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NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

WINTER 1992/3

Program Report

The Economics of Aging

David A. Wise

Members of the NBER's Program on the Economics of Aging currently are doing research on: the housing and living arrangements, health care, and financial status of the elderly; U.S. demographic trends and their economic consequences; labor market and retirement behavior, including saving for retirement; and international comparisons of these issues. Much of this research has been published in a series of University of Chicago Press volumes for the NBER, the first of which appeared in 1989. A fourth volume is scheduled for publication in 1993. Many of our current research efforts are summarized here; substantial related work on health care is now underway, and will be summarized in a future issue of the *NBER Reporter*.

Demographics and Housing

Daniel L. McFadden has been considering the relationship between demographics, the housing market, and the welfare of the elderly.¹ His work emphasizes the distribution of homeownership capital across past and future generations of U.S. households. This issue has particular importance for older people, because a large percentage of the wealth of the majority of elderly households is in the form of housing, and because much of the value of this housing traditionally has resulted from capital appreciation. McFadden's results suggest that people born between 1880 and 1910 achieved a real rate of return on their housing investment of about 3 percent per year. He projects that real housing returns will

¹D. L. McFadden, "Demographics, the Housing Market, and the Welfare of the Elderly," paper presented at the NBER Conference on the Economics of Aging, May 7-10, 1992, and in a conference volume by the University of Chicago Press, forthcoming.

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This issue of the *Reporter* highlights the Bureau's Program on the Economics of Aging. Next, Ben S. Bernanke, Michael D. Bordo, and Lawrence F. Katz summarize their presentations at the NBER's Annual Research Conference in October. After biographical sketches, news of NBER conferences, and other NBER news and reports, the *Reporter* concludes with short summaries of recent Working Papers.

decline to about 1 percent per year for people born around 1915, zero for people born about 1930, negative 1 percent for people born around 1945, and negative 3 percent for people born between 1960 and 1990. Despite the significant variation in capital appreciation across generations, it turns out that real income growth over time has a far larger effect on the welfare of different generations than does housing appreciation.

A related paper by Louise M. Sheiner and David N. Weil examines the degree to which the elderly reduce homeownership as they age.² This study finds that average levels of homeownership and housing wealth decline significantly in the last few years of life. In addition, the value of houses sold by elderly people tends not to remain in their portfolios after the house is sold. About 42 percent of households leave behind a house when the last member dies, and the average value of houses left is about \$38,000.

²L. M. Sheiner and D. N. Weil, "The Housing Wealth of the Aged," NBER Working Paper No. 4115, July 1992.

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Nursing Home Utilization

Alan M. Garber and Thomas E. MaCurdy have been studying the long-term care of the elderly. In a recent paper on nursing home utilization, they find that the risk of a 65-year-old entering a nursing home at some time during the remainder of his or her life is 35 percent.³ Ten percent of the elderly will have more than one admission, and 0.5 percent will have more than four admissions. The median age of a first nursing home ad-

Of the individuals with some nursing home utilization, almost 25 percent spend a total of one month or less; about half spend less than six months total in a nursing home. However, about 10 percent of men admitted to nursing homes will stay there for six or more years; about 10 percent of women admitted to nursing homes will stay for eight or more years.

While two-thirds of 65-year-olds will never enter a nursing home, and a large part of the remaining one-third will experience only a short stay in a nursing home, a substantial minority of older people can expect to have a very lengthy nursing home stay. This minority accounts for a large fraction of total nursing home utilization. The small risk of very long stays suggests that there may be a substantial role for insurance of nursing home care.

Pension Plan Provisions and Retirement

In a series of papers with Robin L. Lumsdaine and James H. Stock, I have demonstrated the dramatic effect of pension plan provisions on retirement behavior. Our work was based on the personnel records of large *Fortune* 500 companies. At most companies with defined-benefit pension plans, the value of the plan to employees varies significantly by age and years of service.⁴ There are large financial incentives to continue working at some ages and to retire at other ages. Using a statistical approach tailored to account for these financial incentives in pension plans, we can predict employee retirement rates by age with considerable accuracy. The estimated retirement rates are 81 for men and 84 for women.

In one study, we consider how retirement behavior changed under a temporary retirement bonus program called a "window plan," and find essentially no difference in the retirement behavior of men and women. Because firm pension plans typically contain financial incentives to retire even before Social Security eligibility, these plans likely influence the overall labor force participation rates of older people.

³A. Dick, A. M. Garber, and T. E. MaCurdy, "Forecasting Nursing Home Utilization of Elderly Americans," *NBER Working Paper No. 4107*, June 1992; also summarized in *NBER Digest*, September 1992.

⁴R. L. Lumsdaine, J. H. Stock, and D. A. Wise, "Pension Plan Provisions and Retirement: Men and Women, Medicare, and Models," *NBER Working Paper No. 4201*, October 1992.

A paper by Alan J. Auerbach, Laurence J. Kotlikoff, and David N. Weil explores how much of the economic well-being of older people is provided through income payments (annuities) as compared with asset holdings.⁵ They find that income annuities have increased in importance between 1962 and 1983, particularly among those over age 75, and among women. The increasing annuitization of the elderly may have contributed to lower levels of saving and smaller bequests, they suggest.

Tax-Advantaged Retirement Savings Plans

Savings can be a major source of support in retirement, and incentives to save for retirement are an important component of government policy. In one paper, Steven F. Venti and I document the basic patterns of saving behavior over the past decade and find little evidence of substitution between IRA for non-IRA saving.⁶ However, we observe that IRA contributions fell approximately 75 percent after the 1986 tax legislation.

In new research, Poterba, Venti, and I focus on 401(k) plans, which offer tax advantages similar to IRAs but are provided through employers.⁷ Approximately one-third of employees currently are eligible for these plans, and the employee participation rate of those who are eligible is roughly 75 percent. Contributions to 401(k) plans reached \$45 billion in 1989 and probably exceed \$60 billion today.

Our study finds little evidence for a saving offset between 401(k)s and other financial assets, but rather shows that households with and without 401(k) plans have very similar patterns of non-401(k) asset accumulation. These findings suggest that households view targeted retirement saving as different from other types of financial saving, and that there is little apparent substitution between the two.

