions might influence the behavior of nonfinancial companies. In principle, these con-

ditions might influence other important classes of borrowers similarly, including (at least subsets of both) financial intermediaries and households. In our 1987 paper, we showed how a shortage of bank capital could induce a decline in lending by restricting banks' ability to attract uninsured deposits.<sup>2</sup> Many observers have maintained that this kind of phenomenon was particularly relevant during the recent capital crunch in banking.

Balance sheet effects on household spending are potentially quite important, in my view. Generally speaking, households face large spreads between borrowing and lending rates (after controlling for default probabilities), particularly for unsecured loans. In addition, some major household purchases, most importantly housing, are linked directly to the condition of household balance sheets by such features as downpayment requirements, up-front transactions costs, and minimum income standards. A recent example of a formal model in which household balance sheets influence housing demand is Edward C. Prescott.<sup>3</sup>

Our original theoretical framework was quite stark, designed mainly to make qualitative points. In subsequent work with Bernanke, with other coauthors, and by myself, I have enriched the institutional detail, in an attempt to move the theory closer to the data.<sup>4</sup> Some very recent work by others that makes progress along these lines includes Nobuhiri Kiyotaki and John Moore, Owen Lamont, and Jonas Fisher.<sup>5</sup>

In recent years I have turned my attention to the empirical side of the issue. Attempting to identify and quantify a financial accelerator mechanism in the data is a difficult

task. Because existing datasets generally were not well suited for the problem, a large part of my effort has involved constructing an entirely new dataset.

One way to appreciate the obstacles present is to understand what will not work. Perhaps contrary to conventional wisdom, it is not possible to identify a financial accelerator effect in the data either by examining the forecasting pow-

“Balance sheet effects on household spending are potentially quite important . . .”

er of credit aggregates or, more generally, by studying the lead/lag pattern between credit aggregates and output.

In the Bernanke–Gertler framework, for example, technology shocks are the only exogenous disturbances in the model. Credit conditions shape the dynamic response of output to these shocks, but they are not a primitive causal force. Thus, even though financial factors play an important role in output dynamics, a credit aggregate would have no marginal forecasting power for output, once technology shocks are included in the information set. A similar observation applies if monetary policy shocks also were a primitive driving force. Once indicators of monetary policy shocks are accounted for in the information set, we should not expect credit aggregates to have any marginal forecasting power.

Assessing the timing relationships between credit aggregates and output also is not helpful. The theory does not predict that credit aggregates should lead output over the cycle. Indeed, there is likely to be a countercyclical component to the demand for credit. Both households and firms may desire to bor-

row to smooth the impact of transitory variation in their incomes over the cycle. For example, as cash flows decline at the onset of a recession, firms may want to borrow to finance the buildup of unsold inventories and other fixed short-term obligations.<sup>6</sup> Firms thus may increase their borrowing temporarily in the early stages of the downturn, even if they have imperfect access to credit. (The credit market

frictions do not imply that firms are unable to borrow. Rather, they imply only that they will borrow less than they would otherwise, relative to a setting of perfect markets.) As a consequence, credit aggregates may lag rather than lead the cycle, even when financial conditions are shaping output dynamics. The Kiyotaki–Moore framework provides a nice formalization of this point.

I have approached the identification problem by exploiting a combination of both cross-sectional and temporal implications of the theory. The cross-sectional implications suggest sorting borrowers according to their relative access to credit, and then looking for differences in behavior implied by the theory, after controlling for nonfinancial sources of heterogeneity. Microdata studies of liquidity constraints commonly have employed this identification strategy, both for the case of households (for example, Stephen Zeldes)<sup>7</sup> and for the case of firms (for example, Stephen Fazzari, R. Glenn Hubbard, and Bruce Peterson).<sup>8</sup> The temporal implications suggest examining how the behavior of borrowers may vary over different phases of the business cycle. For many borrowers, credit market frictions are more likely to impinge on behavior around recessionary periods, when

their balance sheets are weak, than around booms, when they are more likely to have adequate supplies of collateral assets and internal funds.

Hubbard and I used a panel dataset of individual manufacturing firms to identify a financial accelerator effect on investment.<sup>9</sup> We exploited both the cross-sectional and temporal implications that I have just described. We first grouped firms according to their relative access to credit, using dividend behavior as a criterion. We then estimated investment equations that allowed for differences in behavior across groups of firms and across different phases of the business cycle. We found that, after allowing for non-financial influences, liquidity mattered more for the firms that were more likely to be constrained a priori. Further, the influence of liquidity on investment for these firms was stronger around recessionary periods than during booms, in keeping with the theory. Several recent studies have found similar evidence of an asymmetric impact of liquidity constraints over the cycle.<sup>10</sup>

While analysis of panel data provides a useful way to approach the identification problem, there are some limitations to existing studies. First, the samples are typically not representative of the relevant population of borrowers. This makes it difficult to draw inferences about the importance for aggregate activity. Second, the data typically are available only at the annual frequency. Therefore, dynamics at the business cycle frequency are hard to capture.

For these reasons, Simon Gilchrist and I decided to construct a panel dataset using information

available from the Quarterly Financial Reports (QFR) published by the Census Bureau. The advantages of the QFR are that it has reasonably comprehensive cross-sectional information for several important sectors, including manufacturing, and that it is available at the quarterly frequency over a long period, from 1958:Q1 to the present. The main disadvantage of the QFR is that, until recently, it disaggregated only by size class. However, within the last year, we obtained the raw

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“Ten quarters following a shift to tight money, small firms are typically down 17 or 18 percentage points relative to trend (measured by sales behavior), while large firms are down only about 6 or 7 percentage points.”

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firm-level data that the QFR uses to construct the size class aggregates. Currently we are working with this data.

My initial investigation with Gilchrist involved comparing the cyclical behavior of the size class aggregates for manufacturing firms.<sup>11</sup> Our goal was to develop a set of basic facts to guide future research. We first reaggregated the firm size class variables into two categories: “small-firm” and “large-firm.” For guidance, we used available information on financing patterns. Under our classification scheme, small firms rely heavily on intermediated credit. Further, they obtain about 80 percent of their short-term credit from banks and do not issue commercial paper. Large firms primarily obtain credit directly from the open market. And, they account for nearly all of the outstanding issues of commercial paper by manufacturers. Our small-firm category also squares reasonably well

with the evidence from microdata studies: the largest firms in our small-firm category are similar in size to the median of the “liquidity-constrained” firms in the typical panel data study. Overall, by our criteria, small firms account for about 30 percent of total manufacturing sales.

We then traced the impact of a shift to tight monetary policy on the time-series behavior of small firms relative to large firms.<sup>12</sup> We examined sales, inventories, and short-term debt. Overall, small firms contract substantially relative to large firms. Ten quarters following a shift to tight money, small firms are typically down 17 or 18 percentage points relative to trend (measured by sales behavior), while large firms are down only about 6 or 7 percentage points.

The differences in inventory behavior and short-term borrowing are more striking. As their sales begin to decline, large firms appear to borrow to smooth production. Their inventories initially rise. So does their short-term borrowing. In contrast, after a brief period, small firms quickly shed inventories and contract their short-term borrowing. The difference in the percentage cumulative drop in inventories across the size classes is roughly 20 points, about twice the difference in the drop in sales. The difference in the cumulative drop in short-term debt is even greater: between 25 and 30 points. (Interfirm trade credit does not appear to adjust to offset the relative drop in short-term borrowing by small firms.<sup>13</sup> Trade credit to small manufacturing firms drops at about the same pace as short-term borrowing. Further, net trade credit [payables minus receivables] does not rise.)

To try to sort financial from possible nonfinancial explanations for our results, we performed two different kinds of exercises.

First, we presented evidence of asymmetries in small-firm inventory/sales dynamics over the cycle. In booms, small firms appear to smooth production, much like large firms. It is mainly

in recessions that small firms shed inventories quickly as sales drop. Large firms do not exhibit this kind of asymmetry. Second, we estimated some simple inventory equations that permitted technological coefficients to vary across the size classes. We found that balance sheet positions significantly influenced inventory investment for small firms, but not for large firms. In the estimation, we controlled for the possibility that movements in balance sheets may simply be signaling profits.

The most definitive way to pin down the influence of financial effects, of course, is to use microdata. As I mentioned earlier, we are now analyzing the QFR firm-level data. The first stage has involved mainly descriptive analysis, in order to understand the data. In a recent paper with Bernanke, we showed that the cyclical differences across the size classes that emerged in our earlier work largely remain intact, even after controlling for industry differences.<sup>14</sup> We also showed that similar cyclical differences emerge when we use a financial indicator to sort firms (specifically, a measure of bank dependency), rather than size.

While we have focused on inventory behavior, several recent studies have found that very similar differences in cyclical behavior across the size classes emerge for both investment and employment.<sup>15</sup>

The share-weighted differences between small and large firms in both sales and inventory fluctua-

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"In booms, small firms appear to smooth production, much like large firms. It is mainly in recessions that small firms shed inventories quickly as sales drop."

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tions are significant relative to the manufacturing total. It is possible, however, that production could be shuffled from one class of firms to another without any impact on aggregate output. However, as with any "sectoral shocks" theory, aggregate effects will emerge if either: factors are not perfectly mobile in the short run; outputs are not perfectly substitutable; or workers and owners are not perfectly insured against the sectoral shocks. On the other hand, our numbers may understate the true aggregate impact if there are aggregate demand externalities (see, for example, Lamont) or factor-market linkages. This suggests that a better understanding of the connection between industrial structure and the business cycle is necessary.

To pin down the aggregate importance of the kinds of phenomena I have been describing, it is also crucial to examine data outside the manufacturing sector. While firms with imperfect access to credit (by my criteria) account for roughly 30 percent of manufacturing output and employment, they may account for somewhere between 40 to 50 percent of total output. And they are heavily concentrated in some important cyclical sectors, such as retail and wholesale trade and construction. For example, firms that do not have a rating to issue publicly traded debt account for roughly 80 percent of output, employment, and inventories in re-

tail trade. This is especially significant, given the importance of retail inventories in the business cycle.

More generally, it is important not to fall into the trap of thinking about the manufacturing sector in isolation of other sectors. Firms in trade, construction, and services, for example, purchase goods from manufacturers. To the extent that financial conditions influence the spending of these firms, they may contribute to manufacturing fluctuations. In a similar vein, it is important not to ignore the household sector. Gathering evidence on the impact of financial positions on household spending, particularly spending on housing and other durable goods, is potentially a very important task.

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<sup>1</sup>B. S. Bernanke and M. Gertler, "Agency Costs, Collateral, and Business Fluctuations," *American Economic Review* 79, 1 (March 1989), pp. 14-31.

<sup>2</sup>B. S. Bernanke and M. Gertler, "Banking and Macroeconomic Equilibrium," in *New Approaches to Monetary Economics*, W. Barnett and K. J. Singleton, eds. Cambridge, U.K.: Cambridge University Press, 1987.

<sup>3</sup>E. C. Prescott, "Effects of Unanticipated Monetary Policies: An Unanticipated Finding," *University of Minnesota, mimeo*, 1993.

<sup>4</sup>B. S. Bernanke and M. Gertler, "Financial Fragility and Economic Performance," *Quarterly Journal of Economics* (February 1990), pp. 87-114; M. Gertler, "Financial Capacity and Output Fluctuations in an Economy with Multiperiod Financial Relationships," *Review of Economic Studies* (July 1992), pp. 455-472; M. Gertler and R. G. Hubbard, "Corporate Financial Policy, Taxation, and Macroeconomic Risk," *Rand Journal of Economics* 24 (Summer 1993), pp. 286-303; and M. Gertler and K. Rogoff, "North-South Lending and Endogenous Domestic Capital Market Inefficiencies," *Journal of Monetary Economics* 26,2 (September 1989).

<sup>5</sup>N. Kiyotaki and J. Moore, "Credit Cycles," mimeo, 1993; O. Lamont, "Corporate Debt Overhang and Macroeconomic Vulnerability," MIT, mimeo, 1993; and J. Fisher, "Credit Market Imperfections and the Heterogeneous Response of Firms to Monetary Shocks," mimeo, 1994.

<sup>6</sup>For evidence of a countercyclical component to short-term business borrowing, see: M. Gertler and S. Gilchrist, "The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence," *Scandinavian Economics Journal* (1993), pp. 43-64, and "The Cyclical Behavior of Short-Term Business Lending: Implications for Financial Propagation Mechanisms," *European Economic Review* (1993); and L. J. Christiano, M. Eichenbaum, and C. Evans, "What Happens After a Monetary Policy Shock? Evidence from Flow of Funds," mimeo.

<sup>7</sup>S. Zeldes, "Consumption and Liquidity Constraints: An Empirical Investiga-

tion," *Journal of Political Economy* (1990), pp. 275-298.

<sup>8</sup>E. C. Prescott, "Effects of Unanticipated Monetary Policies: . . .," *op. cit.*, and S. Fazzari, R. G. Hubbard, and B. Peterson, "Financing Constraints and Corporate Investment," *Brookings Papers on Economic Activity 1* (1988), pp. 141-195.

<sup>9</sup>M. Gertler and R. G. Hubbard, "Financial Factors in Business Fluctuations," in *Financial Market Volatility*, Kansas City, Mo.: Federal Reserve Bank of Kansas City Annual Symposium, 1988, pp. 33-71.

<sup>10</sup>A. K. Kashyap, O. Lamont, and J. C. Stein, "Credit Conditions and the Cyclical Behavior of Industries," *Quarterly Journal of Economics*, forthcoming, and S. Oliner and G. Rudebusch, "Is There a Broad Credit Channel?" *Federal Reserve Board of Governors*, mimeo.

<sup>11</sup>M. Gertler and S. Gilchrist, "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms,"

*Quarterly Journal of Economics* (May 1994).

<sup>12</sup>Credit conditions may influence the transmission of monetary policy via the financial accelerator. For a discussion, see M. Gertler and S. Gilchrist, "Monetary Policy, Business Cycles. . .," *op. cit.* A complementary way is via the "lending channel." See A. K. Kashyap and J. C. Stein, "Monetary Policy and Bank Lending," in *Monetary Policy*, N. G. Mankiw, ed. Chicago: University of Chicago Press, 1994.

<sup>13</sup>See M. Gertler and S. Gilchrist, "The Role of Credit Market Imperfections. . .," *op. cit.*

<sup>14</sup>B. S. Bernanke, M. Gertler, and S. Gilchrist, "The Financial Accelerator and the Flight to Quality," mimeo, December 1993.

<sup>15</sup>S. Oliner and G. Rudebusch, "Is There a Broad Credit Channel? . . .," *op. cit.*, and S. Sharpe, "Financial Market Imperfections, Firm Leverage, and the Cyclical Employment," *American Economic Review*, forthcoming.

## Retirement Analysis, Social Security, and Pensions

Alan L. Gustman\* and  
Thomas L. Steinmeier†

Our research efforts over the past decade have focused on three central issues in the economics of aging: retirement, Social Security, and pensions. We have examined how retirement is defined and have contributed explanations for the wide differences in retirement behavior among individuals. We have investigated the variety of incentives observed in pension plans and the sharp trends in these incentives over time. We also have considered related public policy questions pertaining to Social Security, pension regulation, and retirement income policies.

In addressing these topics, other important behavioral and institutional questions arise. How do fixed working hours affect labor

supply and retirement choice? What is the nature of the long-term employment relationship and what are the consequences for pensions, retirement, and other dimensions of labor market outcomes? How well informed are individuals about Social Security and their own pensions, and how does misinformation affect retirement behavior?

Much of our work revolves around a structural retirement model. This model incorporates our findings on the proper specification of the opportunities governing the choice of retirement outcomes, and it has been used to analyze a variety of public policies.

Consider first the question of how to define retirement. Our work suggests that it is not fully informative, and sometimes is misleading, to treat retirement as an either/or choice. Retirement behavior is most

properly treated as involving labor market flow among at least three states, including partial retirement. Transition rates into and out of these states determine the stock of full-time workers, partially retired, and fully retired.<sup>1</sup>

Theory suggests that if individuals could choose their hours in a job, most would gradually reduce work hours as they grow old. However, the majority of workers proceed directly from full-time work to retirement. The reason is: most jobs do not have flexible hours. In order to work part time, most workers must change jobs.<sup>2</sup> Our work shows that these hours constraints are pervasive. Most individuals are not free to retire on their main job by smoothly reducing their hours of work from full time to zero, while remaining with their employer. As a result, they

face what is effectively an all-or-nothing decision about retirement from that job. In order to retire partially, they must take a new job and forgo the specific training accumulated over a long period on the main job. Consequently, partial retirement jobs offer much lower wages than can be earned on the main job.<sup>3</sup>

Not only are constraints on hours common, but they are important in estimating retirement models. A retirement analysis that ignores hours constraints could suggest that workers are less subject to the influence of retirement incentives and retirement programs than is in fact the case. We also emphasize that the response of partial retirement to incentives may be substantially different from the response of full retirement to those same incentives. Studies that assume the two effects are identical may misinterpret the relationship of retirement to pension and Social Security incentives.<sup>4</sup>

A central focus of our work has been to estimate a structural retirement model that allows for these features of the labor market, and to apply that model to related policy analysis.<sup>5</sup> The model includes different wage offers for full-time work and for partial retirement work, as well as incentives from both Social Security and pensions. In a recent paper, we also have included the analogous incentives created by retiree health insurance.<sup>6</sup> We also adjust the analysis to reflect the effects of the income tax. We have estimated the model using data from the Retirement History Study (RHS) and the National Longitudinal Study (NLS) of Mature Women.

Our simulations indicate that the major peaks of retirement are a result of the incentives created by pension plans, and by discontinu-

ities in the Social Security benefit formula. Other than components of compensation, important influences on retirement include health status, difficulty of the job associated with major occupation, and interaction with the spouse's retirement choice.<sup>7</sup> Over time, there has been

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“Other than components of compensation, important influences on retirement include health status, difficulty of the job associated with major occupation, and interaction with the spouse's retirement choice.”

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a trend toward defined-contribution plans and toward lower early retirement ages in the remaining defined-benefit plans. Our simulations suggest that these changes account for between one-quarter and more than half of the trend toward lower retirement ages observed between the mid-1970s and the mid-1980s.<sup>8</sup>

Policy simulations may use datasets other than the one from which the preferences are estimated, as long as the datasets are nationally representative and contain enough information to calculate the opportunity set.<sup>9</sup> For example, we have analyzed retirement policies using the 1983 and 1989 Survey of Consumer Finances (SCF), using preferences estimated with data from the RHS or the NLS.<sup>10</sup> The SCF has the advantage of including matched and detailed pension plan descriptions provided by the employer.