In a related paper Poterba, along with Andrea Kusko and David W. Wilcox, analyzes three years of records of contributions to the 401(k) plan at a large U.S. manufacturing firm.⁸ They find a weak positive correlation between the employer match rate for 401(k) contributions

and both the participation and contribution rates in the plan. This conclusion is based on year-to-year variation in employer match rates. These correlations are weak because there is substantial persistence of individual behavior with respect to the 401(k) plan: that is, most participants contribute the same share of salary, year after year. The paper also provides important new evidence on the importance of federal limits on 401(k) contributions in affecting contributor behavior. Roughly 20 percent of the plan participants were making the maximum possible contribution, although only 1.5 percent were constrained by the IRS limit on the dollar value of contributions.

A study by Leslie E. Papke explores related issues.⁹ Using data that companies provide to the IRS about their 401(k) plans, Papke finds that a 0.05 increase in the employer matching rate is associated with an increase in employee contributions of between 1 and 5 percent. She also finds that the Tax Reform Act of 1986 reduced employee contributions to 401(k) plans by 4 percent, because of more restrictive contribution limits, new nondiscrimination requirements, and lower marginal tax rates.

Finally, B. Douglas Bernheim and John K. Scholz explore the effects of public opinion on private saving.¹⁰ Their study suggests that lower-income households may not respond significantly to tax incentives (such as IRAs), so that encouraging the creation and expansion of firm pension plans is more effective in increasing the savings of those households. For higher-income households, however, firm pensions appear to displace private saving, so that tax incentives may be more effective in increasing their savings.

International Comparisons

Axel Börsch-Supan compares the housing, saving, and retirement decisions made by older people in Germany and the United States.¹¹ Germany faces a particularly pronounced aging process: the dependency ratio in Germany is already at a level that will not be reached in the United States until 2015, and is projected to exceed 43 percent at its peak in 2030. In this respect, changes that are occurring now in Germany foreshadow changes to come in the United States.

⁹L. E. Papke, "Participation in and Contributions to 401(k) Pension Plans: Evidence from Plan Data," NBER Working Paper No. 4199, October 1992.

¹⁰B. D. Bernheim and J. K. Scholz, "Private Saving and Public Policy," NBER Working Paper No. 4215, November 1992, and in a volume by the MIT Press, forthcoming.

¹¹A. Börsch-Supan, "Aging in Germany and the United States: International Comparisons," paper presented at the NBER Conference on Aging, May 7-10, 1992, and in a conference volume by University of Chicago Press, forthcoming.

⁵A. J. Auerbach, L. J. Kotlikoff, and D. N. Weil, "The Increasing Annuitization of the Elderly—Estimates and Implications for Intergenerational Transfers, Inequality, and National Saving," NBER Working Paper No. 4182, October 1992.

⁶S. F. Venti and D. A. Wise, "Government Policy and Personal Retirement Saving," NBER Reprint No. 1752, September 1992, and in *Tax Policy and the Economy*, J. M. Poterba, ed. Cambridge, MA: MIT Press, 1992, pp. 1-41.

⁷J. M. Poterba, S. F. Venti, and D. A. Wise, "401(k) Plans and Tax-Deferred Saving," NBER Working Paper No. 4181, October 1992; also summarized in NBER Digest, December 1992.

⁸J. M. Poterba, A. Kusko, and D. W. Wilcox, "Participation in and Contributions to 401(k) Plans: Evidence from Firm Records," paper presented at the NBER Summer Institute, 1992, Cambridge, MA.

Börsch-Supan shows that both countries' pension systems are powerful instruments for influencing retirement decisions. Even after the recent Social Security reforms, pension policies may distort employee decisions in favor of early retirement, particularly in Germany. His results also suggest that an aging-induced reduction in individual savings may be small, or may not occur at all. Further, he finds that entitlement to future Social Security benefits leads to a reduction in savings.

Finally, Börsch-Supan suggests that, under current policies, an aging population may distort the housing market. Policies reducing the mobility of older people inhibit the natural transfer of homes to younger generations; new construction is biased toward too few and too large houses; and there are economic disincentives for family care and multigenerational living arrangements.

Research Summaries

The following articles summarize the three presentations made at the NBER's Annual Research Conference in New York on October 26.

Annual Research Conference—1:

Monetary Policy and Bank Lending

Ben S. Bernanke

Over the last decade or so, NBER researchers have analyzed the effect of financial conditions, particularly the characteristics of borrowers' and lenders' balance sheets in macroeconomic performance.¹ The result, I believe, is a much richer understanding of the sources of aggregate fluctuations. For example, ten years ago the leading theory of the determination of business fixed investment implied that the main factors affecting investment were the marginal product of capital and the real interest rate. Absent large unexplained fluctuations in capital's marginal product, this neoclassical theory was hard pressed to explain the volatility of investment over the business cycle. Recent empirical research has shown instead that balance sheet conditions, such as the firm's indebtedness or its access to internal finance, have a

¹Recent NBER volumes bearing on this theme include: *Asymmetric Information, Corporate Finance, and Investment (1990)* and *Financial Markets and Financial Crises (1991)*, both edited by R. G. Hubbard and published by the University of Chicago Press for the NBER.

major influence on its investment decisions.² It seems likely that cyclical changes in balance sheets or cash flows, perhaps in interaction with the illiquid nature of capital investments, ultimately will provide an explanation of the cyclical volatility of investment spending that is superior to what the neoclassical model can offer.

The research I report on here, on the link between monetary policy and commercial bank lending, is a relatively small subtopic of this larger research program on financial-real interactions. It shares with the larger program the idea that balance sheets matter, as well as the broader conviction that—because the structure of financial arrangements affects the transmission of information and the incentives of market participants—financial conditions do have effects on the real economy.

The Channels of Monetary Transmission: Money Versus Credit

The question I take up here is a very old one: how does monetary policy affect aggregate demand? The standard answer is that the Federal Reserve works its magic by changing the supply of the medium of exchange relative to the demand. According to this story, to slow down the growth of aggregate demand (for example), the Fed uses open market sales to drain reserves from the banking system, reducing the money supply. This shortage of liquidity is presumed to drive up short-term—and possibly, through expectational effects, longer-term—interest rates. Higher interest rates are then presumed to depress aggregate demand by raising the cost of funds relative to the returns to capital (including housing and consumer durables). I will refer to this standard channel as the “money channel” of monetary transmission.

Without necessarily denying the existence of this conventional money channel, recent research has addressed the possibility that there is an additional channel of monetary policy transmission, which I will refer to as the “credit channel.” In contrast to the money channel, which operates through the liabilities side of bank balance sheets (deposits), the credit channel (if it exists) operates through the asset side of the bank balance sheet (loans and securities). This credit channel relies on two assumptions.