We have simulated the effects on retirement and on program costs of a number of major past and potential changes in Social Security, including changes in actuarial adjustments of benefits and in the earnings test. One projection is that the 1983 Social Security reforms, once fully realized, will increase full-time work at age 65 by almost 6 percentage points, or about

25 percent of those still working full time at that age. The overall effect of the 1983 reforms will be to postpone retirement on average by just a few months, given the relatively small number of individuals still working at later ages. However, for those in good health, the in-

crease in work effort is enough to compensate for about half the decline in benefits associated with raising the Social Security normal retirement age to 67. Of the major changes adopted in the 1983 reforms, our simulations indicate that the strongest effects are created by increasing the delayed retirement credit from 3 percent to 8 percent.<sup>11</sup>

We also estimate that the effects of immediately abolishing the retirement earnings test would increase the number of full-time males 65 to 69 who are working by 3.5 percent and would postpone the average retirement age by only about a month or so.<sup>12</sup> Abolishing the retirement earnings test and thereby accelerating the 1983 reforms will have a net cost of about \$40 billion, although this figure is sensitive to whether individuals who get a better than fair actuarial return are willing to wait to collect their benefits. Currently, as part of a Bureau project on privatization of Social Security, we are using this model to investigate the potential effects of various privatization schemes.

A related analysis also has been used to investigate the effects of retiree health benefits on retirement behavior. In contrast to some other studies, but consistent with the work of David A. Wise and his colleagues, we find that retiree health insurance has only a small effect on retirement behavior.<sup>13</sup>

We also have fit a version of our structural retirement model to data for faculty from 30 leading universities and colleges, and have then used simulations to project the effects of the changes in mandatory retirement provisions in higher education. Our findings suggest that raising the mandatory retirement age from 65 to 70 doubles the number of full-time employed faculty in that age range, and abolishing mandatory retirement, as the law just did this past January, has a potentially large additional effect on the fraction working full time who are over age 70 at these leading institutions. Moreover, we also find that policies designed to encourage earlier retirement among these faculties are not likely to be very cost effective.<sup>14</sup>

The prospects for future work on retirement behavior and the role of pensions are very exciting. There are a large number of fundamental behavioral questions that remain unanswered, and the emergence of rich datasets can provide the detailed information required to resolve many of the outstanding puzzles.<sup>15</sup> Researchers now have the opportunity to combine information from employer-reported pension plans with the longitudinal data from nationally representative surveys in which full-time and partial retirement work activities are observed. We already have investigated retirement incentives and behavior using the pension data from the first of these surveys: the 1983 SCF.<sup>16</sup> These surveys not only allow more precise measurement of retirement incentives than are possible with self-reported pension data, but also allow us to investigate the effects of the imperfect understanding of pensions by respondents. Our current work on an NBER Project for the National Insti-

tute on Aging is considering this issue, as well as investigating how changes in pensions, as reported in the 1983 and 1989 SCF, shape retirement behavior.<sup>17</sup>

We also have had the good fortune to take part in the design of two retirement surveys, using the opportunity to incorporate information that will be used to answer questions raised by our work and that of others. A broad group of talented researchers, under the direction of Tom Juster, have been designing the Health and Retirement Survey (HRS), which will be

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“ . . . raising the mandatory retirement age from 65 to 70 doubles the number of full-time employed faculty in that age range . . . ”

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central to retirement research over the next decade. We have had the opportunity to chair working groups on pensions, retirement, and data matching, and to participate as members of the Steering Committee of this survey. Preliminary analysis of the first wave of the HRS data suggests how useful these data will be in resolving outstanding puzzles in retirement analysis.<sup>18</sup> In addition, we have played a role in converting the National Longitudinal Survey of Mature Women to a retirement survey, incorporating questions parallel to those in the HRS. Matched data on pensions of husbands and wives will be available shortly for both surveys, and records indicating employer-provided descriptions of health insurance and Social Security earnings history will be available for the HRS within the next year.

Our related work and that of others on pension plans and their determination also raise questions about the potential endogeneity of

pensions in retirement models. Provisions of many pension plans make sense only in the context of long-term employment contracts, in which compensation does not clear the market in each period.<sup>19</sup> The implicit contracts underlying these arrangements shape various dimensions of worker behavior, and underlie the firm's obligation to provide various types of insurance, sometimes increasing pensions well after the worker has retired.<sup>20</sup> Most importantly, however, as part of an implicit contract, the incentives created by pension benefit formulas must conform to worker preferences. Our research suggests that some motivations of firms for their pensions, such as the claim that firms use backloaded pensions to regulate turnover behavior early in the employment relationship, have been misunderstood or exaggerated.<sup>21</sup> Moreover, trends in pensions suggest that retirees may not have been able to predict what their pension incentives would look like at retirement time.<sup>22</sup> Nevertheless, it clearly is in the firm's interest to design pensions that conform with the retirement preferences of their workers.<sup>23</sup> One of our aims is to bring together the major strands of retirement and pension research in order to address questions about the exogeneity of retirement policies and programs, an issue that can be understood only in the context of a joint analysis of the behavior of workers and firms.

Related major unanswered questions that we are investigating pertain to the integration of savings models with retirement models,<sup>24</sup> and to the relationship of pensions and retirement behavior to incomes in retirement.<sup>25</sup> All structural retirement models assume that the savings market is operating perfect-

ly. If that were the case, contrary to some claims, surprises in pension and Social Security wealth increments at program start-up, and changes in wealth as a consequence of policy revisions, should have little lasting effect on retirement trends, leaving portions of the sharp trends to earlier retirement over the past four or five decades a continuing mystery. Fundamental to retirement research and to understanding the determination of retirement incomes is a better understanding of the operation of liquidity constraints and the interactions of these constraints with pension determination, and the influence of pensions and Social Security on retirement. Investigating these and related issues will keep us busy for some time to come.

*\*Alan L. Gustman is an NBER Research Associate and Loren M. Berry Professor of Economics at Dartmouth College.*

*†Thomas L. Steinmeier is a professor of economics at Texas Tech University.*

<sup>1</sup>A. L. Gustman and T. L. Steinmeier, "Modeling the Retirement Process for Policy Evaluation and Research," *Monthly Labor Review* (July 1984). *Greatly complicating matters, and raising issues that have yet to be fully resolved in the retirement literature, the flows among retirement states are not unidirectional.*

<sup>2</sup>A. L. Gustman and T. L. Steinmeier, "Minimum Hours Constraints and Retirement Behavior," *Contemporary Policy Issues* (April 1983).

<sup>3</sup>A. L. Gustman and T. L. Steinmeier, "The Effects of Partial Retirement on the Wage Profiles of Older Workers," *Industrial Relations* (Spring 1985).

<sup>4</sup>Even in reduced-form equations, estimating the relationship between retirement and conventional measures of incentives from Social Security and pension programs, such as the "deltas" in benefit accrual associated with continued work, requires consistent definition of retirement and depends on the treatment of partial retirement. A. L. Gustman and T. L. Steinmeier, "Partial Retirement and the Analysis of Retirement

Behavior," *Industrial and Labor Relations Review* (April 1984).

<sup>5</sup>A. L. Gustman and T. L. Steinmeier, "A Structural Retirement Model," *Econometrica* (May 1986).

<sup>6</sup>A. L. Gustman and T. L. Steinmeier, "Employer-Provided Health Insurance and Retirement Behavior," forthcoming, *Industrial and Labor Relations Review*, (October 1994).

<sup>7</sup>Among the specific findings with regard to the influence of these factors on retirement are: Blue collar workers have about a 4 percent lower participation rate between ages 58 and 72 than do white collar workers, associated mainly with a higher reservation wage for work. In its effect on preferences for work, ill health is equivalent to aging by about three years. Eliminating the influence of the wife's retirement status on the husband could extend his retirement age by four or five months. A. L. Gustman and T. L. Steinmeier, "A Disaggregated Structural Analysis of Retirement by Race, Difficulty of Work, and Health," *Review of Economics and Statistics* (August 1986), and "Retirement in a Family Context: A Structural Model for Husbands and Wives," NBER Working Paper No. 4629, January 1994.

<sup>8</sup>P. M. Anderson, A. L. Gustman, and T. L. Steinmeier, "Trends in Labor Force Participation and Retirement," mimeo, 1994.

<sup>9</sup>The RHS has been used to estimate a structural model with a nationally representative sample of males born between 1906 and 1911, in which the dependent variable includes the states of full retirement, partial retirement, and full-time work as the three relevant outcomes. The model for husbands and wives that we fit to data from the NLS Survey of Mature Women is used to explain only the transition out of full-time work for each spouse. These women were born between 1923 and 1937.

<sup>10</sup>A. L. Gustman and T. L. Steinmeier, "Changing the Social Security Rules for Work After 65," *Industrial and Labor Relations Review* (July 1991), "Employer-Provided Health Insurance and Retirement Behavior," 1994, op. cit., and P. M. Anderson, A. L. Gustman, and T. L. Steinmeier, "Trends in Labor Force Participation and Retirement," 1994, op. cit.

<sup>11</sup>A. L. Gustman and T. L. Steinmeier, "The 1983 Social Security Reforms and

*Labor Supply Adjustment of Older Individuals in the Long Run*," *Journal of Labor Economics* (April 1985).

<sup>12</sup>A. L. Gustman and T. L. Steinmeier, "Changing the Social Security Rules for Work After 65," 1991, op. cit.

<sup>13</sup>A. L. Gustman and T. L. Steinmeier, "Employer-Provided Health Insurance and Retirement Behavior," 1994, op. cit.

<sup>14</sup>A. L. Gustman and T. L. Steinmeier, "Pension Incentives, Mandatory Retirement, and Retirement Behavior in Higher Education," *Economics of Education Review* (September 1992), and "The Effects of Pensions and Retirement Policies on Retirement in Higher Education," *American Economic Review, Papers and Proceedings* (May 1991).

<sup>15</sup>A. L. Gustman and O. S. Mitchell, "Pensions and Labor Market Activity: Behavior and Data Requirements," in *Pensions and the Economy*, Z. Bodie and A. Munnell, eds. Philadelphia: University of Pennsylvania Press, 1992.

<sup>16</sup>A. L. Gustman and T. L. Steinmeier, "An Analysis of Pension Benefit Formulas, Pension Wealth, and Incentives from Pensions," *Research in Labor Economics* (1989).

<sup>17</sup>A. L. Gustman and T. L. Steinmeier, "Pension Trends, Retirement Incomes and Behavior," in process.

<sup>18</sup>A. L. Gustman, O. S. Mitchell, and T. L. Steinmeier, "Retirement Research Using the Health and Retirement Survey," paper delivered at HRS Early Results Workshop, Institute for Survey Research, University of Michigan, 1993.

<sup>19</sup>A. L. Gustman, O. S. Mitchell, and T. L. Steinmeier, "The Role of Pensions in the Labor Market: A Survey of the Literature," *Industrial and Labor Relations Review* (April 1994).

<sup>20</sup>Following a sample from the Panel Study of Income Dynamics, we find that during 1971 to 1987, yearly pension benefits for those who had already retired were increased by over 45 percent of the increase in the cost of living, which for this period was substantial. A. L. Gustman and T. L. Steinmeier, "Cost of Living Adjustments in Pensions," in *As the Workforce Ages: Costs, Benefits, and Policy Challenges*, O. S. Mitchell, ed., 1993.

<sup>21</sup>A. L. Gustman and T. L. Steinmeier, "Pension Portability and Labor Mobility: Evidence from the Survey of Income and Program Participation," *Journal of*

Public Economics (March 1993), and "Pension Incentives and Job Mobility," final report to the Upjohn Institute, 1994.

<sup>22</sup>"The Stampede Toward Defined-Contribution Pension Plans: Fact or Fiction?" *Industrial Relations* (1992); and P. M. Anderson, A. L. Gustman, and T.

L. Steinmeier, "Trends in Labor Force Participation and Retirement," 1994, *op. cit.*

<sup>23</sup>A. L. Gustman, O. S. Mitchell, and T. L. Steinmeier, "The Role of Pensions in the Labor Market: A Survey of the Literature," 1994, *op. cit.*

<sup>24</sup>This research is part of a project enti-

tled "Wealth, Savings, and Financial Security," a study for the National Institute on Aging in process at the University of Michigan, with F. Thomas Juster as principal investigator.

<sup>25</sup>"Projecting Pension Incomes of the Old and Oldest Old," in process for the NBER under a grant from the NIA.

## NBER Profile: Robert J. Barro

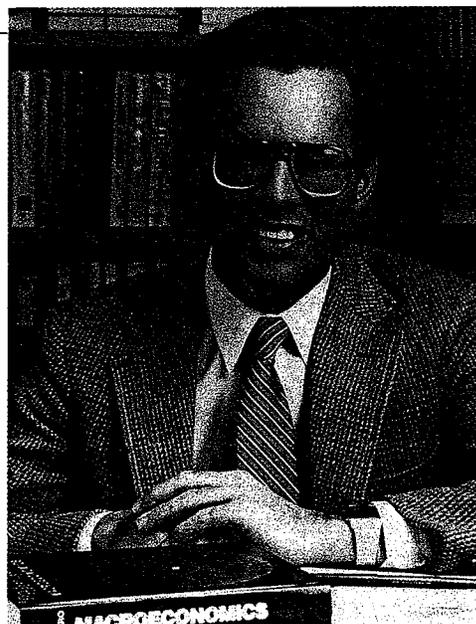
Robert J. Barro was born in New York City in 1944, moved to Los Angeles for high school, received a B.S. in physics from California Institute of Technology in 1965, and earned a Ph.D. in economics from Harvard University in 1970. He is currently a professor of economics at Harvard, a research associate of the NBER, and a fellow of the Hoover Institution at Stanford University.

Barro is also a contributing editor of *The Wall Street Journal*. His books include *Modern Business Cycle Theory*; *Money, Expectations, and Business Cycles*; *Macroeconomic Policy*; and the widely used textbook, *Macroeconomics*, which recently appeared in its fourth U.S. edition. He has published exten-

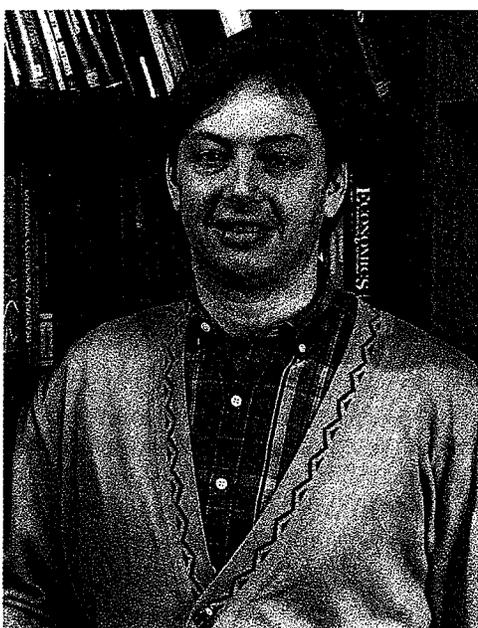
sively in professional journals, and his new book, *Economic Growth*, will appear in fall 1994.

Barro is a fellow of the American Academy of Arts & Sciences and the Econometric Society, and has served as an officer of the American Economic Association. Before joining the Harvard faculty, he taught at the University of Rochester, the University of Chicago, and Brown University.

Barro likes to ski, play tennis and blackjack, and spend time in the home on Cape Cod that his wife, Judy, helped to design. He has four children: Jennifer is a medical student at Stanford; Jason will be a first-year graduate student in economics at Harvard; Lisa is an undergraduate at Harvard; and Josh



is the best nine-year-old economist on the planet.



## NBER Profile: Mark Gertler

Mark Gertler has been a research associate of the NBER since 1990. He is also a professor of economics at New York University and, beginning in September, will serve as an academic consultant at the Federal Reserve Bank of New York.

Gertler received a B.A. from the University of Wisconsin and a Ph.D. from Stanford University. He has taught at Cornell University, the University of Wisconsin, Stanford, and Columbia. His work on macroeconomics, monetary policy, and financial markets has been

published in numerous professional journals and in the NBER Working Paper series. He is also an associate editor of the *Journal of Money, Credit and Banking*.

Gertler and his wife, Cara Lown, live in Manhattan. She is an economist at the Federal Reserve Bank of New York. Lately, Gertler has been spending his free time watching the Knicks and preparing for fatherhood. He and his wife are expecting a baby girl to arrive at about the time of publication of this issue of the *NBER Reporter*.

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## NBER Profile: Alan L. Gustman

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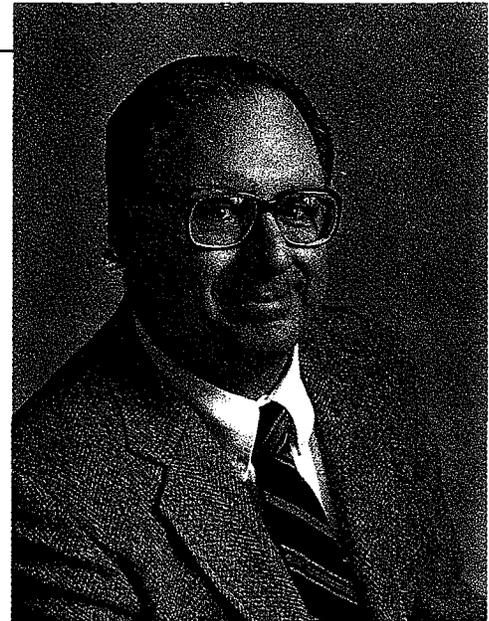
Alan L. Gustman, the Loren M. Berry Professor of Economics at Dartmouth College, has been an NBER research associate since 1979. He is a member of the Bureau's Programs in Labor Studies and Aging.

Gustman received his B.A. from City College of New York, and his Ph.D from the University of Michigan. He joined the Dartmouth faculty in 1969, but served as a special assistant for economic affairs in the U.S. Department of Labor in 1976-7.

In addition to his own research, Gustman has worked with F. Thomas Juster and others on the National Institute of Aging's Health and Retirement Study (HRS). The

HRS will be a fundamental source of data for researchers on retirement and aging for decades to come. He also served with the Technical Advisory Panel of the National Longitudinal Survey, and has worked to turn the National Longitudinal Survey of Mature Women into a retirement survey.

Gustman and his wife, Janice, have three children: Sam graduated from the University of Michigan and is a computer engineer; Evelyn graduated from Boston University and is a special education teacher; and Mara will be a freshman at Brandeis University this fall.



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## Conferences

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### The Economics of New Products

An NBER Conference on Research in Income and Wealth, "The Economics of New Products," was held on April 29-30 in Williamsburg, VA. The organizers were Timothy F. Bresnahan, NBER and Stanford University, and Robert J. Gordon, NBER and Northwestern University. The program was:

**Walter Oi**, University of Rochester, "Welfare Implications of a New Product (the Air Conditioner)"

Discussant:  
Sherwin Rosen, University of Chicago

**Shane Greenstein**, NBER and University of Illinois, "From Superminis to Supercomputers: Estimating Surplus in the Computing Market"

Discussant:  
Erik Brynjolfsson, MIT

**Ernst R. Berndt**, NBER and MIT; **Linda Bui**, Boston University; and **David Reiley** and

**Glen Urban**, MIT, "The Roles of Marketing, Product Quality, and Price Competition in the Growth and Composition of the U.S. Anti-Ulcer Drug Industry"

Discussant:  
Valerie Suslow, NBER and University of Michigan

**William D. Nordhaus**, NBER and Yale University, "Do Real Output and Real Wage Measures Capture Reality? The History of Light Suggests Not"

Discussant:  
Charles R. Hulten, NBER and University of Maryland

**Paul Armknecht**, **Walter Lane**, and **Kenneth Stewart**, Bureau of Labor Statistics, "New Products and the U.S. Consumer Price Index"

Discussant:  
Frank Wykoff, Pomona College  
**Jerry A. Hausman**, NBER and MIT, "Valuation of New Goods Under Perfect and Imperfect Competition"

Discussant:

Timothy F. Bresnahan

**Alice Nakamura** and  
**Masao Nakamura**, University of  
Alberta, "The New Goods  
Problem from the Perspective of  
Price Index Making in Japan and  
Canada"

Discussant:

Robert Summers, University of  
Pennsylvania

**Brent Moulton** and

**Marshall Reinsdorf**, Bureau of  
Labor Statistics, "The Construction  
of Basic Components of Cost of  
Living Indexes"

Discussant:

W. Erwin Diewert, NBER and  
University of British Columbia

**Robert C. Feenstra**, NBER and  
University of California, Davis,  
and

**Clinton R. Shiells**, International  
Monetary Fund, "Bias in U.S.

Import Prices and Demand"

Discussant:

Zvi Griliches, NBER and Harvard  
University

**Joel Mokyr** and

**Rebecca Stein**, Northwestern  
University, "Science, Health, and  
Household Technology: The  
Effect of the Pasteur Revolution  
on Consumer Demand"

Discussant:

John Brown, Clark University

**Oi** describes the welfare benefits and costs that result from the discovery and development of new products and new techniques. Among the subjects he investigates are: the costs of reducing process innovations; the costs of producing inventions and innovations; the diffusion and realization of the gains from an innovation; the impact of the air conditioner; and the effects of knowledge, novelty, and change on new products. He finds that competition results in too few new products when: 1) there is a positive cost of inventing the new product; 2) the sum of consumer and producer surpluses is used to value the invention; and 3) a patent monopoly is used to reward the inventor.

**Greenstein** considers whether the most significant source of innovation in the computer industry was the extension of capabilities to new levels or a decline in the price of existing capabilities. The thesis is that many innovations that created economic value between the late 1960s and the 1970s are associated with extensions in computing capabilities. This thesis goes to the heart of

the relationship between measured price declines and the inferred improvement in economic welfare. Greenstein does not claim that price decreases were unimportant to buyers, but rather that "constant quality" price decreases tell an incomplete story about the welfare improvements realized by buyers.

H2-antagonist prescription drugs represent a revolution in ulcer therapy, as well as a multibillion-dollar market that has existed only since 1977. **Berndt, Bui, Reiley, and Urban** examine the sales and market-

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"Moulton and Reinsdorf suggest that using geometric mean component indexes might reduce the CPI's growth rate by 0.3 to 0.5 percent per year."

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ing of these drugs, distinguishing between "industry expanding" and "rivalrous" marketing efforts. They find that the impact of marketing that is designed to increase industry sales declines as the number of products increases. By contrast, marketing designed to increase market share depreciates by about 40 percent per year. Price, quality,

and order-of-entry effects also are significant.

Historical studies of the growth in real wages and output depend upon the accurate measurement of the price trends of goods and services. Over long periods of time, the consumption bundle has changed profoundly, and most of today's consumption includes items that were not produced, and in some cases not even conceived, at the beginning of the nineteenth century. **Nordhaus** tackles the issue of the quantitative significance of the qualitative change in consumption by choosing a single service—lighting—for which the service characteristic—illumination—is invariant. He estimates changes in lighting efficiency as far back as Beijing man half a million years ago, and constructs a "true" price index back to the beginning of the last century. A comparison of the true price of light with a conventional price of light indicates that conventional price indexes overstate price growth, and therefore understate output growth, by a factor between 1300 and 2500 since 1827. This finding suggests that the "true" growth of real wages and real output may

have been understated significantly during the period since the Industrial Revolution.

The U.S. Consumer Price Index (CPI) attempts to measure the average change in the prices paid by urban consumers for a fixed market basket of goods and services. As such, conceptual problems exist in the construction of indexes when new goods and services are introduced into the consumer marketplace. **Armknecht, Lane, and Stewart** define three types of new products and discuss how each is handled in the U.S. CPI: 1) replacement items, such as the current year's automobile models; 2) supplemental items, such as new brands of cereal; and 3) entirely new items, those not closely tied to any previously available item. Although these third products may satisfy a long-standing consumer need in a novel way, they do not fit into any established CPI category, and their value is not taken into account in the current price index system.

**Hausman** begins by reviewing the theory of cost-of-living indexes and demonstrates how new goods should be included. His primary example is the introduction of a new cereal brand by General Mills in 1989: Apple-Cinnamon Cheerios. Apple-Cinnamon Cheerios are closer to other kinds of Cheerios than they are to some other cereal, such as Shredded Wheat. Hausman finds that virtual price is about twice the actual price of Apple-Cinnamon Cheerios, and that there is a substantial increase in consumer surplus.

**Nakamura and Nakamura** investigate the treatment of new goods, and particularly of electronic computing equipment, in

both the Canadian Industrial Product Price Index (IPPI) and the Japanese Domestic Wholesale Price Index (D-WPI). Both Canada and Japan have moved to hedonic methods of pricing computers in their official producer price statistics. This causes qualitative differences from goods that are priced using the matched models approach. Their findings indicate that the earlier inclusion of computers in either the Canadian ISPI (before the IPPI) or the Japanese D-WPI would have had relatively modest effects on the movements of these indexes and relevant aggregative subcomponents.

It is difficult to aggregate the prices for a narrow category of goods to form a component of the

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“. . . the aggregate import price index is biased upward by about 1.5 percentage points.”

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U.S. CPI. Consumer goods generally are sold in many varieties and at many outlets at dispersed prices that tend to oscillate. Turnover in populations of outlets and varieties makes the linking of indexes representing up-to-date market baskets a necessity, but linking Laspeyres indexes leads to upward drift when prices oscillate. In a plausible model, geometric mean indexes avoid virtually all of this bias. **Moulton and Reinsdorf** suggest that using geometric mean component indexes might reduce the CPI's growth rate by 0.3 to 0.5 percent per year.

**Feenstra and Shiells** measure the potential bias in the U.S. import price index attributable to the appearance of new product varieties, or new foreign suppliers, and determine the effect of this bias on the estimated income elasticity of

import demand. Existing import price indexes are based on a sample of products from importing firms. The authors argue that if the share of import expenditure on the sampled products is falling over time, this will lead to an upward bias in the measured index. Using a correction based on the falling expenditure share on sampled countries, they find that the income elasticity of aggregate U.S. import demand is reduced from 2.5 to 1.7, or about halfway to unity. Their estimates suggest that the aggregate import price index is biased upward by about 1.5 percentage points annually.

**Mokyr and Stein** propose that one key to the decline in mortality is essentially technological in nature. In a simple model of consumer behavior, the household can be viewed as “producing” health for its members, based on a certain set of notions that the household

has about what causes disease. These ideas changed radically in the closing decades of the nineteenth century as a result of growing knowledge that dictated certain “recipes” to the household regarding food, hygiene, personal and medical care, and so on. Mokyr and Stein discuss the origins of this new knowledge and how households were induced to change their behavior. They conclude that much of the credit for the increase in life expectancy goes to household decisionmakers, in addition to scientists, physicians, and civil servants.

These papers and their discussions will be published by the University of Chicago Press. The availability of the volume will be announced in a future issue of the *NBER Reporter*.

## URC: Monetary Policy

Academic economists from all over the United States and policy-makers from the Federal Reserve System met in Cambridge on April 29 and 30 for an NBER-Universities Research Conference on Monetary Policy. NBER Research Associates Laurence M. Ball of Johns Hopkins University and Robert B. Barsky of the University of Michigan organized the program.

**Tamim Bayoumi**, International Monetary Fund, and

**Joseph Gagnon**, Federal Reserve System, "Taxation and Inflation: A New Explanation for International Capital Flows"

Discussant:

Robert B. Barsky

**Michael Belongia**, University of Mississippi, "Measurement Matters: Recent Results from Mon-

etary Economics Reexamined"

Discussant:

N. Gregory Mankiw, NBER and Harvard University

**David Lebow**,

**David Stockton**, and **William Wascher**, Federal Reserve System, "Inflation, Nominal Wage Rigidity, and the Efficiency of Labor Markets"

Discussant:

Erica Groshen, Barnard College

**Judith A. Chevalier**, NBER and Harvard University, and

**David S. Scharfstein**, NBER and MIT, "Capital Market Imperfections and Countercyclical Mark-ups" (NBER Working Paper No. 4614)

Discussant:

Susanto Basu, University of Michigan

**Marcio Garcia**, PUC-Rio,

"Avoiding Some Costs of Inflation and Crawling Toward Hyperinflation"

Discussant:

Eliana A. Cardoso, NBER and Tufts University

**Paul Beaudry**, Boston University, and

**Makoto Saito**, University of British Columbia, "Estimating the Effects of Monetary Shocks: An Evaluation of Different Approaches"

**Jeffrey A. Miron**, NBER and Boston University, "Empirical Methodology in Macroeconomics: Explaining the Success of Friedman and Schwartz"

Discussants:

Christopher Sims, NBER and Yale University, and

James H. Stock, NBER and Harvard University

According to **Bayoumi** and **Gagnon**, the current system of taxation of nominal interest implies that the aftertax cost of capital and the return to saving in each country are strongly and negatively correlated with the rate of inflation. It follows that a country's net foreign asset position ought to be correlated negatively with its long-run inflation rate. The magnitude of these effects is potentially large. For OECD countries, inflation rates are good predictors of net foreign assets, even after controlling for business cycles, demographic factors, and government borrowing. These results imply that the existing distribution of net foreign assets may reflect mainly tax distortions, rather than an optimal allocation of world savings.

Although monetary economists generally agree that financial inno-

vations have created a variety of near-monies and thereby complicated measurement of the money stock, empirical research continues to use reported, simple sum monetary aggregates. Because simple sum indexes cannot internalize the type of pure substitution effects associated with changing interest rate differentials and portfolio adjust-

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“. . . the shape of the distribution of wage changes is largely unaffected by the rate of inflation.”

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ments, it is likely that inferences about the effects of money on economic activity may depend on the choice of monetary index. **Belongia** replicates five recent studies that have challenged an aspect of the "conventional wisdom" about money and its effects. In four of

the five cases, he finds, the qualitative inference in the original study is reversed when a simple sum index of money is replaced by a Divisia index of the same asset collection. In the fifth case, the results are somewhat mixed.

Do nominal wages adjust upward in response to a positive shift in demand, but not downward in response to a negative shift?

That type of rigidity implies that workers who would acquiesce to reductions in real wages brought about by increases in the price level would resist those same wage

reductions if caused by a decline in nominal wages. **Lebow**, **Stockton**, and **Wascher** examine data on changes in individuals' wages and find little evidence for the existence of such downward rigidities in nominal wages. They find the shape of the distribution of wage

changes is largely unaffected by the rate of inflation. About 7.5 percent of the observations in their sample show no wage change. But the authors estimate that at most about one-quarter of that spike represents truncation associated with downward nominal rigidities.

**Chevalier and Scharfstein** present a model in which markups are countercyclical because of imperfections in the capital market. During recessions, liquidity-constrained firms try to boost short-run profits by raising prices to cut their investments in market share. The authors provide evidence from the supermarket industry to support this theory. They show that during regional and macroeconomic recessions, the most financially constrained supermarket chains raise their prices relative to the less financially constrained chains.

Brazil has been experiencing inflation levels well above 1000 percent a year since 1988 without entering the classical hyperinflation

“Two elements play key roles in differentiating the Brazilian case from other hyperinflationary experiences: indexation and the provision of a reliable *domestic* currency substitute.”

path. Two elements play key roles in differentiating the Brazilian case from other hyperinflationary experiences: indexation, and the provision of a reliable *domestic* currency substitute. **Garcia** claims that the existence of this domestic currency substitute is the main source of both the inability of the Brazilian central bank to fight inflation and the unwillingness of Brazilians to face the costs of such a fight.

**Beaudry and Saito** compare several methods for estimating the effects of monetary innovations on

key macroeconomic variables. In particular, they make explicit the properties that a measure of monetary policy must satisfy in order to identify the effects of monetary shocks. They find that none of the currently popular methods of identifying the effects of monetary shocks are supported by the data.

**Miron** discusses the success of Friedman and Schwartz's *A Monetary History of the United States, 1867-1960*. He argues that the book's approach to identification, its treatment of economic theory, its style of presenting empirical results, and its presentation of new data have been the keys to its popularity. Miron suggests, however, that full appreciation of the virtues of the narrative approach inevitably makes one pessimistic about how much macroeconomists can learn about the world.



## NBER/OECD Fiscal Affairs Joint Meeting: Public Policies That Affect Private Saving

A group of NBER economists presented new research findings to a number of high-ranking tax policy officials from the OECD nations at a joint NBER/OECD meeting in Paris on May 18 and 19. The meeting, organized by James M. Poterba of MIT, director of the NBER's public economics program, and Jeffrey Owens, head of the Fiscal Affairs Directorate of the OECD, focused on how public policies affect private saving. In the following papers, research teams described the ex-

perience of five OECD nations that have adopted policies to encourage household saving.

**James M. Poterba**, "401(k) Plans and Personal Saving in the United States"

**Stephen F. Venti**, NBER and Dartmouth College, and

**David A. Wise**, NBER and Harvard University, "RRSPs and Saving in Canada"

**Takatoshi Ito**, NBER and Hitotsubashi University, and

**Yukinobu Kitamura**, Bank of

Japan, "Tax Incentives and Personal Saving in Japan"

**James Banks**,

**Richard Blundell**, and

**Andrew Dilnot**, Institute for Fiscal Studies, United Kingdom, "Savings Incentives and Personal Saving in the United Kingdom"

**R. Alessie**,

**Arie Kapetyn**, and

**E. Klijn**, Tilburg University, "Mandatory Pensions and Personal Saving in the Netherlands"

**Poterba** describes the U.S. experience with 401(k) retirement savings plans. He summarizes the rapid expansion of these plans during the 1980s, and presents evidence suggesting that most 401(k) contributions represent net new saving for households participating in the plans.

**Venti** and **Wise** examine the effects of Registered Retirement Savings Plans (RRSPs) in Canada. These plans, which have been available since the early 1970s, enable households to defer taxes on current income and on accruing capital income. Venti and Wise show that the availability of RRSP accounts has increased private saving in Canada. They also find that households are unlikely to withdraw funds from these accounts, even though such withdrawals do not incur any penalties.

**Ito** and **Kitamura** report on the Japanese experience surrounding the virtual elimination of postal saving accounts, a tax-favored saving vehicle, in 1988. The authors

show that even though the tax burden on interest income rose when these accounts were phased out, nominal interest rates declined at roughly the same time. Moreover, the interest rate change largely offset the decline in aftertax returns associated with the tax reform, making it difficult to draw inferences from this experience on the link between rates of return and saving.

**Banks, Blundell, and Dilnot** present evidence on a set of policies that the United Kingdom has adopted to spur private saving. These include Personal Equity Plans, Personal Pension Plans, and Tax-Exempt Special Saving Accounts. The authors show that each of these plans attracted substantial resources after they were introduced. At least in the first few years after their introduction, however, it appears that a high fraction of the assets placed in these accounts were drawn from other components of household net worth.

**Alessie, Kapetyn, and Klijn** analyze the link between government-provided pensions and private saving in the Netherlands. Their evidence, based on household data from the late 1980s, shows the importance of the social security system in the retirement income security of Dutch households, although it does not permit a precise estimate of how such government-provided retirement benefits affect private saving.

In addition to the authors, participants at the meeting included: Philippe Brunel, Ministry of the Economy, France; Martin Feldstein, NBER and Harvard University; Geraldine Gerardi, U.S. Department of the Treasury; Keith Horner, Department of Finance, Canada; Mervyn A. King, NBER and Bank of England; Bill McNie, Board of Inland Revenue, United Kingdom; Mark Robson, OECD; Ian Stewart, Chairman, Fiscal Affairs Working Party 2; and Leo van den Ende, Ministry of Finance, Netherlands.