The first is that banks do not treat loans (for example, to commercial and industrial firms) and securities (such as Treasury bills) as perfect substitutes in their portfolios. This assumption is quite realistic: banks hold securities primarily for liquidity, for collateral, and to satisfy various legal requirements, while loans are held primarily for their expected return.

²See, for example, S. Fazzari, R. G. Hubbard, and B. C. Petersen, “Financing Constraints and Corporate Investment,” *Brookings Papers on Economic Activity (1988:1)*, pp. 141–195.

The second assumption is that potential borrowers, such as business firms, are not indifferent between bank loans and the issuance of open-market securities, such as equities or corporate bonds, as a means of raising funds. Again, this assumption is realistic: many firms, especially smaller ones, have essentially no access to open-market credit and must rely entirely on banks or other intermediaries for funds. In part, this is because of the large fixed costs of open-market issues, as well as because of the comparative advantage that banks have developed in assessing the quality of business loans, which reduces the net cost of borrowing through a bank. Even large firms do not appear to be indifferent about their sources of funds: for large firms, bank loans may provide short-run liquidity not available from public issues. Studies of stock market data also have shown that the announcement of large new bank loans raises equity values, suggesting that bank loans are a useful method of signaling to the market that the firm's prospects are good.

Adding these two plausible assumptions to the standard macro model leads to a new channel of monetary policy transmission: the credit channel.³ The credit channel works as follows: suppose again that the Federal Reserve wants to depress aggregate spending, and therefore has drained reserves from the banking system. To the extent that the loss of reserves forces a contraction in bank liabilities (deposits), it must lead simultaneously to a parallel contraction in bank assets (loans and securities). If loans and securities are not perfect substitutes for banks, then in general, as banks lose deposits, they will try to reduce both categories of assets. In particular, banks may cut down new lending, fail to renew old loans, and in extreme cases even call outstanding loans.

If firms were indifferent about their source of finance, then a cutback in bank lending would not affect their behavior; they simply would switch to alternative credit sources. However, if alternative forms of credit are more expensive to the firm, or simply are not available,⁴ then a drying up of bank lending may force firms to cancel or delay capital projects, reduce inventories, or even cut payrolls. In short, the credit channel story says that contractionary monetary policy can force banks to cut loans, and that reduced bank lending in turn impels firms that

are wholly or partially dependent on banks for credit to reduce their spending. Similar effects could operate in the consumer sector, to the extent that households are directly or indirectly dependent on banks for certain types of credit.⁵

The existence of a credit channel does not rule out the simultaneous existence of a money channel. Indeed, there could be other modes of monetary transmission operating as well: for example, the research on investment alluded to in my introduction suggests that changes in nominal interest rates may affect investment spending via their impact on balance sheets or cash flows, as well as through the familiar "cost-of-capital" effect. Putting these various channels together yields a picture of the operation of monetary policy that is potentially much richer than the simple textbook analysis.

Evidence for the Credit Channel

Does a tightening of policy by the Federal Reserve lead to a reduction in bank lending, as required by the credit channel story? Does a fall in bank lending lead potential borrowers to reduce their spending?

A number of researchers have investigated the timing between monetary tightening and bank lending. Blinder and I found that, during the pre-1980 sample period, a tightening of monetary policy (as indicated by a rise in the federal funds rate) was followed in subsequent months by a decline in bank deposits and a matching decline in bank holdings of securities.⁶ Bank loans did not fall during the first months after a tightening; indeed, initially, loans rose slightly. However, within six to nine months, banks began to rebuild their security holdings and to reduce lending substantially. The timing of the fall in lending corresponded closely to a rise in the unemployment rate. Blinder and I interpreted this pattern as being consistent with the credit channel story, arguing that the relatively slow reaction of lending was the result of costs that banks faced in adjusting their loan portfolios in the short run.

A potential problem with our interpretation is that a similar pattern might arise if only the money channel was operative. Suppose for example that a Fed tightening raised interest rates and induced firms to delay investment projects. Then we would expect again to see a decline in bank lending follow the tightening of policy,

³For a simple formal analysis, see B. S. Bernanke and A. S. Blinder, "Credit, Money, and Aggregate Demand," NBER Reprint No. 1205, June 1989, and American Economic Review Papers and Proceedings, 78, 2 (May 1988), pp. 435-439. An additional necessary assumption is that the Fed can affect the quantity or cost of funds available to the banking system.

⁴The literature on the credit channel often has been related to the literature on credit rationing. However, credit rationing, in the sense of strict limits on credit availability, is not needed for this channel to operate; it is sufficient that credit obtained from alternative sources be more expensive than the bank loan.

⁵The idea that bank lending plays a role in monetary transmission is not new; it was discussed under the rubric of the "availability doctrine" in the 1950s and can be found even in Keynes. However, because of developments in the economics of imperfect information and in econometric techniques, the theoretical and empirical bases for the idea are noticeably stronger than in the past.

⁶B. S. Bernanke and A. S. Blinder, "The Federal Funds Rate and the Channels of Monetary Transmission," NBER Working Paper No. 3487, October 1990, and in American Economic Review 82, 4 (September 1992), pp. 901-921.

except that in this case the decline in lending would be the result of a fall in borrowers' demand for loans, rather than a reduced willingness of banks to lend.

In an interesting attempt to resolve the identification problem, Anil K. Kashyap, Jeremy C. Stein, and David W. Wilcox examined the behavior of alternatives to bank lending following episodes of monetary tightening.⁷ They argued that, if the source of the lending slowdown was a reduction in loan supply, as implied by the credit channel theory, then nonbank sources of credit should rise following policy tightening, as firms looked to alternative lenders. In contrast, if the reason for the slowdown in lending was a decline in credit demand, then all forms of credit extension should fall after a tightening of policy. These authors' empirical results favored the credit channel view, as they found that issuance of commercial paper in particular has tended to rise sharply following a tightening of policy. Mark Gertler and Simon Gilchrist found that much of the Kashyap–Stein–Wilcox result was driven by the relatively more severe impact of monetary tightening on small, bank-dependent firms (as opposed to larger firms with access to commercial paper markets).⁸ Gertler and Gilchrist interpreted their results as being consistent with a combination of the existence of a credit channel for monetary policy and a tendency for small firms to be financially weaker than larger firms.