## Market Failures and Public Policy

The NBER's Transatlantic Public Economics Seminar, or TAPES, on "Market Failures and Public Policy" took place on May 19-21 in Italy. Organizers Roger H. Gordon, NBER and the University of Michigan, and Domenico Siniscalco, University of Torino, planned the following program:

**Kevin A. Hassett**, Columbia University;

**Jason G. Cummins**, Federal Reserve Board; and

**R. Glenn Hubbard**, NBER and University of Chicago, "Firm Investment, Capital Market Efficiency, and International Tax Reforms"

Discussants:

Alan J. Auerbach, NBER and University of Pennsylvania, and Michael Haliassos, University of Cyprus

**Michael Haliassos**, and **Costas Christou**, University of Maryland, "How Do Students Finance Human Capital Accumulation? The Choice Between Borrowing and Work"

Discussants:

Harvey S. Rosen, NBER and Princeton University, and Giuseppe Bertola, NBER and University of Torino

**David M. Cutler**, NBER and Harvard University, "Market

Failure in Small Group Health Insurance"

Discussants:

Jeffrey K. MacKie-Mason, NBER and University of Michigan, and Hugo A. Hopenhayn, Universitat Pompeu Fabra

**Harvey S. Rosen**;

**Douglas Holtz-Eakin**, NBER and Syracuse University; and

**John Penrod**, Princeton University, "Health Insurance and the Supply of Entrepreneurs"

Discussants:

Roger H. Gordon, and Arik Levinson, University of Wisconsin

**Donald O. Parsons**, Ohio State University, "Imperfect Tagging in Social Insurance Programs"

Discussants:

David M. Cutler, and  
Onorato Castellino, University of  
Torino

**Torsten Persson**, NBER and  
Institute for International  
Economic Studies, and  
**Guido Tabellini**, University of  
Brescia, "Federal Fiscal  
Constitutions: Risk Sharing, and  
Redistribution"

Discussants:

Jean-Jacques Laffont, Université des  
Sciences Sociales, Toulouse, and  
Frederick van der Ploeg,  
University of Amsterdam

**Hugo A. Hopenhayn** and  
**Juan Pablo Nicolini**, Universitat  
Pompeu Fabra, "Optimal  
Unemployment Insurance and  
Employment History"

Discussants:

Guido Tabellini and  
Donald O. Parsons

**Jean-Jacques Laffont** and

**Jean Tirole**, Université des  
Sciences Sociales, Toulouse,  
"Pollution Permits and  
Compliance Strategy"

Discussants:

A. Lans Bovenberg, University of  
Tilburg, and  
Yeganeh H. Farzin, Georgetown  
University

**Arik Levinson**, "Environmental  
Regulations and Manufacturers'  
Location Choices: Systematic  
Evidence from the Census of  
Manufacturers"

Discussants:

Hilary Sigman, NBER and Univer-  
sity of California, Los Angeles,  
and  
Christiano Antonelli, University of  
Torino

**Yeganeh H. Farzin**, "Optimal  
Pricing of Environmental and  
Natural Resource Use with Stock  
Externalities"

Discussants:

Domenico Siniscalco, and

Henn Tulkens, Université  
Catholique de Louvain and CORE  
**A. Lans Bovenberg** and  
**Frederick van der Ploeg**,

"Optimal Taxation, Public Goods,  
and Environmental Policy with  
Involuntary Unemployment"

Discussants:

Carlo Carraro, University of  
Venice, and  
Kevin A. Hassett

**Carlo Carraro**;  
**Marzio Galeotti**, Bocconi  
University, Milano; and  
**Massimo Gallo**, GRETA

Associati, Venezia,  
"Environmental Taxation and  
Unemployment: Some Evidence  
on the 'Double Dividend'  
Hypothesis in Europe"

Discussants:

James M. Poterba, NBER and MIT,  
and

John Whalley, NBER and  
University of Western Ontario

**Hassett, Cummins, and Hub-  
bard** use firm-level panel data from  
13 countries to explore the extent  
to which fixed investment responds  
to tax reforms. They find significant  
investment responses to tax  
changes in 11 of the 13 countries.  
There is only limited evidence that  
capital market imperfections are an  
important determinant of invest-  
ment, though.

Student loan programs, which  
have been used in several countries  
for promoting redistribution and  
growth, recently have become par-  
ticularly important, since fiscal re-  
straint has created a widening gap  
between tuition fees and grants. At  
the same time, fiscal imbalances  
have put such programs under  
scrutiny and have strengthened the  
case for restructuring and curtailing  
loans programs. Given the taxpayer  
cost and political relevance of stu-

dent loans, it is important to under-  
stand who benefits primarily from  
such programs, how they are used  
by students in conjunction with  
work opportunities, and to what  
extent support from grants and  
from relatives influences the  
work/loan "portfolio" chosen. **Hal-  
iassos** and **Christou** study the rel-  
evance of student characteristics  
(such as race, sex, age, student sta-  
tus, and marital status) and of the  
amounts of support provided by  
grants, parents, spouse, and other  
relatives for the portfolio of loans  
and of work chosen by students.

Typically, health insurance pre-  
miums depend at least in part on  
the previous costs of the insuring  
firm, a factor termed "experience  
rating." This link between health  
status and future premiums raises  
concerns of market failure, since it  
limits the ability of firms to insure

the price at which they can pur-  
chase insurance in future years.  
**Cutler** analyzes the economic fac-  
tors that influence experience rat-  
ing. He demonstrates first that pre-  
miums at the 90th percentile of the  
experience rating distribution are  
2-1/2 times greater than premiums  
at the 10th percentile of the distri-  
bution. This difference does not  
appear to be caused by the gen-  
erosity of benefits or the demo-  
graphic composition of the firm.  
**Cutler** then argues that experience  
rating is a natural outcome of mar-  
kets where both firms and insurers  
know each firm's expected costs,  
and where there is no ability for  
firms or insurers to commit to long-  
term contracts. In such a situation,  
firms with high demand for inter-  
temporal insurance will choose  
community-rated policies, while  
firms with low demand for inter-

temporal insurance will choose more experience-rated policies. Public policies that subsidize the uninsured may increase the amount of experience rating, by lowering expected health payments if costs are very large. Finally, Cutler finds evidence that firms with high-wage employees and low turnover have less premium variability than firms with low-wage employees or high turnover, but no evidence that public sector health care provision affects the amount of premium variability.

A number of commentators have suggested that the absence of portable health insurance may impede the decision to leave a job and start a new firm, so that the provision of universal health insurance would enhance entrepreneurship in America. To determine whether this view is correct, **Rosen, Holtz-Eakin, and Penrod** compare wage-earners who make a transition to self-employment over a given time with their counterparts who do not. They find that the current health insurance system does not affect the propensity to leave wage employment and strike out on one's own.

**Parsons** derives the optimal benefit structure of an earnings insurance program when a characteristic, or "tag," imperfectly identifies those unable to work. With two-sided tagging or classification error, the optimal program involves a dual work incentive structure, with a consumption differential that is sufficient to induce the able in each group to work. There are relatively more generous payments to both nonworkers and workers tagged unable-to-work than to untagged workers. Parsons concludes with a few remarks on the implications of his analysis for the benefit structure

of the U.S. Social Security disability system.

**Persson and Tabellini** study the political and economic determinants of regional public transfers. They take the notion of a region (or state in a federation) as a primitive entity, given by historical or

“ . . . the current health insurance system does not affect the propensity to leave wage employment and strike out on one's own.”

geographical circumstances. Each region controls a local fiscal policy instrument that redistributes among local residents under regional majority rule. They focus not so much on these intraregional policy choices as on how interregional transfers are shaped by alternative fiscal constitutions. By a fiscal constitution, they mean a set of fiscal instruments, which govern—directly or indirectly—the extent of interregional transfers, as well as a procedure for the collective choice of these fiscal instruments.

**Hopenhayn and Nicolini** characterize the optimal insurance contract between a risk-neutral principal and a risk-averse agent who faces job uncertainty, in the presence of those incentive problems. The key feature of the environment is that the probability of finding a new job is an increasing function of the effort the agent makes. The main goal of the paper is to develop a general theoretical framework in which to analyze the optimal unemployment insurance design problem. This framework can be applied to many countries to create more efficient ways of providing unemployment insurance and to minimize the program budgets.

**Laffont and Tirole** analyze the impact of spot and futures markets

for tradable pollution permits on the potential polluters' compliance decisions. Polluters can buy permits, invest in pollution abatement, or else stop production or outsource. They show that stand-alone spot markets induce excessive investment. The introduction of a futures market reduces this incentive to invest, but is not the optimal way to control pollution. A menu of options on pollution rights, possibly coupled with intertemporally bundled sales, yields higher economic welfare.

**Levinson** uses establishment-level data to examine the effect of differences in the stringency of state environmental regulations on location choice. Unlike previous work in this area, which has focused on particular industries or sets of plants and on one or two measures of environmental regulatory stringency, this study uses a broad range of industries and measures of stringency. The results show that differences in environmental regulations do not affect the location choices of most manufacturing plants systematically.

Use of depletable resources involves the resource depletion itself and the accumulation of pollution beyond a certain critical level. **Farzin** addresses the optimal timing of pollution control strategy. Among his counterintuitive results are that, even if for an initial period there is going to be no sign of any environmental damage whatsoever, the optimal strategy still requires pollution abatement to begin immediately, and to occur at increasingly higher rates over that period. The case of greenhouse warming illustrates the quantitative importance of accounting for the shadow externality costs of fossil fuel depletion and carbon accumulation in

delaying global warming, and the sensitivity of the optimal strategy to key policy variables.

**Bovenberg** and **van der Ploeg** derive the implications of increased concern for the environment for the optimal provision of public goods, tax structure, environmental policy, and involuntary unemployment. Their framework has no lump-sum taxes or subsidies, and labor supply is rationed because of a rigid consumer wage. A shift toward "greener" preferences will

boost employment if: labor is a better substitute for polluting resources than the fixed factor; the profit tax is low; and the production share of the fixed factor is large. If initial concern for the environment is small, then public consumption may rise as well.

**Carraro, Galeotti, and Gallo** develop a new computational general equilibrium model to assess the macroeconomic consequences of adopting unilateral and multilateral carbon tax policies in the Eu-

ropean Community. The model emphasizes the potential gains in employment that might be associated with "revenue recycling," using revenues from a carbon tax to subsidize labor. The authors present new evidence on the extent to which such carbon tax policies can generate a "double dividend," that is, a simultaneous improvement in environmental quality and a reduction in unemployment.

These papers will be published in a special issue of the *Journal of Public Economics*.

## Bureau News

### Spring Meeting of the Program on Development of the American Economy

On April 23, about 30 members and guests of the NBER's Program on the Development of the American Economy met in Cambridge. The program, organized by Claudia Goldin of the NBER and Harvard University, was:

**Janet Currie**, NBER and University of California, Los Angeles, and

**Joseph P. Ferrie**, NBER and Northwestern University, "Strikes

and the Law in the United States, 1880-1900"

**Margaret Levenstein**, NBER and University of Michigan, "Mass Production Conquers the Pool: Firm Organization and the Nature of Competition in the Nineteenth Century"

**Dora L. Costa**, NBER and MIT, "Health and Labor Force Participation, 1900-91"

**Arthur Grinath**, University of

Maryland;

**Richard Sylla**, NBER and New York University, and

**John J. Wallis**, NBER and University of Maryland, "Debt, Default, and Revenue Structure: The Debt Crisis and American State Governments in the 1840s"

**Naomi R. Lamoreux**, NBER and Brown University, and

**Kenneth L. Sokoloff**, NBER and University of California, Los Angeles, "Patents and the Market for Technology in the Late Nineteenth- and Early Twentieth-Century United States"

The unprecedented labor strife in the last decades of the nineteenth century occurred at a time of considerable variation in labor law across states. **Currie** and **Ferrie** attempt to use states' economic characteristics to explain these differences, and to relate the variation in strike activity across states to differences in their legal environments. Using data on more than 11,000 labor disputes between 1880 and 1894, they find that states with more capital per worker, larger foreign-born populations, and a

history of greater strike activity adopted laws more favorable to labor and failed to adopt legal devices or laws unfavorable to labor. States with laws more favorable to labor had fewer political strikes, less employer resistance to strikes, and lower strike costs, although these developments came at a cost to labor, since such states also lost more jobs after strikes than states with laws less favorable to labor.

In the bromine, salt, and bleach markets during the late nineteenth century, producers used a variety

of strategies to cope with the increased competition associated with increased market integration. In all three cases, **Levenstein** observes, the initial response was to promote cooperation among producers to increase prices, restrict output, and divide up markets. In the bromine and salt industries, these cooperative actions took the form of formal contracts. In the bleach industry, price setting and market division agreements were informal. These cooperative schemes created disincentives to the adop-

tion of mass production techniques, and limited information flows between customers and producers. Dow Chemical Company at first cooperated with the pool, but also invested profits in production facilities and corporate organization. These investments allowed it to develop higher-quality, customer-specific products that limited the effectiveness of the pool's punishment mechanism: price competition.

**Costa** examines how the relationship between health and labor supply among older men has changed between 1900 and 1991. Using weight-adjusted-for-height as a proxy for health, she finds that in both 1900 and 1985-91, there was a U-shaped relationship between health and the relative risk of non-participation in the labor force. Because men in 1900 were extremely lean—so lean that they faced an elevated mortality risk compared to men today—if they had enjoyed the health of men today, their labor force participation rates, and thus GNP, would have been higher. But, differences in ab-

solute rates of participation in the labor force suggest that improve-

“ . . . improvements in health have led not only to greater productivity, but also to an increased demand for leisure.”

ments in health have led not only to greater productivity, but also to an increased demand for leisure.

Debts incurred by states to finance internal improvements during the 1820s and 1830s led to debt crises in the early 1840s that included nine defaults and four repudiations. **Grinath, Sylla, and Wallis** use revenue structure to explain whether states borrowed, the extent to which they borrowed, and whether they defaulted. Older states had a variety of revenues: investment income, business taxes, and property taxes. If they defaulted, it was from an aversion either to having a property tax or to raising it when they could have done so. Newer states' choices were more limited. They relied almost entirely on property tax revenues, which were higher per person than in the

older states. It was not politically possible for these states to raise property taxes, so they borrowed extensively to finance improvements. When the projects failed as investments, they were forced into default.

**Lamoreux and Sokoloff**

argue that a market for technology evolved in late nineteenth- and early twentieth-century America. It developed first in such areas as New England, where per capita patenting rights were historically high, and then spread with higher levels of patenting to other regions of the country. It was especially important in sectors of the economy that employed the most complex and capital-intensive technologies. Patentees who assigned away their inventions increasingly were differentiated from other patentees by their inventive productivity, suggesting that improved techniques of intermediation were important in mobilizing the resources needed to undertake inventive activity, and also in encouraging individuals with the requisite skills to specialize in invention.

## Workshop on Macroeconomic History

An NBER Workshop on Macroeconomic History, organized by Jeffrey A. Miron, NBER and Boston University, and Christina D. Romer, NBER and the University of California, Berkeley, took place in Cambridge on May 6. The program was:

**Timothy W. Guinnane**, Yale University.

**Harvey S. Rosen**, NBER and Princeton University, and

**Kristen L. Willard**, Princeton University, “Turning Points in the Civil War: Views from the Greenback Market”

Discussant:

David N. Weil, NBER and Brown University

**William D. Nordhaus**, NBER and Yale University, “Do Real Outputs and Real Wage Measures Capture Reality? The History of Light Suggests Not” (See “The Economics of New Products” in the “Conferences” section of this issue of the *NBER Reporter*.)

Discussant:

William B. English, Federal Reserve System

**Christopher Hanes**, University of Pennsylvania, “Changes in the

Cyclical Behavior of Nominal Prices, 1869-1990”

Discussant:

Robert J. Gordon, NBER and Northwestern University

**Richard S. Grossman**, Wesleyan University, “The Shoe That Didn't Drop: Explaining Banking Stability During the Great Depression”

Discussant:

Ben S. Bernanke, NBER and Princeton University

**Stanley Fischer**, NBER and MIT, and

**Michael Lee**, MIT, “On the Shortage of Cash During Hyperinflations”

Discussant:  
Eugene N. White, NBER and  
Rutgers University

**Richard A. Highfield,**  
**Maureen O'Hara,** and  
**Bruce Smith,** Cornell  
University.

"Do Open Market Operations  
Matter? Theory and Evidence  
from the Second Bank of the  
United States"

Discussant:  
Stefan Oppers, University of  
Michigan

In early 1862, the U.S. government began issuing Greenbacks, a legal tender currency that was not convertible into gold. Speculators understood that the probability of eventual redemption of Greenbacks into gold depended on the Union Army's military fortunes and other events that affected the total cost of the war. To serve the speculative interest in gold, a market emerged for trading Greenbacks for gold dollars, in which the market price of a Greenback reflected the public's perceptions of future war costs. **Guinnane, Rosen,** and **Willard** use daily quotations of the gold price of Greenbacks to identify a set of dates during the Civil War that market participants regarded as turning points. In some cases, these dates coincide with events familiar from conventional historical accounts of the war. In other instances, however, market participants reacted strongly to events that historians have not viewed as very significant.

Existing studies of changes in cyclical price behavior have failed to take account of the historical shift in the composition of output, from primary products to more fin-

ished goods. Using a new price index and a simple Keynesian model, **Hanes** shows that apparent differences between the prewar (1869–1914) and postwar (1947–90) periods reflect differences in the time pattern of demand shocks. The wage- and price-setting process may not have changed at all.

**Grossman** explains the unusual stability exhibited by the banking systems of Britain, Canada, Czechoslovakia, Denmark, Lithuania, the Netherlands, Spain, Sweden, and several other countries during the Great Depression. He considers three possible explanations for the stability: macroeconomic policy and performance; the structure of the commercial banking system; and the actions of a lender of last resort. Using data from 25 countries across Europe and North America, Grossman finds that macroeconomic policy—especially exchange rate policy—and banking structure, but not lender of last resort, were systematically responsible for banking stability.

The shortage of cash typically observed in hyperinflations is peculiar, given the massive increases in

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"Using data from 25 countries across Europe and North America, Grossman finds that macroeconomic policy—especially exchange rate policy—and banking structure . . . were systematically responsible for banking stability."

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the quantity of money typically associated with them. The cash shortage is partly an imbalance among the different components of the money stock. In particular, it reflects technical difficulties in printing and distributing notes as fast as central banks or commercial banks

can create deposits. But available data from Germany provide mixed support for this view, suggesting that imbalances are not the entire story. In Germany, the hyperinflation led to a shortage of private bank credit, as high and low nominal rates prompted banks to reduce loan supply and shift into more secure, relatively illiquid assets. Despite generally negative real rates, central bank credit seemed unable to provide sufficient liquidity, especially toward the end of the period. However, **Fischer** and **Lee** conjecture that accelerating inflation was the main culprit, advancing with a lead over accommodative money and credit creation, and wiping out liquid balances faster than the central bank could create more credit.

The quantity theory of money asserts that permanent changes in the quantity of money accomplished through open market operations either will cause proportional long-run changes in prices and exchange rates or, under fixed exchange rates, will produce offsetting movements in other components of the money supply. The real bills doctrine asserts that such open market activity will produce *no* price level or exchange rate effects. **Highfield, O'Hara,** and **Smith** use the "golden age" of the Second Bank of the United States to contrast these two viewpoints empirically. They conclude that the data support the implications of the real bills doctrine.



## NBER Labor Economists Meet in Cambridge

The NBER's Program in Labor Studies, directed by Richard B. Freeman of NBER and Harvard University, met in Cambridge on May 13 to discuss the following papers:

**Renee M. Landers**, Boston College,

**James B. Rebitzer**, MIT, and

**Lowell J. Taylor**, Carnegie-Mellon University, "Rat Race Redux: Adverse Selection in the Determination of Work Hours"

**Patricia M. Anderson**, Dartmouth College, and

**Bruce D. Meyer**, NBER and Northwestern University, "The Extent and Consequences of Job Turnover"

**Susan L. Ettner**, Harvard University, "Is Working Good for You? Evidence of the Endogeneity of Mental and Physical Health to Female Employment"

**Robert G. Gregory** and **A. E. Daly**, Australian National University, "The Welfare and Economic Progress of Indigenous People of Australia and the United States"

**Landers, Rebitzer, and Taylor** propose that the income-sharing characteristic of legal partnerships creates incentives for firms to promote associates who tend to work very hard. But since the tendency to work hard cannot be observed, law firms must rely on certain indicators of it, especially on an associate's record of billable hours. This may lead firms to impose inefficiently long hours as the norm. Further, firms might not adjust these norms when new employees who desire short hours are hired. This type of "adverse selection" in hours also may be important in settings with strong complementarities among groups of professional employees, such as software production teams, or where there is competition for promotion to high-level managerial positions.

**Anderson and Meyer** find that there is more turnover in the work force than previously was thought; it affects more people than previous analyses have indicated; and a larger fraction of it is permanent.

But there is a declining probability of separation from a job as tenure on the job increases. And the level of earnings, industry, and firm size all have large effects on the probabilities of turnover. Anderson and Meyer estimate that about 28 percent of turnover is temporary, and 31 percent is related to job creation and destruction. In terms of lost earnings, the cost of most turnover is not high, but a small fraction of job separations result in large loss-

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**"Anderson and Meyer estimate that 28 percent of turnover is temporary, and 31 percent is related to job creation and destruction."**

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es of earnings. In addition, total turnover is procyclical, although temporary turnover is countercyclical, and job reallocation is countercyclical, at least at annual intervals.

**Ettner** looks at how employment affects women's health, and how health affects female employment. Using data from the National Survey of Families and Households and the Survey of Income and Pro-

gram Participation, she finds that self-assessed health status, depressive symptoms, self-reported work limitations, limitations on daily living, and days in bed all predict employment. Furthermore, employment had a salutary structural effect on self-assessed health status, depressive symptoms, and days in bed.

**Gregory and Daly** discuss the economic well-being of indigenous men in Australia and the United States, particularly over the recent decade. In 1980, the income ratio for indigenous white males in Australia was less than the analogous ratio in the United States by 15 percent. Aboriginals were favored by a compressed income distribution, but disadvantaged by their position on the income ladder. After the authors standardize for the different income compression in each country, they find that Aboriginals were 38 percent lower on the income ladder than indigenous men in the United States. By 1990, the income ratio had risen in Australia and fallen in the United States. Both groups were affected adversely by the widening income dispersion of the 1980s. However, Australian Aboriginals have succeeded in

moving up the income ladder by 20 percent, while native Americans in this sample slipped by 10 percent. Most of the change in Australia seems to be the result of very large increases in government expenditure, far beyond what might be expected in the United States. In 1991-2, the Australian government spent on identified Aboriginal programs almost twice the income that Aboriginal men earned from employment.

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## Meeting of Health Economists

Members of the NBER's Program on Health Care, directed by Alan M. Garber, of Stanford University, met in Cambridge on May 23. They discussed the following papers:

**Jonathan Gruber**, NBER and MIT, and

**Maria Owings**, National Center for Health Statistics, "Physician Financial Incentives and the Diffusion of Cesarean Section Delivery"

**David M. Cutler**, NBER and Harvard University, "Market Failure in Small Group Health Insurance" (See "Market Failures and Public Policy" in the "Confer-

ences" section of this issue.)

**Jonathan S. Skinner**, NBER and University of Virginia, and

**Mark B. McClellan**, NBER and Harvard University, "The Distribution of Medicare Benefits: A Lifetime Perspective"

**Alan M. Garber**, and

**Thomas E. MaCurdy**, NBER and Stanford University, "Nursing Home Utilization Near the End of Life"

**Martin Feldstein**, NBER and Harvard University, and

**Jonathan Gruber**, "Can We Control Health Care Cost by Changing the Structure of Health Insurance Plans?"

From 1970-82, the rate of cesarean delivery rose to 240 percent. This occurred simultaneously with a sizable fall in the fertility rate. Using national microdata for this period, **Gruber** and **Owings** show that there is a strong correlation between within-state declines in the fertility rate and within-state increases in cesarean delivery rates. Their estimates imply that changes in fertility can explain approximately 15 percent of the growth in primary cesarean delivery in this period. If, in addition to declining fertility rates, the rapid increase in the supply of ob/gyns is considered to be a shock to their income, then changes in financial incentives can explain as much as 33 percent of the diffusion of cesarean deliveries over 1970-82.

Medicare provides nearly universal health insurance coverage among the elderly. It is funded by earmarked payroll taxes, general tax revenue, and (Part B) premiums. **Skinner** and **McClellan** evaluate anticipated lifetime Medicare

benefits and taxes among different income groups. They find first that accumulated taxes paid into Medicare fall short of anticipated benefits by an average of more than \$35,000 per newly eligible person; this amount represents a transfer from the younger generation. Second, higher-income people have paid more into the Medicare system through higher payroll and income taxes, but they also receive a larger amount in benefits over their lifetime. High-income people tend to receive more intensive treatment for a given disease, and they also tend to live longer to receive Medicare benefits.

**Garber** and **MaCurdy** combine data from several sources to characterize utilization of nursing homes by elderly Americans. Their method enables them to fully characterize distributions of nursing home utilization, the timing of spells in nursing homes and in the community, the age distribution of utilization, and utilization stratified by decedent status. Their primary ob-

jective is to assess the extent to which nursing home utilization occurs before death, and whether such utilization follows the pattern found for general medical care, which increases as death approaches.

Using data on medical spending and copayment rates from the 1987 National Medical Expenditure Survey, **Feldstein** and **Gruber** compare the effect of raising copayment rates from their level under existing plans to (for example) 50 percent, up to a maximum out-of-pocket expense of 10 percent of income. They find that such plans can reduce medical spending substantially: their baseline plan cuts the level of spending by over 20 percent. Furthermore, there are net welfare gains under a number of scenarios from such a plan, as the reduced deadweight loss of excess medical spending more than compensates for any increased risk-bearing on the part of medical consumers.

Also attending the program meeting were: Laurence C. Baker, Princeton University; Paul J. Gertler, NBER and Rand Corporation; Brigitte Madrian and Douglas O. Staiger, NBER and Harvard University; David Meltzer, NBER and Brigham and Women's Hospital; Michael Moore, Duke University; and Burton Singer, NBER and Yale University.



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1868. "Fiscal Paradise: Foreign Tax Havens and American Business," by **James R. Hines, Jr.** and **Eric M. Rice** (NBER Working Paper No. 3477)

1869. "Looting: The Economic Underworld of Bankruptcy for Profit," by **George A. Akerlof** and **Paul M. Romer**

1870. "Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards," by **Paul M. Romer**

1871. "The Diversification of Production," by **Boyan Jovanovic**

1872. "R and D Tax Policy During the 1980s: Success or Failure?" by **Bronwyn H. Hall** (NBER Working Paper No. 4240)

1873. "Asymptotic Filtering Theory for Univariate ARCH Models," by **Daniel B. Nelson** and **Dean P. Foster** (NBER Technical Paper No. 129)

1874. "Determinants of Interest Rates on Tax-Exempt Hospital Bonds," by **Michael Grossman,**

**Fred Goldman, Susan W. Nesbitt,** and **Pamela Mobilia** (NBER Working Paper No. 4139)

1875. "Fiscal Policy and Economic Growth: An Empirical Investigation," by **William Easterly** and **Sergio T. Rebelo** (NBER Working Paper No. 4499)

1876. "The Ramsey Problem for Congestible Facilities," by **Richard J. Arnott** and **Marvin Kraus** (NBER Technical Paper No. 84)

1877. "Do Short-Term Objectives Lead to Under- or Overinvestment in Long-Term Projects?" by **Lucian Arye Bebchuk** and **Lars A. Stole** (NBER Technical Paper No. 98)

1878. "Measuring Ignorance in the Market: An Application to Physician Services," by **Martin Gaynor** and **Solomon W. Polachek** (NBER Working Paper No. 3430)

1879. "Inventories and the Short-Run Dynamics of Commodity Prices," by **Robert S. Pindyck** (NBER Working Paper No. 3295)

1880. "Credit Channel or Credit Actions? An Interpretation of the Post-war Transmission Mechanism," by **Christina D. Romer** and **David H. Romer** (NBER Working Paper No. 4485)

1881. "Dynamic Efficiency in the Gifts Economy," by **Stephen A. O'Connell** and **Stephen P. Zeldes** (NBER Working Paper No. 4318)

1882. "Can the Markov-Switching Model Forecast Exchange Rates?" by **Charles M. Engel** (NBER Working Paper No. 4210)

1883. "No Place Like Home: Tax Incentives and the Location of R and D by American Multinationals," by **James R. Hines, Jr.** (NBER Working Paper No. 4574)

1884. "Intertemporal Analysis of State and Local Government Spending: Theory and Tests," by **Douglas Holtz-Eakin, Harvey S. Ro-**

**sen,** and **Schuyler Tilly** (NBER Working Paper No. 4261)

1885. "Asymmetric Price Adjustment and Economic Fluctuations," by **Laurence M. Ball** and **N. Gregory Mankiw** (NBER Working Paper No. 4089)

1886. "Proprietary Public Finance and Economic Welfare," by **Herschel I. Grossman** and **Suk Jae Noh** (NBER Working Paper No. 2696)

1887. "International Growth Linkages: Evidence from Asia and the OECD," by **John F. Helliwell** (NBER Working Paper No. 4245)

1888. "Efficiency of the Tokyo Housing Market," by **Takatoshi Ito** and **Keiko Nosse Hirono** (NBER Working Paper No. 4382)

1889. "The Role of Judgment and Discretion in the Conduct of Monetary Policy: Consequences of Changing Financial Markets," by **Benjamin M. Friedman** (NBER Working Paper No. 4599)

1890. "Empirical Linkages Between Democracy and Economic Growth," by **John F. Helliwell** (NBER Working Paper No. 4066)

1891. "Entrepreneurial Decisions and Liquidity Constraints," by **Douglas Holtz-Eakin, David Joulfaian,** and **Harvey S. Rosen** (NBER Working Paper No. 4526)

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1893. "Why Exchange Rate Bands? Monetary Independence in Spite of Fixed Exchange Rates," by **Lars E. O. Svensson** (NBER Working Paper No. 4207)

1894. "The Life Cycle of a Competitive Industry," by **Boyan Jovanovic** and **Glenn M. MacDonald** (NBER Working Paper No. 4441)

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"The Stabilizing Properties of a Nominal GNP Rule in an Open Economy," by **Jeffrey A. Frankel** and **Menzie Chinn** (forthcoming, *Journal of Money, Credit and Banking*)

"Sterilization of Money Inflows: Difficult (Calvo) or Easy (Reisen)?" by **Jeffrey A. Frankel** (Center for International and Development Economics Research Working Paper 93-024, University of California, Berkeley. Also forthcoming in *Capital Inflows: Size, Nature, and Policy Adaptations*, to be published by Fedesarrollo in Bogota.)

"Monetary Regime Choices for a Semi-Open Country," by **Jeffrey A. Frankel** (forthcoming in *Capital Controls, Exchange Rates, and Monetary Policy in the World Economy*, Cambridge University Press.)

"A Two-Country Analysis of International Targeting of Nominal GNP," by **Jeffrey A. Frankel** and **Norbert Funke** (This paper appears in Italian in *Rivista di Politica Economica*, volume 83, series no. 3, April 1993, pp. 69-106, Rom.)

"A 'Greater China' Trade Bloc?" by **Shang-Jin Wei** and **Jeffrey A. Frankel**

## Fischer to Lead IMF

Stanley Fischer, an NBER research associate since 1978 and a professor of economics at MIT since 1977, recently was named first deputy managing director of the International Monetary Fund (IMF). It is expected that his appointment will be effective on September 1, 1994. In his new capacity, Fischer will have broad responsibility across the whole range of issues facing the institution, and will exercise comprehensive oversight.

Fischer was born in Zambia. He received his B.Sc. and M.Sc. in economics from the London School of Economics, and his Ph.D. from MIT. He was an assistant professor of economics at the University of Chicago until 1973 when he returned to MIT as an associate professor.

Fischer also has held visiting positions at the Hebrew University and the Hoover Institution. From January 1988 to August 1990, he served as vice president, Development Economics, and chief economist at the World Bank.

## Bureau Books

### Insider Lending

*Insider Lending: Banks, Personal Connections, and Economic Development in Industrial New England*, by Naomi Lamoreaux, is now available from Cambridge University Press for \$39.95. This volume, part of a series on Long-Term Factors in Economic Development, explores the important role that insider lending played in the economic development of early nineteenth-century New England.

Today the term *insider lending* conveys an aura of abuse and corruption. But in New England in the 1800s, insider lending was not only an accepted fact of economic life, but also enabled banks to help finance economic development. As the banking system evolved over the course of the century, lending practices became more impersonal and professional. Yet, the informa-

tion problems that banks faced when they began to conduct more and more of their business at arm's length forced them to concentrate on providing short-term loans to commercial borrowers, and to give up financing economic development.

Lamoreaux is a research associate in the NBER's Program in Development of the American Economy, and a professor at Brown University. Her book should interest both economists and historians.

This volume should be ordered directly from Cambridge University Press, Order Department, 110 Midland Avenue, Port Chester, NY 10573; (914) 937-9600.



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

## Studies in the Economics of Aging

*Studies in the Economics of Aging*, edited by David A. Wise, is available now from the University of Chicago Press. This is the fourth volume to emerge from an NBER project on the topic that began in 1986.

The eleven papers in this volume consider the effects of growth of the elderly population; how and why the elderly save for retirement, including the role of 401(k)s and housing; compare retirement behavior in the United States and Germany; describe the economics of aging in Taiwan; and discuss the utilization of nursing homes.

Wise is the director of the NBER's research on aging and the John F. Stambaugh Professor of Political Economy at the John F. Kennedy School of Government, Harvard University.

The price of this volume is \$59.00.

## Monetary Policy

An NBER conference volume, *Monetary Policy*, edited by N. Gregory Mankiw, will be available from the University of Chicago Press this summer for \$49.00. The first three papers in this volume discuss alternative ways of conducting monetary policy in order to reduce both the average rate of inflation and the volatility of nominal GDP growth. The next three chapters analyze the behavior of prices and inflation. Two papers look at the monetary transmission mechanism, or how central banks' actions affect spending on goods and services. The final paper examines the causes and effects of the Fed's shift to an explicitly disinflationary policy, which has occurred six times since World War II. Mankiw is director of the NBER's Program in Monetary Economics and a professor of economics at Harvard University.

## The Economics of Aging

*The Economics of Aging*, edited by Yukio Noguchi and David A. Wise, will be available from the University of Chicago Press this summer. This volume is the result of a joint conference between the NBER and the Japan Center for Economic Research. Its seven papers look at the changes and issues that arise when a population ages, and examine the economic status of the elderly in Japan and the United States. The topics covered include trends in the retirement age in both countries, and how housing equity affects the economic status of the elderly.

Noguchi is professor of economics at Hitotsubashi University. Wise is the director of the NBER's research on aging and the John F. Stambaugh Professor of Political Economy at the John F. Kennedy School of Government at Harvard University.

This volume costs \$39.95.

## The Regulated Economy

*The Regulated Economy: An Historical Approach to Political Economy*, edited by Claudia Goldin and Gary Libecap, will be available this summer from the University of Chicago Press. The eight case studies in this volume concentrate on the origins of government intervention in, and regulation of, the U.S. economy in the late nineteenth and early twentieth centuries. Among other topics, the volume explores how interest groups affect the development of government regulation, and how the necessity for coalition building can transform the structure of regulation and legislation. Specifically, Goldin and Libecap discuss history's solutions to such perceived economic problems as exorbitant railroad and utility rates, bank failure, the financing of government, falling agricultural prices, the immigration of low-skilled workers, and workplace injury.

Goldin is director of the NBER's Program in Development of the American Economy and a professor of economics at Harvard University. Libecap is an NBER research associate in the same program, and a professor of economics at the University of Arizona's College of Business. Their book is priced at \$56.00.

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*Journal of Economic Literature* (JEL) subject codes, when available, are listed after the date of the paper, followed by the 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 May 1994 are presented below. A complete list of NBER Working Papers and Reprints can be accessed on the Internet by using our gopher at [nber.harvard.edu](http://nber.harvard.edu). 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

#### Downsizing and Productivity Growth; Myth or Reality?

Martin Neil Baily,  
Eric J. Bartelsman, and  
John C. Haltiwanger

NBER Working Paper No. 4741

May 1994

JEL Nos. E23, E24, J24

Economic Fluctuations, Productivity

The conventional wisdom is that the rising productivity in the U.S. manufacturing sector in the 1980s

was driven by the apparently pervasive downsizing over the period. Aggregate evidence clearly shows falling employment accompanying the rise in productivity. In this paper, we examine the microeconomic evidence using plant level data from the Longitudinal Research Database. We find that plants that increased employment as well as productivity contribute almost as much to overall productivity growth in the 1980s as the plants that increased productivity at the expense of employment. Further, there are striking differences by

sector (defined by industry, size, region, wages, and ownership type) in terms of whether plants upsize or downsize, and whether they increase or decrease productivity. Nevertheless, in spite of those striking differences, most of the variance in productivity and employment growth is accounted for by idiosyncratic factors.

#### The Effects of Minimum Wages on Employment: Theory and Evidence from the United Kingdom

Richard Dickens,  
Stephen Machin, and  
Alan Manning

NBER Working Paper No. 4742

May 1994

JEL No. J42

Labor Studies

Recent work on the economic effects of minimum wages has stressed that the standard economic model, in which increases in minimum wages depress employment, is not supported by the empirical findings in some labor markets. In this paper, we present a theoretical framework that is general enough to allow minimum wages to have the conventional negative impact on employment, but that also allows for the possibility of a neutral or positive effect. The model's structure is based on labor market frictions that give employers some degree of monopsony power. The formulated model has a number of empirical implications that we go on to test using data on industry-based minimum wages set by the U.K. Wages Councils between 1975 and 1990. Some strong results emerge: minimum wages significantly compress the distribution of earnings and, contrary to conventional economic wisdom but in line with several recent studies, do not have a nega-

tive impact on employment. If anything, the relationship between minimum wages and employment appears to be positive.