Another type of evidence favoring the existence of a credit channel follows from the cyclical behavior of various interest rate spreads. For example, several researchers have found that the spread between the commercial paper (CP) rate and the interest rate on Treasury bills of similar maturity has remarkably strong forecasting power for the real economy; in particular, an increase in the CP rate relative to the T-bill rate signals an impending recession.⁹ While several factors may explain the predictive power of this interest rate spread, one possibility is the operation of the credit channel of monetary transmission: a tightening of policy that reduces bank lending should lead both to a wider spread between the CP rate and the T-bill rate, as a constricted loan supply forces borrowers to rely more heavily on commercial paper issuance, and to a subsequent economic downturn. Indeed, I show that this particular interest rate spread is closely linked to indicators of mone-

tary policy.¹⁰ Similar results, with a similar interpretation, obtain for other spreads such as the spread between the rate on bank CDs and the T-bill rate.

If we accept that a tightening of monetary policy reduces the supply of bank loans, there still remains the question of whether potential borrowers are forced to reduce spending, or whether they can switch without significant costs to alternative credit sources. The evidence here is more limited but suggests that there do exist "bank-dependent" borrowers who face significant costs of finding alternative sources of credit. Gertler and Gilchrist's finding that small firms suffer disproportionately from episodes of monetary stringency is consistent with this view. Similarly, Kashyap, Owen A. Lamont, and Stein found that bank-dependent firms, defined to be firms without bond ratings and with low reserves of liquidity, were much more likely than other firms to shed inventories during a period of tight money.¹¹

The evidence that I have described here briefly is, of course, drawn from historical episodes. It is possible that, whatever the relevance of the credit channel in the past, institutional changes that have occurred over the last 20 years or so may have rendered the credit channel inoperative by now. For example, Christina D. Romer and David H. Romer have stressed the significance of the elimination of reserve requirements on banks' managed liabilities; now, if an open market sale drains reserves and reduces banks' core deposits, banks that wish to make loans still can obtain funds by issuing large-denomination CDs. Other institutional changes that may have weakened the credit channel are the increasing ability of banks to securitize assets and the proliferation of alternative sources of commercial credit, including, among others, junk bonds, finance companies, and asset-backed commercial paper.

While the strength of the credit channel no doubt has changed, I suspect that it remains a nontrivial part of the monetary transmission mechanism. The ability of banks to issue large CDs at a given interest rate, for example, likely is limited by the depth of the market and concerns about bank risk, while economic theory suggests strongly that there is a core of information-intensive loans that will be difficult to securitize. On the borrower side, small firms still do not have access to junk bonds or asset-backed commercial paper; and finance companies, which

⁷A. K. Kashyap, J. C. Stein, and D. W. Wilcox, "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance," NBER Working Paper No. 4015, March 1992, and in *American Economic Review*, forthcoming.

⁸M. Gertler and S. Gilchrist, "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms," NBER Working Paper No. 3892, November 1991.

⁹B. M. Friedman and K. N. Kuttner, "Money, Income, and Prices After the 1980s," NBER Reprint No. 1731, July 1992, and J. H. Stock and M. W. Watson, "New Indexes of Coincident and Leading Economic Indicators," in NBER Macroeconomics Annual, Volume 4, O. J. Blanchard and S. Fischer, eds., Cambridge, MA: MIT Press, 1989.

¹⁰B. S. Bernanke, "On the Predictive Power of Interest Rates and Interest Rate Spreads," NBER Working Paper No. 3486, October 1990, and in *New England Economic Review*, Federal Reserve Bank of Boston (November–December 1990), pp. 51–68. See also B. M. Friedman and K. N. Kuttner, "Why Does the Paper-Bill Spread Predict Real Economic Activity?" NBER Working Paper No. 3879, October 1991, and in *New Research in Business Cycles, Indicators, and Forecasting*, J. H. Stock and M. W. Watson, eds., Chicago: University of Chicago Press, forthcoming.

¹¹A. K. Kashyap, O. A. Lamont, and J. C. Stein, "Credit Conditions and the Cyclical Behavior of Inventories: A Case Study of the 1981–2 Recession," NBER Working Paper No. 4211, November 1992; also summarized in NBER Digest, February 1993.

do service small firms, have focused on more standardized lending rather than customized, information-intensive loans. Also, it should be remembered that institutional changes, particularly the offering by nonbanks of close substitutes for bank deposits, likewise have potentially affected the strength of the conventional money channel, so that it may be that the relative importance of the credit channel has not declined. In any case, we can hope that research on the alternative channels of monetary transmission will be of some help to policymakers as they try to cope with a rapidly changing financial environment.

The Credit Channel and the 1990 Recession

One of the striking features of the 1990 recession, documented by Cara S. Lown and me, among many others, is the sharp decline in bank lending.¹² Does this decline reflect the operation of the credit channel?

Interestingly, the answer appears to be no. Indeed, the 1990 recession may be one of the few postwar recessions in which a decline in bank lending engendered by tight monetary policy did *not* play a part. Evidence for the claim that the credit channel was not in operation during this recession includes: the decline of the federal funds rate well in advance of the recession; an apparent reluctance of banks to issue managed liabilities (contributing to slow M2 growth); weak growth of commercial paper and other nonbank forms of credit; and an unusual prerecession decline in the spreads between the CP and CD rates on the one hand and the T-bill rate on the other. Rather than the credit channel of monetary policy, Lown and I argue that two other types of financial developments contributed to the recession that began in 1990: first, a shortage of bank capital that constrained bank lending, particularly in the Northeast; second and more importantly, weakness in borrowers' balance sheets arising from high levels of indebtedness. To the extent that our diagnosis is correct, the 1990 recession illustrates the point made at the beginning of this article: that balance sheets play a potentially important role in business cycle dynamics.

¹²B. S. Bernanke and C. S. Lown, "The Credit Crunch," *Brookings Papers on Economic Activity* (1991:2), pp. 205–239.

Annual Research Conference—II:

The Bretton Woods International Monetary System: A Lesson for Today

Michael D. Bordo

In fall 1991, the NBER held a conference—"A Retrospective on the Bretton Woods International Monetary

System"—at the Mount Washington Hotel in Bretton Woods, New Hampshire. The historic International Monetary Conference of July 1944, creating the Bretton Woods System of adjustable pegged exchange rates, the International Monetary Fund (IMF), and the World Bank, was held at this hotel. The motivation for the NBER conference, organized by Barry J. Eichengreen and me, was to reexamine the Bretton Woods System 20 years after Richard Nixon closed the gold window in August 1971, effectively ending the world's last experiment with pegged exchange rates.

Some scholars' and officials' dissatisfaction with the performance of the present floating exchange rate system, coupled with increased interest in restoring fixed exchange rate arrangements and buoyed by the apparent success of the European Monetary System (EMS), made the conference timely. We assembled a group of young scholars, leading academic authorities on Bretton Woods, former officials from the Bretton Woods era, and one of the participants at the original Bretton Woods conference.