### **Information, Trading, and Stock Returns: Lessons from Dually Listed Securities**

**K. C. Chan, Wai-Ming Fong, and René M. Stulz**

NBER Working Paper No. 4743

May 1994

Asset Pricing

This paper compares the intraday patterns of volatility, trading volume, and bid-ask spreads on the NYSE and AMEX for dually listed European stocks, Japanese stocks also listed in London, and dually listed Japanese stocks not listed in London, with American stocks of comparable average trading volume and volatility. We show that the intraday patterns for these stocks are remarkably similar, even though the public information flows differ markedly across these stocks during the trading day. In the morning, Japanese stocks have the greatest volatility and volume, followed by European stocks and American stocks. These rankings are reversed in the afternoon. We argue that these patterns are consistent with markets reacting to the overnight accumulation of public information that is greatest for Japanese stocks and smallest for American stocks, and inconsistent with the view that early morning volatility can be attributed to monopolistic specialist behavior.

### **Localization Economies, Vertical Organization, and Trade**

**Gordon H. Hanson**

NBER Working Paper No. 4744

May 1994

JEL Nos. E14, O18, R11

International Trade and Investment

This paper develops a model of regional production networks based on localization economies. I consider an industry with two activities: one with location-specific external economies, the other with constant returns. Under autarky, localization economies imply the formation of an industry center. Agglomeration drives up wages in the center, causing the constant returns activity to disperse to outlying regions. Trade re-creates the regional production network on a global scale. I apply the model to data from the Mexican apparel industry. Estimation results on Mexico's pre- and post-trade regional apparel wage structure are consistent with localization economies. I also discuss implications for the North American Free Trade Agreement.

### **Trade Politics and the Semiconductor Industry**

**Douglas A. Irwin**

NBER Working Paper No. 4745

May 1994

JEL No. F13

International Trade and Investment

A coalition of well-organized semiconductor producers, along with compliant government agencies (U.S. Trade Representative and the Commerce Department), brought about a 1986 trade agreement in which the United States forced Japan to end the "dumping" of semiconductors in all world markets and to help secure 20 percent of the Japanese semiconductor market for foreign firms within five years. The antidumping provisions of the 1986 agreement, which later proved to be partly illegal under the GATT, resulted in such steep price rises for certain semiconductors that downstream user industries (primarily computer systems manufacturers) forced the U.S. government to remove those provisions in

the 1991 renegotiation of the agreement. The equally controversial 20 percent market share provision—based on circumstantial evidence that the Japanese market was closed—provided "affirmative action" for the industry in its efforts to sell more in Japan, but has been criticized as constituting "export protectionism." By analyzing the political and economic forces leading up to the 1986 accord and shaping subsequent events, this paper examines how the U.S. semiconductor industry became the beneficiary of this unique and unprecedented sectoral trade agreement.

### **The Political Economy of U.S. Automobile Protection**

**Douglas R. Nelson**

NBER Working Paper No. 4746

May 1994

International Trade and Investment

This paper examines the political process through which the U.S. auto industry pursued and ultimately received protection from Japanese competition. It is not at all obvious that trade protection was the most effective policy response to the industry's economic problems. I argue that the industry's political strategy reflects a response to a crisis in the political-economic regime regulating relations among the major interests in the U.S. auto industry.

### **The Political Economy of U.S. Export Subsidies for Wheat**

**Bruce L. Gardner**

NBER Working Paper No. 4747

May 1994

JEL No. Q18

International Trade and Investment

During 1985-93 the U.S. government provided \$4.9 billion in subsidies to targeted foreign buyers of

U.S. wheat under its Export Enhancement Program (EEP). The subsidies averaged \$31 per metric ton, or about 25 percent of the U.S. price. The EEP generates a small gain to U.S. farmers compared to its costs, but lacks clear economic justification. The key factors in the political success of the EEP are: 1) farmers and agribusiness have been unified in support of the program, and have excellent political channels through which to express their views; 2) domestic users of wheat have not opposed the program; and 3) the program received an initial boost because of its use of large government-owned wheat stocks, allowing it to be treated as budget-neutral in Congress. One economic argument that carried political weight was that the EEP, by increasing the costs of the European Community's wheat export subsidies, would encourage negotiation of joint U.S./EC subsidy reductions. In fact, the EC did agree in 1993 to multilateral subsidy reductions in the GATT, as well as reforming their own policies unilaterally. But it remains questionable whether this outcome justifies the EEP.

### **The Impact of Wage Structure on Trends in U.S. Gender Wage Differentials: 1975–87**

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

NBER Working Paper No. 4748

May 1994

JEL Nos. J16, J31

Labor Studies

The U.S. labor market experienced two dramatic developments in the past 20 years: a falling male-female pay gap, and a rising level of wage inequality. This paper uses Michigan Panel Study on Income Dynamics data for 1975 and 1987

and Current Population Survey data for 1971 and 1988 to analyze how this dramatic decline in the gender gap was achieved in the face of shifts in overall wage structure that were increasingly unfavorable to low-wage workers. The decrease is traced to a rise in women's relative experience levels and occupational status, and a larger negative impact of de-unionization on male than female workers. In addition, there was a substantial decline in the "unexplained" portion of the pay gap. These "gender-specific" factors were more than sufficient to counterbalance changes in both measured and unmeasured prices that worked against women.

Using a simple supply and demand framework, we find that the net effect of supply and demand shifts was unfavorable for women as a group: shifts in the composition of demand during this period favoring female workers were more than offset by the rising relative supply of women. However, supply and demand changes match up fairly well with observed relative changes in the gender gap among skill groups, specifically a faster closing of the gap at the bottom of the skill distribution than at the top. Moreover, our analysis of the sources of the greater progress at the bottom than at the top is consistent with the operation of demand and supply forces.

### **Precedent and Legal Argument in U.S. Trade Policy: Do They Matter to the Political Economy of the Lumber Dispute?**

**Joseph P. Kalt**

NBER Working Paper No. 4749

May 1994

International Trade and Investment

For more than a decade, the

United States and Canada have been engaged in a rancorous dispute over trade in softwood lumber. Through three successive rounds of administrative litigation before the U.S. Department of Commerce, the U.S. sawmill industry has sought to have countervailing duties imposed upon Canadian lumber imports. The U.S. interests argue that Canada subsidizes its sawmills by providing timber from public forests at below-market prices, and by restricting exports of Canadian logs.

The trade war over lumber is waged primarily in the hearing rooms of the Department of Commerce. The rules of war are set down in the legal criteria and precedents of U.S. countervailing duty (CVD) law, and both the U.S. and Canadian interests have invested heavily in legal armaments. This study examines whether, and to what extent, the institutional framework—the legal rules, standards, and precedents—of CVD law influences the success or failure of the contending parties.

I test two alternative theories of political economy. "Capture Theory" emphasizes the role of institutional settings of the kind at work here: the outcomes of political action are determined by the stakes and organization of rent-seeking parties, and the quasijudicial regulatory proceedings of the Department of Commerce are mere Stiglerian theater. "The New Institutionalism," on the other hand, posits that the structure and form of such proceedings are conditioning constraints, with the capacity to significantly influence the outcome of rent-seeking battles. This study finds more support for Capture Theory than for the New Institutionalism. An issue with large stakes is never lost by the political-

ly favored party, even when legal precedent and the burden of argument are against the party's interest.

## **The Consumption Smoothing Benefits of Unemployment Insurance**

**Jonathan Gruber**

NBER Working Paper No. 4750

May 1994

JEL Nos. J65, H31, H53

Labor Studies, Public Economics

Previous research on unemployment insurance (UI) has focused on the *costs* of the program, in terms of the distorting effects of generous UI benefits on worker and firm behavior. For assessing the optimal size of an unemployment insurance program, however, it is also important to gauge the *benefits* of increased UI generosity, in terms of smoothing consumption across periods of joblessness. I do this by directly measuring the effect of legislated variations in UI benefits on changes in food consumption among individuals who become unemployed. I use annual observations on food consumption expenditures for 1968–87 from the Panel Study of Income Dynamics, matched to information on the UI benefits for which unemployed persons were eligible in each state and year. I estimate that a 10 percentage point increase in the UI replacement rate leads to a fall in consumption upon unemployment that is 2.7 percent smaller than would occur otherwise. Over this period, the average fall in consumption for the unemployed was 7 percent; my results imply that, in the absence of unemployment insurance, this fall would have been over three times as large. I also find that the positive effect of UI extends for only one period, smoothing consumption during initial job loss but having no perma-

nent effect on consumption levels. Individuals who anticipate layoff experience a smaller consumption smoothing effect. And, UI appears to crowd out other forms of public consumption somewhat. Despite the substantial estimated consumption smoothing effect, however, my results imply that the optimal UI benefit level is within the range of current replacement rates only at fairly high levels of risk aversion.

## **The MFA Paradox: More Protection and More Trade?**

**J. Michael Finger and Ann Harrison**

NBER Working Paper No. 4751

May 1994

JEL Nos. F1, L6

International Trade and Investment

The political power of the textile industry stemmed from its importance in southern states and from the power of the southern delegation in Congress in the 1960s. The strongest resistance to the industry's pressure for protection came from the foreign policy interests of the executive branch. There are many reasons why negotiated, or voluntary export restraints, sanctioned by international agreements (such as the Multi-Fiber Agreement) became the form that protection took. First, the Japanese, who at the time were the world's leading textile exporter, had exhibited a willingness to accept negotiated agreements to trade disputes by the 1930s. Second, the U.S. executive branch, which had been a leader in establishing the GATT system in order to control the sort of unilateral restrictive actions that contributed to the Depression of the 1930s, was reluctant to take unilateral action. Third, the arrangement was acceptable to U.S. industry because, through its particular power over agricultural legisla-

tion, the southern delegation won passage of amendments to agriculture bills that enforce these "voluntary" restraints at the U.S. border. But because enforcement remained with the executive branch, it tended to follow the letter of the agreements. Hence exports could continue to expand by shifting to new product varieties and to new supplier countries.

## **The Great Wars, the Great Crash, and the Unit Root Hypothesis: Some New Evidence About an Old Stylized Fact**

**Dan Ben-David and David H. Papell**

NBER Working Paper No. 4752

May 1994

JEL Nos. C22, O40

Growth

For decades, the prevailing sentiment among economists was that growth rates remain constant over the long run. Kaldor considered this to be one of the six important "stylized facts" that theory should address. Until the emergence of endogenous growth models, this was a fundamental feature of growth theory.

Using annual GDP data spanning up to 130 years and an endogenous trend break model, we investigate the unit root hypothesis for 16 countries. We find that most countries exhibited fairly steady growth for several decades. The end of this period usually was characterized by a significant, and sudden, drop in GDP levels. But rather than simply returning to their previous steady-state path, as predicted by the standard neoclassical growth model, most countries continued to grow at roughly *double* their prebreak rates for many decades, even after their original growth path had been surpassed.

## **American Regionalism and Global Free Trade**

**Edward E. Leamer**

NBER Working Paper No. 4753

May 1994

International Trade and Investment

A free trade agreement supports global free trade since trade barriers tend to divert trade in favor of members, but not to reduce imports. The term "mutual assured deterrence" refers to a regional free trade association in which no member can gain individually from the imposition of a barrier against a nonmember. Mutual assured deterrence is possible for a surprisingly rich set of partners.

A customs union is compatible with global free trade if the vast majority of trade takes place naturally within the confines of the association. A customs union that is likely to have this property would combine countries to form a nearly exact economic replica of the globe.

The economic combination of Mexico and the United States does not form a replica of the global economy because, compared with Asia, North America has relatively high capital per worker even after adding the Mexican work force. However, NAFTA does seem to have the property of mutual assured deterrence, and for that reason may amount to a commitment to global free trade as well as regional free trade.

## **Changes in the Structure of Family Income Inequality in the United States and Other Industrial Nations During the 1980s**

**McKinley L. Blackburn and David E. Bloom**

NBER Working Paper No. 4754

May 1994

JEL No. J0

Labor Studies

We examine the detailed structure of family income inequality in the United States, Canada, and Australia at various points during the 1980s. In each of these countries, we find, income inequality increased among families of married couples. The increases were closely associated with increases in the inequality of husbands' earnings. However, only in the United States was the increased inequality of husbands' earnings also associated with an increase in education-earnings differentials. In addition, increased inequality of earnings was associated with increases in both the variance of wages and the variance of labor supply in the United States and Canada, but only with an increase in the variance of labor supply in Australia. Evidence of an increase in income inequality among married couples also was found for France and the United Kingdom, but not for Sweden or the Netherlands.

For families of married couples in Canada, Sweden, the United Kingdom, and the United States, increased inequality of family income was closely associated with an increased correlation between husbands' and wives' earnings. A more detailed examination of this correlation in Canada and the United States suggests that this increase cannot be explained by an increase in the similarity of husbands' and wives' observable labor market characteristics in either country. Rather, it is explained partly by changes in the way those characteristics translate into labor outcomes and, more importantly, by changes in the interspousal correlation between unobservable factors that influence labor market outcomes.

## **Changing Wage Structure and Black-White Wage Differentials Among Men and Women: A Longitudinal Analysis**

**David Card and Thomas Lemieux**

NBER Working Paper No. 4755

May 1994

JEL Nos. J31, J70

Labor Studies

Despite several decades of research, there is still widespread disagreement over the interpretation of the wage differences between black and white workers. Do the differences reflect productivity differences, discrimination, or both? If lower black earnings reflect a productivity difference, then an economywide increase in the relative wages of more highly skilled workers should lead to a parallel increase in the black-white earnings gap. We evaluate this hypothesis using longitudinal data for men and women from the Panel Study of Income Dynamics.

Our findings suggest that returns to observed and unobserved skills of male workers rose by 5-10 percent between 1979 and 1985. For female workers, the return to observed skills was relatively constant, while the return to unobserved skills increased by 15 percent. The evidence that black-white wage differentials rise with the return to skills is mixed. Among female workers, the black-white wage gap widened in the early 1980s, consistent with the premise that racial wage differences reflect a productivity difference. For men in our sample, the black-white wage gap declined between 1979 and 1985, a change that is inconsistent with the rise in the return to skills.

## **Multifactor Models Do Not Explain Deviations from the CAPM**

**A. Craig MacKinlay**

NBER Working Paper No. 4756

June 1994

JEL No. G12

Asset Pricing

A number of studies have presented evidence rejecting the validity of the Capital Asset Pricing Model (CAPM). This evidence has spawned research into possible explanations, which can be divided into two main categories: the risk-based alternatives, and the nonrisk-based alternatives. The risk-based category includes multifactor asset pricing models developed under the assumptions of investor rationality and perfect capital markets. The nonrisk-based category includes biases introduced in the empirical methodology, the existence of market frictions, or explanations arising from the presence of irrational investors. The distinction between the two categories is important for asset pricing applications, such as estimation of the cost of capital. This paper proposes to distinguish between the two categories using *ex ante* analysis. I develop a framework showing that, *ex ante*, one should expect that CAPM deviations caused by missing risk factors will be very difficult to detect statistically. In contrast, deviations resulting from nonrisk-based sources will be easy to detect. I conclude that the risk-based alternatives are not the whole story for the CAPM deviations. This implies that the adoption of empirically developed multifactor asset pricing models may be premature.

## **The Effect of the Minimum Wage When It Really Bites: A Reexamination of the Evidence from Puerto Rico**

**Alan B. Krueger**

NBER Working Paper No. 4757

June 1994

JEL No. J31

Labor Studies

This paper reinvestigates the evidence on the impact of the minimum wage on employment in Puerto Rico. The strongest evidence that the minimum wage had a negative effect on employment comes from an aggregate time-series analysis. The weakest evidence comes from cross-industry analyses. The main finding of the paper, however, is that the statistical evidence of a negative employment effect of the minimum wage in Puerto Rico is surprisingly fragile.

## **Bilateralism and Regionalism in Japanese and U.S. Trade and Direct Foreign Investment Patterns**

**Jonathan Eaton and Akiko Tamura**

NBER Working Paper No. 4758

June 1994

JEL No. F02

International Trade and Investment

We apply a modified "gravity model" incorporating measures of factor endowments to analyze Japanese and U.S. bilateral trade flows and direct foreign investment positions with a sample of around 100 countries for 1985–90. Our analysis takes into account population, income, the land-labor ratio, the average level of education, and region. We find that the features of a country associated with more trade with either Japan or the United States also tend to be associated with more direct foreign invest-

ment from Japan or the United States. U.S. economic relations with Japan and Western Europe provide an important exception. Despite U.S. concern about its trade deficit with Japan, we find Japan to be much more open to the United States, not only as a source of imports, but also as a destination for U.S. exports, than most countries in Western Europe. Taking other factors into account, however, Western Europe is more open to U.S. direct foreign investment. We also find that a country's level of education tends to significantly increase interaction of all types between the United States and that country, even after we correct for per capita income. Education does not play a significant role in Japanese trade patterns. As factor endowments theory would predict, the United States tends to trade more with densely populated countries, while Japan tends to import more from sparsely populated countries. Even after taking into account population, income, factor endowments, and region, there is a substantial degree of "bilateralism" in Japanese and U.S. economic relationships: the residual correlation among exports, imports, and outward direct foreign investment is much larger than would be the case if these magnitudes were independent across countries.

## **Staggering and Synchronization in Price Setting: Evidence from Multiproduct Firms**

**Saul Lach and Daniel Tsiddon**

NBER Working Paper No. 4759

June 1994

Miscellaneous

Most of the theoretical literature on price setting deals with the special case in which only a single price is changed. At the level of the

retail store, at least, where dozens of products are sold by a single price setter, price-setting policies are not formulated for individual products. This feature of economic behavior raises a host of questions, the answers to which carry interesting implications. Do price setters stagger the timing of price changes? Are price changes for different products synchronized within the store? If so, is this a result of aggregate shocks, or of the presence of a component specific to the store? And, can observed small changes in prices be rationalized by a menu cost model? We exploit the multi-product dimension of the dataset on prices used in Lach and Tsiddon (1992) to explore several of these and other issues. To the best of our knowledge, this is the first empirical work on this subject.