One year after the NBER conference, it seems that our topic was even more timely than we had imagined. The EMS recently has undergone convulsions reminiscent of the currency crises of the Bretton Woods era. Last fall we witnessed a replay of the scenes of 25 years ago: the shunting of anxious officials from one capital to another; their vigorous statements denying that devaluation was imminent; then, after the unthinkable happened, laying the blame on other countries' policies—Germany and the United States, and of course greedy speculators. I will focus here first on the history of the Bretton Woods System: its origins, how it worked in its heyday, its problems, and its collapse. Then I will discuss the conclusions of our conference, and finally the lessons for today.

The History of Bretton Woods

The planning during World War II that led to Bretton Woods aimed to avoid the chaos of the interwar period. The perceived ills to be avoided included: 1) floating exchange rates condemned in the early 1920s as prone to destabilizing speculation; 2) the subsequent gold exchange standard marred in the early 1930s by problems of adjustment, liquidity, and confidence that enforced the international transmission of deflation; and 3) after 1933, the beggar-thy-neighbor devaluations, trade restrictions, exchange controls, and bilateralism. To avoid these ills, John Maynard Keynes, Harry Dexter White, and others made the case for an adjustable peg system. The new system was intended to combine the favorable features of the fixed exchange rate gold standard, particularly exchange rate stability, with flexible rates, that would allow monetary and fiscal independence. Both Keynes, leading the British negotiating team, and White,

leading the American team at Bretton Woods, planned an adjustable peg system to be coordinated by an international monetary agency. Considerable differences between the two plans reflected the vastly different circumstances of the two powers at the end of the war: the United Kingdom with a massive outstanding external debt and her resources depleted; the United States the only major power to emerge with her productive capacity unscathed and holding the bulk of the world's gold reserves.

The Articles signed at Bretton Woods represented a compromise between the two plans and between the interests of the United States and the United Kingdom. The system that emerged defined parities in terms of gold and the dollar (the par value system) that could be altered only in the event of a fundamental disequilibrium in the balance of payments (caused, for example, by major technological shocks, changes in preferences, or events such as wars). International reserves and drawings on the IMF (special drawing rights, or SDRs) were to finance adjustment of the balance of payments in ordinary circumstances. In addition, members were supposed to make their currencies convertible for current account transactions, but capital controls were permitted.

The Bretton Woods System took 12 years to achieve full operation. It was not until December 1958 that the western European countries made their currencies convertible for current account transactions. Under the system, each member intervened in the foreign exchange market, either buying or selling dollars, to maintain the parity of its currency within the prescribed 1 percent margins. The U.S. Treasury in turn pegged the dollar at the gold price of \$35 per ounce by buying and selling gold freely. Thus, each currency was anchored to the dollar, and indirectly to gold.

The heyday of Bretton Woods was from 1959 to 1967. The dollar emerged as the key reserve currency, reflecting both its use as an intervention currency and a growing demand by the private sector for dollars as money. This growth in dollar demand was a response to stable U.S. monetary policy. In addition, the adjustable peg system evolved into a virtual fixed exchange rate system. Between 1949 and 1967, there were very few changes in parities of the G-10 countries. Because of the devaluation experience of 1949, monetary authorities were unwilling to accept the risk associated with discrete changes in parities: loss of prestige, the impression that others might follow, and the destabilizing speculation that occurred whenever devaluations were rumored.

As the system evolved into a fixed exchange rate, gold dollar standard, three problems that had plagued the interwar gold exchange standard reemerged: adjustment, liquidity, and confidence. They dominated the academic and policy discussions during the period, and were central to the analysis at the NBER conference.

The adjustment issue focused on how to achieve balance-of-payments equilibrium in a world with capital controls, fixed exchange rates, inflexible wages and prices, and domestic policy autonomy. Various policy measures were proposed to aid adjustment. Of particular interest during the period was asymmetry in adjustment between the reserve currency country, the United States, and the rest of the world. For the United States, the persistence of balance-of-payments deficits after 1957 was a source of concern.

The balance-of-payments deficit under Bretton Woods arose because capital outflows exceeded the current account surplus. For the U.S. monetary authorities, the deficit was perceived as a problem because of the threat of a convertibility crisis as outstanding dollar liabilities rose relative to the U.S. monetary gold stock. By 1959, the U.S. monetary gold stock equaled total external dollar liabilities, and was exceeded by the rest of the world's monetary gold stock. By 1964, official dollar liabilities held by foreign monetary authorities exceeded the U.S. monetary gold stock.

U.S. policies to restrict capital flows and discourage convertibility did not solve the problem. The Europeans regarded the U.S. balance-of-payments deficit as a problem because, as the reserve currency country, the United States did not have to adjust her domestic economy to the balance of payments. They resented the asymmetry in adjustment. Before 1965, they also believed mistakenly that the United States was exporting inflation to Europe through its deficits.

However, a number of prominent U.S. economists did not view the persistent U.S. balance-of-payments deficit as requiring adjustment. In their view, it served as the means to satisfy the rest of the world's demand for dollars. All that was required of the United States was to maintain price stability.

The main solution advocated for the adjustment problem was increased liquidity. Exchange rate flexibility was opposed strongly, as was the French proposal to raise the price of gold.

The liquidity problem evolved from a shortfall of monetary gold beginning in the late 1950s. The gap increasingly was made up by dollars. However, as Robert Triffin pointed out in 1960, dollars supplied by the U.S. deficit could not be a permanent solution. As outstanding dollar liabilities increased relative to U.S. gold reserves, the risk of a convertibility crisis grew. In reaction to this risk, it was feared that the United States would adopt policies to stem the dollar outflow. Hence new sources of liquidity were required, answered by the creation of SDRs in 1967. However, by the time SDRs were injected into the system in 1970, they exacerbated worldwide inflation.

The key perceived problem of the gold dollar system was how to maintain confidence. If the growth of the world's monetary gold stock was not sufficient to finance

the growth of world real output and to maintain U.S. gold reserves, the system would become dynamically unstable. From 1960 to 1967, the United States developed a number of policies to prevent conversion of dollars into gold. This included formation of the Gold Pool in 1961, swaps, Roosa bonds, and moral suasion. The defense of sterling was viewed as a first line of defense for the dollar. When none of these measures worked, the two-tier arrangement of March 1968 solved the problem temporarily by demonetizing gold at the margin and hence creating a de facto dollar standard.

By 1968, the seeds of destruction of the Bretton Woods System were sown. The world was on an unloved dollar standard. European countries were not happy with the dollar standard but were afraid of the alternatives. Both they and the United States were unwilling to allow their exchange rates to adjust. Moreover, the fixed exchange rate system was under increased pressure because of growing capital mobility. Governance of the system was in a state of flux: the IMF was weak, U.S. power was threatened, and the G-10, the de facto governors, were in discord.

The Bretton Woods System collapsed between 1968 and 1971 in the face of U.S. monetary expansion that exacerbated worldwide inflation. The United States broke the implicit rules of the dollar standard by not maintaining price stability. The rest of the world did not want to absorb additional dollars that would lead to inflation. Surplus countries (especially Germany) were reluctant to revalue. The Americans' hands were forced by British and French decisions in the summer of 1971 to convert dollars into gold. The impasse was ended by President Nixon's closing of the gold window on August 15, 1971.

Another important source of strain on the system was the unworkability of the adjustable peg under increasing capital mobility. Speculation against a fixed parity could not be stopped by either traditional policies or international rescue packages. The breakdown of Bretton Woods marked the end of U.S. financial dominance. The absence of a new center of international management set the stage for a centrifugal international monetary system.

Conclusions of the Conference

The following conclusions emerged from the NBER's Bretton Woods conference:

First, a comparison of the macro performance of the G-7 countries under Bretton Woods with the regimes that preceded and followed it revealed that the convertible period from 1959 to 1971 was the most stable regime for both nominal and real variables, and the most fragile. We still do not know whether Bretton Woods' stability was attributable to the design of the regime or to the absence of significant demand and supply shocks while it lasted. Bretton Woods' fragility, though, was attributed

both to flaws in its design and to conflicting policy objectives of the key deficit and surplus countries.

Second, capital controls were important in allowing different countries to follow independent monetary and fiscal policies for significant periods of time, and hence to have divergent inflation rates without having to realign their parities. Yet controls were not effective enough to prevent speculative attacks when the fundamentals dictated a realignment. Reliance on controls in turn impeded efficient international resource allocation. The gradual removal of controls, and the growing integration of world financial markets during the Bretton Woods convertible period, made it increasingly difficult for members to follow divergent policies and hence worsened the strains on the system.

A third issue was whether the Bretton Woods System was rule based, in the sense that adherence by the United States to gold convertibility, and by other member countries to fixed rates with the dollar, constrained monetary authorities to follow stable domestic monetary policies. And, did adherence to the Bretton Woods Articles constrain members from practicing competitive devaluations and encourage them to coordinate their monetary and fiscal policies?

Our conclusion was that the rules of Bretton Woods were not very effective. Gold convertibility did not brake U.S. monetary expansion in the mid-1960s. Competitive devaluations occurred in 1949 and to a lesser extent in 1967, and policy divergence prevailed throughout the period. Moreover, the IMF proved ineffective in enforcing compliance with the Articles by major countries. However, it did play an important role in monitoring the performance of, and assisting in the balance-of-payments adjustment by, developing countries.

Finally, the NBER conference provided new insights on the causes of the collapse of Bretton Woods. Although the United States followed a low inflation policy in the 1950s and early 1960s and hence played by the rules of the game, the cumulation of two decades of even low inflation meant that the fixed price of gold at \$35 per ounce eventually would be unsustainable. At that point, which occurred in March 1968, a speculative attack by rational agents could bring it down. Once the regime evolved into a de facto dollar standard, the obligation of the United States was to maintain price stability. Its failure to do so in turn precipitated a speculative attack, since rational currency speculators understood that monetary expansion was inconsistent with maintaining both stable prices and fixed exchange rates.

A Lesson for Today

The experience of Bretton Woods and its collapse provide interesting insights on recent events in the EMS. The exchange rate mechanism of the EMS was designed as an adjustable peg exchange rate system, but

its architects hoped to avoid the problems that plagued Bretton Woods.

Like Bretton Woods, it was based on a set of fixed parities called the Exchange Rate Mechanism (ERM). Each country was to establish a central parity of its currency in terms of ECU, the official unit of account. Like Bretton Woods, each currency was bounded by a set of margins of 2.25 percent on either side of parity (over twice those of Bretton Woods). Unlike Bretton Woods, the monetary authorities of both depreciating and appreciating countries were required to intervene when a currency hit one of the margins. Intervention and adjustment were to be financed under a complicated set of arrangements, designed to overcome the weaknesses of the IMF during Bretton Woods. Also, unlike Bretton Woods, whose members (other than the United States) could in effect decide unilaterally to alter their currencies, EMS changes in central parities were to be decided collectively. Finally, like Bretton Woods, members could (and did) impose capital controls that recently were phased out.

After a shaky start from 1979 to 1985, the EMS was, until recently, successful at stabilizing both nominal and real exchange rates within Europe and at reducing divergences among members' inflation rates. The success of the EMS was attributed in large measure to its evolution as an asymmetrical system, like Bretton Woods, with Germany acting as the center country. The other EMS members adapted their monetary policies to maintain fixed parities with Germany. The Bundesbank has exhibited a strong credible commitment to maintain low inflation. Other members of the EMS, by tying their currencies to the Deutschmark, have used an exchange rate target as a commitment mechanism to successfully reduce their own rates of inflation.

Yet, despite its favorable performance since the mid-1980s, the EMS recently was subjected to the same kinds of stress that plagued Bretton Woods. Like Bretton Woods, the EMS is a pegged exchange rate system that requires that member countries follow similar domestic monetary and fiscal policies and hence have similar inflation rates. This is difficult to do in the face of both differing shocks across countries, and differing national priorities. Under Bretton Woods, capital controls and less integrated international capital markets allowed members to follow divergent policies for considerable periods of time. Under the EMS, the absence of controls and the presence of extremely mobile capital means that any movement of domestic policies away from those consistent with maintaining parity quickly will precipitate a speculative attack. Also, just as under Bretton Woods, the adjustable peg in the face of such capital mobility becomes unworkable. Thus, the difference between the two regimes when faced with asymmetric shocks or differing national priorities was the speed of reaction by world capital markets.

Although the fundamental cause of the crisis was similar in the two regimes, the source of the problem differed. The shock that led to the collapse of Bretton Woods was an acceleration of inflation in the United States, ostensibly to finance the Vietnam War as well as social policies, and to maintain full employment. Under the EMS, the shock was bond-financed German reunification and the Bundesbank's subsequent deflationary policy. In each case, the system broke down because other countries were unwilling to go along with the policies of the center country. Under Bretton Woods, Germany and other western European countries were reluctant to inflate or to revalue, and the United States was reluctant to devalue. Under the EMS, the United Kingdom, Italy, Spain, and Ireland were unwilling to deflate, and Germany was unwilling to revalue. As under Bretton Woods, the EMS had the option for a general realignment, but both improved capital mobility and the Maastricht commitment to a unified currency made it an unrealizable outcome.