### **Steel Protection in the 1980s: The Waning Influence of Big Steel?**

**Michael O. Moore**

NBER Working Paper No. 4760

June 1994

International Trade and Investment

The U.S. integrated steel industry has been very successful in securing import protection over the last 20 years. Critical to that success has been a cohesive coalition of steel producers, the steelworkers' union, and "steel-town" congressional representatives. The political strength of this coalition has diminished substantially over the last decade as the integrated steel industry has restructured, and as domestic mills have played an increasingly important role in the U.S. steel sector. In addition, an effective domestic coalition of industries using steel acted as a critical counterweight, beginning with the fight over a voluntary restraint agree-

ment extension in 1989. After 1989, quotas on steel were nonbinding and the industry was largely unsuccessful in obtaining antidumping duties in its 1993 unfair trade petitions. These factors point to a diminished ability of the integrated steel industry to obtain special trade agreements in the future.

### **Toward a Modern Macroeconomic Model Usable for Policy Analysis**

**Eric M. Leeper and**

**Christopher A. Sims**

NBER Working Paper No. 4761

June 1994

JEL Nos. E63, E52, C50, C32

Economic Fluctuations

This paper presents a macroeconomic model that is both a completely specified dynamic general equilibrium model and a probabilistic model for time-series data. We view the model as a potential competitor to existing ISLM-based models that continue to be used for actual policy analysis. Our approach is also an alternative to recent efforts to calibrate real business cycle models. In contrast to these existing models, ours embodies all of the following important characteristics: 1) it generates a complete multivariate stochastic process model for the data it aims to explain, and the full specification is used in the maximum-likelihood estimation of the model; 2) it integrates modeling of nominal variables—money stock, price level, wage level, and nominal interest rate—with modeling real variables; 3) it contains a Keynesian investment function, breaking the tight relationship of the return on investment with the capital-output ratio; 4) it treats both monetary and fiscal policy explicitly; and 5) it is based on dynamic optimizing behavior of the private agents in the model.

We estimate flexible-price and sticky-price versions of the model and evaluate their fits relative to a naive model of no-change in the variables, and to an unrestricted variable autoregression. We show the model's implications for the dynamic responses to structural shocks, including policy shocks, and evaluate the relative importance of various shocks for determining economic fluctuations.

### **How America Graduated from High School: 1910 to 1960**

**Claudia Goldin**

NBER Working Paper No. 4762

June 1994

JEL Nos. J24, I20, N32

Development of the American Economy

Human capital accumulation and technological change were to the 20th century what physical capital accumulation was to the 19th century: the engine of growth. The accumulation of human capital accounts for almost 60 percent of all capital formation and 28 percent of the per capita growth residual from 1929 to 1982. Advances in secondary schooling account for about 70 percent of the increase in total educational attainment from 1930 to 1970 for men 40 to 44 years old. High school, not college, was responsible for the enormous increase in the human capital stock during much of this century. In this paper, I show when and where high schools advanced in the period from 1910 to 1960.

The most rapid expansion outside of the South occurred in the brief period from 1920 to 1935. The 1920s provided the initial burst in high school attendance, but the Great Depression added significantly to high school enrollment and graduation rates. Attendance

rates were highest in states, regions, and cities with the least reliance on manufacturing, and in areas where agricultural income per worker was high. Schooling was particularly low where certain industries that hired youths were dominant, and where the foreign born had entered in large numbers before the immigration restriction of the 1920s. More education enabled states to converge to a higher level of per capita income between 1929 and 1947, and states rich in agricultural resources, yet poor in manufacturing, exported educated workers in later decades.

### **Interstate Cigarette Bootlegging: Extent, Revenue Losses, and Effects of Federal Intervention**

**Jerry G. Thursby and Marie C. Thursby**

NBER Working Paper No. 4763

June 1994

JEL Nos. H26, K42

International Trade and Investment

We develop and estimate a model of commercial smuggling in which some, but not all, firms smuggle a portion of the cigarettes they sell. We use the model to examine the effects on interstate cigarette smuggling of the Contraband Cigarette Act and a change in the federal excise tax. We find that both policies have unintentional effects. While the Contraband Cigarette Act was imposed to reduce interstate smuggling, we find that it had the opposite effect. In contrast, an increase in the federal tax is not intended to affect smuggling, but we find that it increases the portion of cigarette sales that is smuggled commercially.

### **Taxes and Fringe Benefits Offered by Employers**

**William M. Gentry and Eric Peress**

NBER Working Paper No. 4764

June 1994

JEL No. H32

Public Economics

Using cross-sectional data on blue collar and white collar workers in U.S. cities, we examine how the tax treatment of fringe benefits affects whether employers offer benefits. Differences in income taxes across states cause variations in the tax incentives for fringe benefits. We find that employers respond to these tax incentives, especially for blue collar workers. The tax incentives affect both the probability of basic benefits, such as medical coverage, and of more "marginal" benefits, such as vision care and dental coverage. Higher taxes also reduce the amount of explicit cost sharing between employers and employees for some benefits.

### **What Ends Recessions?**

**Christina D. Romer and David H. Romer**

NBER Working Paper No. 4765

June 1994

JEL Nos. E63, E32

Economic Fluctuations,

Monetary Economics

We analyze the contributions of monetary and fiscal policy to post-war economic recoveries. We find that the Federal Reserve typically responds to downturns with prompt and large reductions in interest rates. Discretionary fiscal policy, in contrast, rarely reacts before the trough in economic activity, and even then the responses are usually small. Our simulations show that the declines in the interest rate explain nearly all of

the above-average growth that occurs early in recoveries. On several occasions, expansionary policies also have contributed substantially to above-normal growth outside of recoveries. Finally, we find that the persistence of movements in aggregate output is largely the result of the persistence in the contribution of policy changes.

### **Mass Layoffs and Unemployment**

**Andrew Caplin and John Leahy**

NBER Working Paper No. 4766

June 1994

Economic Fluctuations

Mass layoffs give rise to groups of unemployed workers who possess similar characteristics and therefore may learn from one another's experience in searching for a new job. Two factors lead workers to be too selective in the job offers that they accept. The first is an information externality: job searchers fail to take into account the value of their experience to others. The second is an incentive to "free ride": each worker would like others to experiment and reveal information about productive jobs. Together, these forces imply that in equilibrium the natural rate of unemployment is too high.

### **Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investment in the United States**

**Keith Head, John Ries, and Deborah Swenson**

NBER Working Paper No. 4767

June 1994

JEL No. F21

International Trade and Investment

Recent theories of economic geography suggest that firms in the same industry may be drawn to the

same locations because proximity generates positive externalities or "agglomeration effects." Under this view, chance events and government inducements can have a lasting influence on the geographical pattern of manufacturing. However, most evidence on the causes and magnitude of industry localization has been based on stories, rather than statistics. We examine the location choices of 751 Japanese manufacturing plants built in the United States since 1980. Our estimates support the hypothesis that industry-level agglomeration benefits play an important role in location decisions.

**On the Timing and Efficiency of Creative Destruction**  
**Ricardo J. Caballero and Mohamoud L. Hammour**

NBER Working Paper No. 4768  
June 1994  
JEL Nos. E32, E6, J64  
Economic Fluctuations

This paper analyzes the timing, pace, and efficiency of the ongoing job reallocation that results from product and process innovation. There are strong reasons why an efficient economy ought to concentrate both job creation and destruction during cyclical downturns, when the opportunity cost of reallocation is lowest. Malfunctioning labor markets can disrupt this synchronized pattern, and decouple creation and destruction. Moreover, regardless of whether workers are too strong or too weak, labor market inefficiencies generally lead to technological "sclerosis," characterized by excessively slow renovation. Government incentives for production may alleviate high unemployment in this economy, but at the cost of exacerbating sclerosis. Creation incentives, on the con-

trary, increase the pace of reallocation. We show how an optimal combination of both types of policies can restore economic efficiency.

**Macroeconomic Adjustment with Segmented Labor Markets**  
**Pierre-Richard Agénor and Joshua Aizenman**

NBER Working Paper No. 4769  
June 1994  
JEL No. F41  
International Trade and Investment

We analyze the macroeconomic effects of fiscal and labor market policies in a small, open developing country. Our framework considers an economy with a large informal production sector and a heterogeneous work force. The labor market is segmented because of efficiency considerations and minimum wage laws. We then extend the basic model to account for unemployment benefits, income taxation, and imperfect labor mobility across sectors.

Assuming perfect labor mobility, we show that a permanent reduction in government spending on nontraded goods leads in the long run to a depreciation of the real exchange rate, a fall in the market-clearing wage for unskilled labor, an increase in output of traded goods, and a lower stock of net foreign assets. A permanent reduction in the minimum wage for unskilled workers improves competitiveness, and expands the formal sector at the expense of the informal sector. Hence, in a two-sector economy in which the minimum wage is enforced only in the formal sector, and wages in one segment of the labor market are determined competitively, efficiency wage considerations do not alter the standard neoclassical presumption. A reduction in unemployment

benefits also has a positive effect on output of tradable goods by lowering both the level of efficiency wages and the employment rent of skilled workers.

**Estimating a Wage Curve for Britain, 1973–90**  
**David G. Blanchflower and Andrew J. Oswald**

NBER Working Paper No. 4770  
June 1994  
Labor Studies

Since Phillips's original work on the United Kingdom, applied research on unemployment and wages has been dominated by the analysis of highly aggregated time-series datasets. However, it has proved difficult to uncover statistically reliable models with such methods. We adopt a different approach: we use microeconomic data on 175,000 British workers from 1973–90 to provide evidence for the existence of a negatively sloped relationship linking the *level* of pay to the local rate of unemployment. This "wage curve" has an elasticity of approximately  $-0.1$ . Contrary to the Phillips Curve, there is no autoregression in wages. This paper casts doubt on standard ideas in macroeconomics, regional economics, and labor economics.

**Relative Wage Movements and the Distribution of Consumption**  
**Orazio Attanasio and Steven J. Davis**

NBER Working Paper No. 4771  
June 1994  
JEL Nos. J31, D12, E21  
Economic Fluctuations

We analyze how relative wage movements across birth cohorts and education groups during the 1980s affected the distribution of household consumption. We find that low-frequency movements in

the cohort-education structure of pretax hourly wages drove large changes in the distribution of household consumption. The results constitute a spectacular failure of the consumption insurance hypothesis, and one that is not explained by existing theories of informationally constrained optimal consumption allocations. We also develop a procedure for assessing the welfare consequences of deviations from full consumption insurance and, in particular, from the failure to insulate the consumption distribution from relative wage shifts across cohort-education groups. For a coefficient of relative risk aversion equal to 2, being able to fully insulate households from group-specific variation in endowment would raise welfare by an amount equivalent to a uniform 2.7 percent increase in consumption.

### **Trade and Industrial Policy Reform in Latin America**

**Sebastian Edwards**

NBER Working Paper No. 4772

June 1994

JEL Nos. F13, F14, O14

International Trade and Investment,

International Finance and

Macroeconomics

This paper documents and evaluates the process of trade reform in Latin America from the mid-1980s until 1993. It provides an analytical and historical discussion of the consequences of industrial policies in the region, from the early 1950s when import-substitution ideas were supported by the Economic Commission for Latin America, to the 1990s when liberal regimes were embraced.

I carefully distinguish between policies based on strict import substitution and policies that combine high and uneven import tariffs with

export promotion. Additionally, I assess the role of supporting policies to assure the success of trade liberalization. I discuss in detail questions related to the sequencing of economic reform, with particular emphasis on stabilization and trade reform policies.

I also discuss the extent of trade reform in Latin America. The analysis concentrates on the evolution of productivity and exports, and it deals with several countries' experiences. I study the role of real exchange rates in the trade liberalization process, and scrutinize the recent trend toward appreciation observed in many countries in the region. Finally, I analyze the recent attempts at reviving regional integration agreements, and the consequences of the completion of GATT for Latin American nations.

### **Policy Transferability and Hysteresis: Daily and Weekly Hours in the BRD and the United States**

**Daniel S. Hamermesh**

NBER Working Paper No. 4773

June 1994

JEL Nos. D78, J20

Labor Studies

I develop a model with the path of labor-market outcomes exhibiting hysteresis that depends on prior labor-market policy. My results suggest that attempts to transfer policies across economies can lead to surprising results, even if *current* economic outcomes in the countries appear similar. I present examples of minimum wages, optimal income maintenance, and training programs, and apply the results to a discussion of overtime laws and differences in days and weekly hours worked in the United States and Germany.

### **Bubbles in Metropolitan Housing Markets**

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

NBER Working Paper No. 4774

June 1994

JEL Nos. G12, R33

Public Economics

A common sense and empirically supported approach to explaining changes in metropolitan real house prices is for the theory to describe an equilibrium price level to which the market is adjusting constantly. The determinants of real house price appreciation then can be divided into two groups: one that explains changes in the equilibrium price, and the other that accounts for the adjustment dynamics, or changing deviations from the equilibrium price.

The former group includes the growth in real income and real construction costs, and changes in the real aftertax interest rate. The latter group consists of lagged real appreciation, and the difference between the actual and equilibrium real house price levels. Either group of variables can explain a little over two-fifths of the variation in real house price movements in 30 cities over 1977-92; together, they explain three-fifths of the variation.

### **Rental Adjustment and Valuation of Real Estate in Overbuilt Markets: Fundamental Versus Reported Office Market Values in Sydney, Australia**

**Patric H. Hendershott**

NBER Working Paper No. 4775

June 1994

JEL No. G12

Public Economics

Real estate markets periodically are plagued by excess supply, rent

concessions, and few arm's-length transactions. During such periods, valuation is problematic. The model presented here requires the forecasts of future vacancy rates, and equilibrium and actual rental rates. I obtain vacancy rate forecasts of market participants, specify the equilibrium rental rate as the cost of capital, and estimate a rental adjustment equation in which real effective office market rents in Sydney are related to gaps between both natural and actual vacancy rates, and equilibrium and actual real effective rental rates.

Then I compute value estimates (relative to replacement cost) for 1992, including those for above-market leases, and show the sensitivity to key assumptions. I calculate value/replacement cost for the entire 1985-92 period, in contrast to comparable estimates implicit in data published by two prominent Australian real estate sources. Finally, I project the ratios of real effective rents to equilibrium rents, and value to replacement cost for 1993-2006.

### **Internal Versus External Capital Markets**

**David S. Scharfstein,  
Jeremy C. Stein, and  
Robert H. Gertner**

NBER Working Paper No. 4776  
June 1994  
Corporate Finance

We present a framework for analyzing the costs and benefits of internal versus external capital allocation. We focus primarily on comparing an internal capital market to bank lending. While both represent *centralized* forms of financing, in the former case the financing is *owner-provided*, while in the latter case it is not. We argue that the ownership aspect of internal capital allocation has three important con-

sequences: 1) it leads to more monitoring than bank lending; 2) it reduces managers' entrepreneurial incentives; and 3) it makes it easier to efficiently redeploy the assets of projects that are performing poorly under existing management.

### **Financial Decisionmaking in Markets and Firms: A Behavioral Perspective**

**Werner F. M. De Bondt and  
Richard H. Thaler**

NBER Working Paper No. 4777  
June 1994  
JEL No. G10  
Asset Pricing

In its attempt to model financial markets and the behavior of firms, modern finance theory starts from a set of axioms about individual behavior. Specifically, people are said to be risk-averse maximizers of expected utility and unbiased Bayesian forecasters; that is, agents make rational choices based on rational expectations. However, the rational paradigm may be criticized because the assumptions are descriptively false and incomplete, and the theory often lacks predictive power.

One way to make progress is to characterize actual decisionmaking behavior, as behavioral economists and psychologists do. This paper provides a selective review of recent work in behavioral finance. First, we ask why economists should be concerned with the psychology of decisionmaking. Then we discuss a series of key behavioral concepts, for example, people's well-known tendencies to give too much weight to vivid information and to show excessive self-confidence. The body of the paper illustrates the relevance of these concepts to important topics in investment theory and corporate finance. In each case, behavioral fi-

nance offers a new perspective on results that are anomalous within the standard approach.

### **Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift?**

**Roni Michaely,  
Richard H. Thaler, and  
Kent Womack**

NBER Working Paper No. 4778  
June 1994  
JEL No. G12  
Asset Pricing

Initiations and omissions of dividend payments are important changes in corporate financial policy. This paper investigates the market reaction to such changes in terms of prices, volume, and changes in clientele. We find that short-run price reactions to omissions are greater than for initiations (-7.0 percent versus +3.4 percent three-day return). However, when we control for the change in the magnitude of dividend yield (which is larger for omissions), the asymmetry shrinks or disappears, depending on the specification. In the 12 months after the announcement (excluding the event calendar month), there is a significant positive market-adjusted return for firms initiating dividends of +7.5 percent and a significant negative market-adjusted return for firms omitting dividends of -11 percent. However, the post *dividend* omission drift is distinct from, and more pronounced than, what follows earnings surprises. A trading rule employing both samples (long in initiation stocks and short in omission stocks) earns positive returns in 22 out of 25 years. Although these changes in dividend policy might be expected to produce shifts in clientele, we find little evidence for such a shift. Volume increases, but

only slightly and briefly, and there are no important changes in institutional ownership.

### **Technological Linkages, Market Structure, and Optimum Production Policies**

**Douglas Holtz-Eakin and Mary E. Lovely**

NBER Working Paper No. 4779  
June 1994  
JEL Nos. F12, H21, H50  
Public Economics

We show that policy design for vertically related industries hinges on the nature of market interactions, as well as on technological linkages. Using a model in which final-good producers realize productivity gains from increasing domestic specialization of intermediate processes, we find no theoretical basis for presuming that an imperfectly competitive intermediates sector restricts output below the optimal level, or that the market produces too many varieties. The direction of distortion depends on the relationship between the extent of the external economy and the market power of individual intermediates producers. Optimal corrective policies require two instruments: an output subsidy, and a lump-sum tax or subsidy. If only one instrument is available, it may be optimal to tax instead of subsidize the activity generating the externality.

### **Investment with Uncertain Tax Policy: Does Random Tax Policy Discourage Investment?**

**Kevin Hassett and Gilbert E. Metcalf**

NBER Working Paper No. 4780  
June 1994  
JEL Nos. H2, H3, E2  
Public Economics

In models with irreversible in-

vestment, increasing uncertainty about prices increases the required rate of return (hurdle rate) and delays investment. One serious form of uncertainty faced by firms, which policymakers conceivably could control, is tax uncertainty. In this paper, we show that it does not follow from earlier work that uncertainty in tax policy increases the expected hurdle price ratio and delays investment. This is because tax uncertainty has an unusual form that distinguishes it from price uncertainty: tax rates tend to remain constant for many years, and then change in large jumps. When tax policy follows a jump process, firms' expectations of the likelihood of the jump occurring have important effects on investment. Indeed, while price uncertainty increases the hurdle rate and slows down investment, tax uncertainty has the opposite effect.