Thus the lesson for today is that pegged exchange rate systems do not work for long no matter how well they are designed. Pegged exchange rates, capital mobility, and policy autonomy just do not mix. The case made years ago, during the heyday of Bretton Woods, for floating exchange rates for major countries still holds. This is not to say that European countries could not form a currency union with perfectly fixed exchange rates, if member countries were completely willing to give up domestic policy autonomy. In an uncertain world subject to diverse shocks, the costs for individual countries of doing so apparently are extremely high.

Annual Research Conference—III:

Understanding Recent Changes in the Wage Structure

Lawrence F. Katz

Increases in family income inequality during the 1980s have received prominent media attention over the last year. Some of the media focus on this topic clearly reflects election-year politics. But popular interest in income distribution also reflects the concerns of many Americans that the economic expansion of the mid- to late 1980s failed to benefit a substantial fraction of American families by enough to offset the losses incurred during the recessions of the early 1980s. In fact, data from the Bureau of the Census indicate that the real money incomes of the bottom 40 percent of Ameri-

can families were essentially no higher in 1989 than the incomes of the bottom 40 percent of families a decade earlier. In contrast, the incomes of the upper 20 percent of families in 1989 were almost 20 percent higher than those of the analogous families in 1979.¹ The enormous disparities in the fortunes of American families in the 1980s largely have been associated with labor market changes that have increased overall wage inequality and altered the wage structure in favor of more-educated and more-skilled workers. Although the recent recession of the early 1990s may or may not be remembered as a white collar recession, the expansion of the 1980s was certainly a white collar expansion.

Understanding changes in family income inequality requires understanding changes in the wage structure. NBER economists have attempted to document and explain recent and historical changes in the U.S. wage structure. My remarks focus on the conclusions that can be drawn from this research concerning: 1) the dimensions of recent dramatic wage structure changes in the United States; 2) the likely causes of these changes; and 3) the extent to which similar changes are occurring in other advanced industrial nations.

A major cause of rising wage inequality and increased educational wage differentials since the 1970s is a strong secular shift in relative labor demand favoring more-educated workers and workers with problem-solving skills. This shift in labor demand is driven primarily by two forces: the increased internationalization of the U.S. economy, and skill-biased technological change, associated in part with the computer revolution. Similar changes in relative labor demand favoring more-educated workers appear to have occurred in other OECD countries. But not all OECD nations have experienced sharp increases in wage dispersion and educational wage premiums as the United States has. National differences in wage-setting institutions and in training and education systems appear to lead to quite different changes in wage structure in response to a similar set of market-driven shifts in demand.

Wage dispersion among both men and women increased substantially in the United States during the 1980s. The hourly earnings of the 90th percentile full-time worker relative to the 10th percentile full-time worker increased by approximately 20 percent for men and 25 percent for women from 1979 to 1989. Changes in the wage structure along three dimensions contributed to rising wage inequality. First, educational and occupational wage differentials expanded with a particularly sharp rise in the relative earnings of college graduates. The college wage premium doubled for young workers, with the weekly wages of young male college graduates

¹U.S. Bureau of the Census, Money Income of Households, Families, and Persons in the United States: 1991, *Current Population Reports, Series P-60, No. 180*, Washington, DC: U.S. Department of Commerce, August 1992.

increasing by approximately 30 percent relative to those of young males with 12 or fewer years of schooling. Second, the average wages of older workers increased relative to those of younger workers for those without college degrees. Third, wage dispersion increased greatly within narrowly defined demographic and skill groups. In other words, wage dispersion expanded among individuals of the same age, education, and sex, and it expanded among those working in the same industries and occupations. Much of this within-group increase in wage dispersion involved increases in wage differentials for "similar" work across establishments in the same industry. Both the identity of one's employer and one's formal educational qualifications matter more for one's earnings today than in the past. In fact, wage dispersion for males was greater at the end of the 1980s than at any time since 1940.

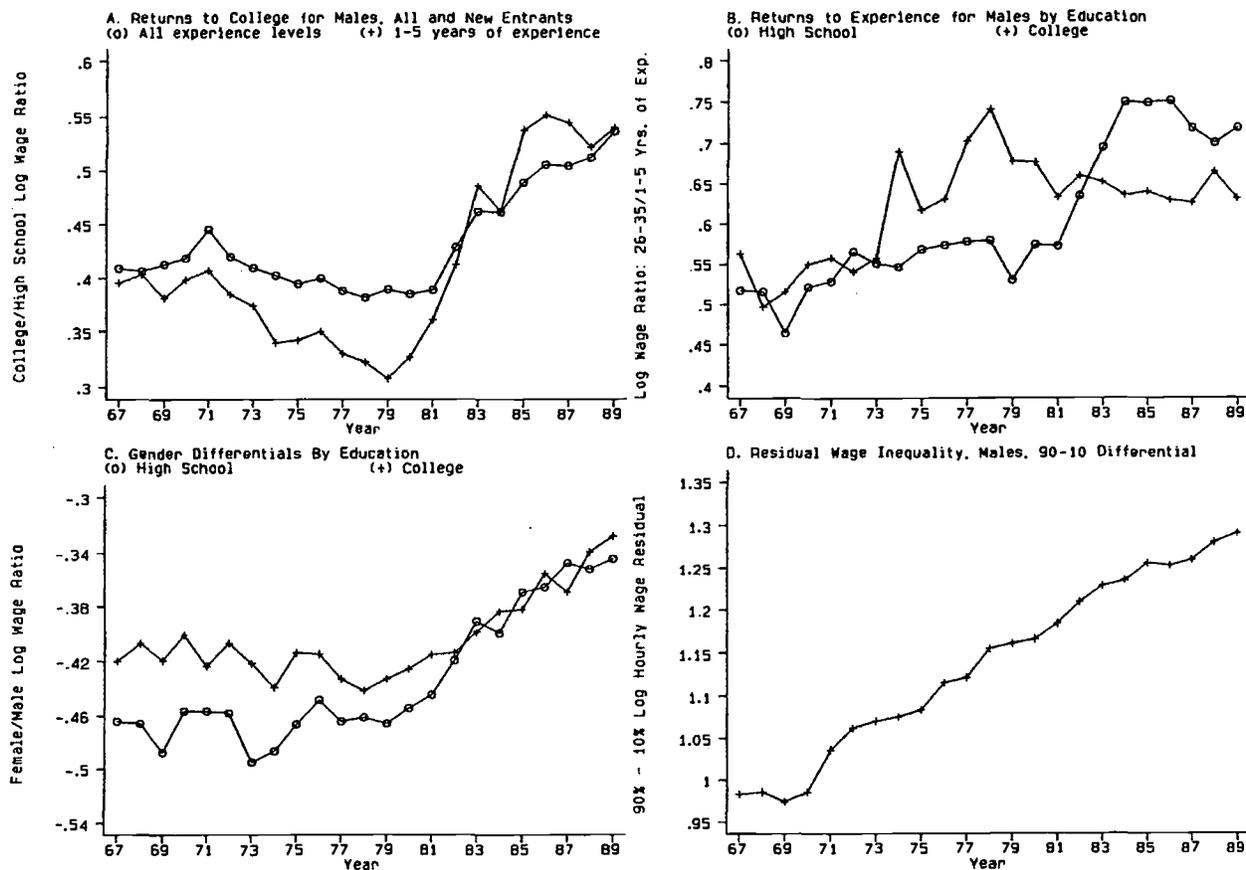
Since these wage structure changes occurred in a period of stagnation in overall real wage growth, the less-educated and the less-fortunate suffered substantial losses in real earnings relative to analogous individuals a decade earlier. The real hourly wages of young males with 12 or fewer years of schooling dropped by approximately 20 percent from 1979 to 1989. Finally, the one aspect of the wage structure that narrowed substantially during the 1980s was the gender gap, with the earnings of women increasing (typically by 10 percent or more) relative to men in all education and age groups from 1979 to 1989.