### **Agglomeration and the Price of Land: Evidence from the Prefectures**

**Robert Dekle and Jonathan Eaton**

NBER Working Paper No. 4781  
June 1994  
JEL Nos. R12, F12  
International Trade and Investment

We use Japanese prefectural wages and land prices to estimate the agglomeration effects in manufacturing and finance. We also examine how agglomeration effects diminish with distance, by using a specification that encompasses the polar cases of purely local agglomeration economies, on the one hand, and national increasing returns to scale, on the other. We find that agglomeration effects are slightly stronger in financial services than in manufacturing, and that they diminish substantially with distance in either sector. Our

estimates indicate that agglomeration effects can explain about 5.6 percent of the growth in Japanese output per worker in manufacturing and about 8.9 percent of the growth in output per worker in financial services during 1976–88. Our estimates imply that, while the average elasticity of productivity with respect to agglomeration is between 10 and 15 percent, agglomeration economies in the largest prefectures are nearly exhausted.

### **Waves of Creative Destruction: Customer Bases and the Dynamics of Innovation**

**Jeremy C. Stein**

NBER Working Paper No. 4782  
June 1994  
Corporate Finance

This paper develops a model of repeated innovation with knowledge spillovers. The model's novel feature is that firms compete on two dimensions: 1) product quality or cost, in which one firm's innovation ultimately spills over to other firms; and 2) distribution costs, in which there are no spillovers across firms and in which incumbent firms' existing customer bases give them a competitive advantage over would-be entrants. Customer bases have two important consequences: in some circumstances they can reduce the long-run average level of innovation dramatically, and they lead to endogenous bunching, or waves, in innovative activity.

### **The Alternative Minimum Tax and the Behavior of Multinational Corporations**

**Andrew B. Lyon and Gerald Silverstein**

NBER Working Paper No. 4783  
June 1994  
JEL Nos. H25, H32  
Public Economics

This paper examines the extent to which U.S.-based multinational corporations are affected by the alternative minimum tax (AMT). More than half of all foreign-source income received by corporations in 1990 was earned by corporations subject to the AMT. The AMT rules potentially affect multinational corporations differently from domestic corporations. We examine the differential incentives the AMT creates for locating investment either domestically or abroad, and consider how it affects the incentives for the repatriation of foreign-source income. We also examine tax return data of U.S.-based multinationals to see how these incentives may influence the actual repatriation of foreign-source income.

### **Mathematical Achievement in Eighth Grade: Interstate and Racial Differences**

**Victor R. Fuchs and  
Diane M. Reklis**

NBER Working Paper No. 4784

June 1994

JEL No. H52

Labor Studies

The 1992 eighth grade mathematics test of the National Assessment of Educational Progress (NAEP) reveals a low average level of achievement, wide variation across states, and a large difference in average scores of white and black students. Multiple regression analysis across states indicates that the characteristics of children (such as readiness to learn in kindergarten) and of the households in which they live (such as mother's education) have much larger effects on NAEP test scores than do variables that measure school characteristics (such as the student/teacher ratio). White-black differences in the levels of child and household variables account for much of the

white-black difference in NAEP test scores.

### **Can State Taxes Redistribute Income?** **Martin Feldstein and Marian Vaillant**

NBER Working Paper No. 4785

June 1994

JEL Nos. H71, H73

Public Economics

This paper supports the basic theoretical presumption that state and local governments cannot redistribute income. Since individuals can avoid unfavorable taxes by migrating to jurisdictions with more favorable tax conditions, a relatively unfavorable tax will cause gross wages to adjust until the resulting net wage is equal to what is available elsewhere. Our findings go beyond confirming this long-run tendency, and show that gross wages adjust rapidly to the changing tax environment. Thus, states cannot redistribute income even for a period of a few years.

The adjustment of gross wages to tax rates implies that a more progressive tax system will raise the cost to firms of hiring more highly skilled employees and reduce the cost of hiring lower-skilled labor. Thus a more progressive tax induces firms to hire fewer high-skilled employees and more low-skilled employees.

Since state taxes cannot alter net wages, there can be no trade-off at the state level between distribution goals and economic efficiency. Shifts in state tax progressivity, by altering the structure of employment and distorting the mix of labor inputs used by firms, create deadweight efficiency losses without achieving any net redistribution of income.

### **Effectiveness of Government Policy: An Experience from a National Health Care System**

**Tetsuji Yamada, Tadashi Yamada, Chang Gun Kim, and Haruko Noguchi**

NBER Working Paper No. 4786

June 1994

JEL No. I1

Health Economics

This paper examines the trade-off between the length of treatment (in days) and the units of service provided per day for elderly patients in the context of the initiative taken by the Ministry of Health and Welfare of Japan to discourage lengthy hospital treatment and/or stay by elderly patients. By using three leading diseases among the elderly in Japan (cancer, heart-related disease, and mental illness), and separating utilization of care into an episode by types of treatment, we find that the government measures function but does not work effectively to reduce increases in medical expenditures by the elderly on a fee-for-service basis. The evidence shows the interdependency between days and quantity of services, and the larger impact of services on days than days on services. Providers are more able to raise their revenue by additional services than by additional treatment days, under the government's current cost containment policy toward the elderly care. For the so-called skilled type of treatment services (injection, general treatment, consultation, and operation), the results for all elderly, ages 65 and over, without disease classification show some statistically significant positive impact on length of treatment in days and quantity of services provided per day. For the so-called material type

of service (medication and examination), medical service providers are likely to prescribe more drugs as the price of drugs falls under the current strict drug price control by the Japanese government.

### **Unemployment Insurance Benefits and Takeup Rates**

**Patricia M. Anderson and Bruce D. Meyer**

NBER Working Paper No. 4787

June 1994

Labor Studies

Despite clear theoretical predictions of the effects of UI on takeup, there is little work on the link between the generosity of the program and the propensity to file for benefits. Administrative data allow us to assign the potential level and duration of benefits accurately for a sample of workers leaving their employers, whether or not UI was ever received. We then use these values, along with marginal tax rates, as our main explanatory variables in estimates of the probability that an employee leaving a job receives UI. We find that the benefit level has a strong positive effect on takeup, but little effect on the potential duration of benefits. Our estimates imply elasticities of the takeup rate with respect to benefits of about 0.46 to 0.78. We also show that potential claimants respond to the tax treatment of benefits. The effects of taxing UI benefits are such that recent tax changes can explain most of the decline in UI receipt in the 1980s.

In addition, we find support for the proposition that those with short unemployment spells are less likely to file. We show that if the decision to file for UI is affected by benefit levels and the expected duration of unemployment, it will bias estimates of the effects of UI on unemployment duration.

### **Efficient and Inefficient Sales of Corporate Control**

**Lucian Arye Bebchuk**

NBER Working Paper No. 4788

July 1994

Law and Economics

This paper develops a framework for analyzing transactions that transfer a company's controlling block from an existing to a new controller. I use this framework to compare the market rule, which is followed in the United States, with the equal opportunity rule, which prevails in some other countries. The market rule is superior to the equal opportunity rule in facilitating efficient transfers of control, but inferior to it in discouraging inefficient transfers. I identify conditions under which one of the two rules is superior overall: for example, the market rule is superior if existing and new controllers draw their characteristics from the same distributions. Finally, I analyze the effects of the rules on surplus division, which reveals a rationale for mandatory rules.

### **The Financial Accelerator and the Flight to Quality**

**Ben S. Bernanke, Mark Gertler, and Simon Gilchrist**

NBER Working Paper No. 4789

July 1994

JEL Nos. E32, E44, E51

Monetary Economics

Adverse shocks to the economy may be amplified by worsening conditions in the credit market; that is, there is a financial "accelerator." We interpret the financial accelerator as resulting from endogenous changes over the business cycle in the agency costs of lending. One implication of the theory is that, at the onset of a recession, borrowers facing high agency costs should receive a relatively lower

share of the credit extended, and hence should account for a proportionally greater part of the decline in economic activity. We review the evidence for these predictions with data from large and small manufacturing firms.

### **Agricultural Interest Groups and the North American Free Trade Agreement**

**David Orden**

NBER Working Paper No. 4790

July 1994

JEL Nos. F13, Q17, Q18

International Trade and Investment

This paper evaluates the influence of diverse U.S. agricultural interest groups on the North American Free Trade Agreement (NAFTA). Under NAFTA, licenses and quotas that restricted agricultural trade between Mexico and the United States were converted to tariffs in January 1994; all tariffs are to be phased out over adjustment periods of up to 15 years. The agricultural provisions of the 1988 Canada-U.S. Free Trade Agreement—which left quantitative barriers intact for dairy, poultry, and other sectors—remain in effect for bilateral Canadian-U.S. trade.

NAFTA received support from export-oriented U.S. producers of most grains, oilseeds, livestock, and some horticultural products. There was opposition from wheat producers, seeking leverage on Canadian export-pricing issues, and from protected producers of sugar, peanuts, and winter fruits and vegetables. The opposition was not addressed in the side agreements negotiated by the Clinton administration, but the agricultural commodity groups were able to bargain for accommodations in the subsequent legislative debate. Final concessions protect U.S. sugar from Mexi-

can competition, provide some transition protection to winter fruits and vegetables, and ensnarl the United States in disputes about Canadian exports of wheat and peanut butter. With these concessions, NAFTA results in essentially no reform of entrenched domestic agricultural support programs in the United States (or Canada) during the lengthy tariff phase-out periods.

### **The Ethnic and Racial Character of Self-Employment**

**Robert W. Fairlie and Bruce D. Meyer**

NBER Working Paper No. 4791

July 1994

JEL Nos. J10, J20

Labor Studies

Using the 1980 and 1990 Censuses, we show that self-employment rates differ substantially across ethnic and racial groups in the United States. These differences exist for both men and women, within broad combinations of ethnic/racial groups such as Europeans, Asians, Hispanics, and blacks, and after controlling for variables such as age, education, immigrant status, and time in the country. Although there are large differences in self-employment rates across ethnic/racial groups, the processes determining self-employment within each ethnic/racial group are not substantially different. We find fairly similar effects of age, education, year of immigration, and other factors in determining who is self-employed for most groups.

We examine whether ethnic/racial self-employment rates are associated with group returns to self-employment. We find evidence of a positive association between an ethnic/racial group's self-employment rate and the difference between average self-employment

and wage/salary earnings for that group. This result suggests that our economic model of the self-employment decision may be useful in explaining differences in self-employment rates across ethnic/racial groups. We also find that different ethnic/racial groups locate their businesses in different types of industries. In addition, we do not find that ethnic/racial groups who immigrate from countries with high self-employment rates have high self-employment rates in the United States.

### **Recent Private Capital Inflows to Developing Countries: Is the Debt Crisis History?**

**Michael P. Dooley, Eduardo Fernandez-Arias, and Kenneth M. Kletzer**

NBER Working Paper No. 4792

July 1994

JEL No. F34

International Finance and

Macroeconomics

We find that while debt reduction and policy reforms in debtor countries have been important determinants of renewed access to international capital markets, changes in international interest rates have been the dominant factor. We calculate the effects of changes in international interest rates for a "typical" debtor country. We conclude that increases in interest rates associated with business cycle upturn in industrial countries could depress the secondary market prices of existing debt to levels inconsistent with continued capital flows.

### **Capital Flight, External Debt, and Domestic Policies**

**Michael P. Dooley and Kenneth M. Kletzer**

NBER Working Paper No. 4793

July 1994

JEL Nos. F32, F34

International Finance and

Macroeconomics

It is now well documented that capital flight has been a dominant feature of capital movements between developing and industrial countries. Since 1988, reductions in the stock of capital flight more than account for private capital flows to emerging markets. This suggests that what appears to be a diversification of portfolios of residents of developed countries may be a restoration of "home bias" in the portfolios of residents of developing countries. We show that changes in the stock of capital flight can increase or decrease welfare, depending on the structure of distortionary taxes and subsidies on capital income, and the effects of capital flight on the tax base.

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

#### **The Population of the United States, 1790-1920**

**Michael R. Haines**

NBER Historical Paper No. 56

June 1994

In the 130 years following the first federal census of the United States in 1790, the American population increased from about four million to almost 107 million people. This was predominantly a natural increase, driven initially by

high birth rates and moderate mortality levels and later (after the Civil War) by declining death rates. In addition, over 33 million recorded arrivals of immigrants increased the growth rate. By the two decades prior to World War I, about one-third of the total increase originated in net migration.

A number of unusual features characterized the American demographic transition over the "long" 19th century. The fertility transition began early (dating from at least 1800) and started from very high levels. The average woman had over seven live births in 1800. The crude birth rate declined from about 55 in 1800 to about 25 in 1920. This occurred prior to 1860 in an environment mainly without widespread urbanization and industrialization. Mortality levels were moderate, and death rates began their sustained decline only by the 1870s, long after the fertility transition had begun. This contrasts with the more usual description of the demographic transition in which mortality decline precedes or accompanies the fertility transition. Internal migration in the United States was also distinctive. Over most of the 19th century, flows followed east-west axes, although this began to weaken as rural-urban migration began to supplant westward rural migration in importance. International migration proceeded in waves and changed its character as the "new" migration from eastern and southern Europe replaced the "old" migration from western and northern Europe. This paper summarizes much of what is currently known about the American population, its composition, vital processes, and location, over this crucial period of growth.

### **Appendix to: "How America Graduated from High School, 1910 to 1960," Construction of State-Level Secondary School Data**

**Claudia Goldin**

NBER Historical Paper No. 57

June 1994

JEL Nos. J24, I20, N32

A new state-level series on secondary school data demonstrates that graduation and enrollment rates increased greatly in the 1920s and 1930s in most regions. An 18-year-old male in 1910 had just a 10 percent chance of having a high school diploma, but by the mid-1930s the median 18-year-old male was a high school graduate. This appendix describes the procedures used to construct the state-level numbers for secondary school enrollment and graduation that appear in NBER Working Paper No. 4762, "How America Graduated from High School: 1910 to 1960."

### **Labor Markets in the Twentieth Century**

**Claudia Goldin**

NBER Historical Paper No. 58

June 1994

JEL Nos. N31, N32, J40

The study of the labor market over the past 100 years reveals enormous progress, but also that history repeats itself and that we have come full circle in some ways. There has been progress in the rewards of labor: wages, benefits, and increased leisure through shorter hours, more vacation time and sick leave, and earlier retirement. Labor also has been granted added security on the job, and there are more safety nets for the unemployed, ill, and aged.

The progress in the labor market has interacted with societal changes, of which women's increased

participation in the paid labor force is probably the most significant. Another major change in the labor market is the virtual elimination of child and full-time juvenile labor.

But two of the most pressing economic issues of our day demonstrate that history repeats itself: First, labor productivity has been lagging since the 1970s. It was equally sluggish at other junctures in American history, but the present period has unique features. The current productivity slowdown in the United States has been accompanied by a widening the wage structure.

Because of this coincidence, rising inequality is a far more serious problem today. The wage structure was as wide in 1940 as it is today, but there is no hard evidence to date of when it began its upward trend. Therefore, the wage structure has come full circle, to what it was more than a half century ago. Union strength also has come full circle to what it was at the turn of this century.

## **Technical Papers**

### **Small Sample Bias in GMM Estimation of Covariance Structures**

**Joseph G. Altonji and Lewis M. Segal**

NBER Technical Paper No. 156

June 1994

Labor Studies

We examine the small sample properties of the GMM estimator for models of covariance structures, in which the technique is often referred to as the optimal minimum distance (OMD) estimator. We present a variety of Monte Carlo ex-

periments based on simulated data and on the data used by Abowd and Card (1987, 1990) in an examination of the covariance structure of hours and changes in earnings. Our main finding is that OMD is seriously biased in small samples for many distributions, and in relatively large samples for poorly behaved distributions. The bias is almost always downward. It arises because sampling errors in the second moments are correlated with sampling errors in the weighting matrix used by OMD. Furthermore, OMD usually has a larger root mean square error and median absolute error than equally weighted minimum distance (EWMD).

We also propose and investigate an alternative estimator, which we call independently weighted optimal minimum distance (IWOMD). IWOMD is a split sample estimator using separate groups of observations to estimate the moments and the weights. IWOMD has identical large sample properties to the OMD estimator but is unbiased regardless of sample size. However, the Monte Carlo evidence indicates that IWOMD usually is dominated by EWMD.

### **Econometric Mixture Models and More General Models for Unobservables in Duration Analysis**

**James J. Heckman and Christopher R. Taber**

NBER Technical Paper No. 157

June 1994

JEL No. C41

Labor Studies

This paper considers models for unobservables in duration models. It demonstrates how cross-section and time-series variation in regressors facilitates identification of single-spell, competing risks, and multiple-spell duration models. We

also demonstrate the limited value of traditional identification studies by considering a case in which a model is identified in the conventional sense but cannot be estimated consistently.

### **Biases in Twin Estimates of the Return to Schooling: A Note on Recent Research**

**David Neumark**

NBER Technical Paper No. 158

June 1994

JEL Nos. C23, J31

Labor Studies

Ashenfelter and Krueger's (1993) estimate of the return to schooling among a sample of twins is about 13–16 percent. If their estimate is unbiased, then their results imply considerable downward measurement error bias in uncorrected estimates of the return to schooling, and considerable downward omitted ability bias in cross-section estimates.

This note points out that if there are ability differences among twins, then Ashenfelter and Krueger's instrumental variables estimator exacerbates the omitted ability bias. Thus, upward omitted ability bias may provide an alternative explanation of the surprisingly high estimates of the return to schooling that they obtain, and permit their results to be reconciled with upward, rather than downward, omitted ability bias in cross-section estimates.

### **Interpreting Tests of the Convergence Hypothesis**

**Andrew B. Bernard and Steven N. Durlauf**

NBER Technical Paper No. 159

June 1994

JEL Nos. O47, C1

Economic Fluctuations

This paper provides a framework for understanding the cross-section and time-series approaches that have been used to test the con-

vergence hypothesis. We present two definitions of convergence that capture the implications of the neo-classical growth model for the relationship between current and future cross-country differences in output. Then we identify how the cross-section and time-series approaches relate to these definitions. Cross-section tests are associated with a weaker notion of convergence than time-series tests. Third, we show how these alternative approaches lead to different assumptions on whether the data are characterized well by a limiting distribution. As a result, the choice of an appropriate testing framework depends on both the specific null and alternative hypotheses under consideration and on the initial conditions characterizing the data being studied.



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