Although there is some disagreement about the causes of these wage structure changes, there is a broad consensus that wage inequality and "skill" differentials have increased sharply since the 1970s.² These facts have been documented and replicated by many researchers using many alternative data sources. Figure 1 provides a longer-term perspective on changes in the wage structure using data on relative hourly wages for full-time workers from the March Current Population Surveys. The key changes in the U.S. wage structure over the past 25 years can be summarized as follows:

1) The college wage premium rose from 1963 to 1971, fell from 1971 to 1979, and then rose sharply from 1978 to 1989. The changes in the college/high school wage ratio were greatest for the youngest workers in the 1970s and 1980s.

²J. Bound and G. E. Johnson, "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations," *American Economic Review* 82 (June 1992), pp. 371-392; S. J. Davis and J. C. Haltiwanger, "Wage Dispersion Within and Between Manufacturing Plants, 1963-86," NBER Working Paper No. 3722, May 1991, and Brookings Papers on Economic Activity: Microeconomics (1991), pp. 115-180; M. Koster, "Wages and Demographics," in M. Koster, ed., *Workers and Their Wages*, Washington, DC: American Enterprise Institute, 1991; F. Levy and R. Murnane, "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," *Journal of Economic Literature*, forthcoming; and K. M. Murphy and F. Welch, "The Structure of Wages," *Quarterly Journal of Economics* 107 (February 1992), pp. 285-326.

Figure 1. U. S. Relative Hourly Wage Changes, 1967–89



2) Experience differentials expanded substantially over the last 20 years. The most dramatic increases in experience differentials occurred for less-educated males from 1979–87.

3) Within-group (residual) wage inequality for men has been increasing steadily over the last 20 years. Overall wage inequality for men increased in the early 1970s, and the rate of increase accelerated in the 1980s.

4) After remaining fairly stable in the 1960s and 1970s, male/female wage differentials narrowed substantially from 1979 to 1990.

Thus, rising wage inequality for men started prior to the 1980s and was driven by rising within-group inequality in the 1970s. Both within-group inequality and educational wage differentials expanded dramatically in the 1980s.

NBER researchers have explored how to explain these changes with simple supply and demand models and to what extent one also must investigate changes in wage-setting institutions or pay-setting norms. A supply and demand framework that treats different demographic, education, and skill groups as imperfect substitutes in production does a good job of explaining changes in educational differentials over the last 30 years, but within-group inequality is much tougher to explain. Institutional changes from the late 1970s to the late 1980s (for

example, product market deregulation, the decline of private sector unionization, and the erosion of real value of the federal minimum wage) appear to play some role in explaining rising wage inequality.

Most researchers conclude that demographic changes are not the major factor behind recent wage structure changes. In fact, the same groups with relative wage increases in the 1980s (college graduates and women) also experienced substantial increases in their relative numbers in the labor force. The positive correlation of relative wage and quantity changes among demographic groups in the 1980s strongly suggests that relative demand shifts or changes in the relative “qualities” of the different groups are necessary to understand recent wage structure movements. Furthermore, increased educational wage differentials and rising wage inequality occurred across all age cohorts of workers in the 1980s. These within-cohort increases in inequality even for cohorts educated more than 20 years ago strongly suggest that rising wage inequality largely does not reflect an alleged recent decline in the quality of primary and secondary education in the United States.

The key to understanding rising “skill differentials” appears to be a strong secular shift in relative labor demand favoring more-educated workers and workers with problem-solving skills. The industrial and occupational distribution of U.S. employment shifted substantially in

favor of college graduates relative to noncollege workers and in favor of women relative to men during the 1970s and the 1980s. Employment declined in traditional goods-producing sectors that disproportionately employ blue collar males and expanded in professional, medical, and business service sectors that disproportionately employ college graduates.

These shifts reflect a long-term trend over at least the last 30 years in which the industrial and occupational distribution of employment has shifted in favor of college graduates relative to noncollege workers. The loss of high-wage, blue collar jobs in traditional goods-producing sectors may account for as much as one-quarter to one-third of the increase in the college/high school wage differential for males during the 1980s.³

Although much of this shift in relative demand can be explained by observed shifts in the industrial and occupational composition of employment toward relatively skill-intensive sectors, the majority reflects shifts in relative labor demand occurring within detailed sectors. Inside almost all sectors of the economy, firms are substituting more-educated for less-educated workers and are increasing their use of professional, managerial, and technical workers relative to production workers. These changes in factor ratios could arise from eliminating jobs done by those less-educated in the past, or from a shift in the production function caused by changes in technology, the organization of work, or government regulations affecting the demand for professional and administrative support services.

The increased internationalization of the U.S. economy has received much attention as a possible factor in widening educational and occupational wage premiums. NBER research has documented that both international trade and immigration operated to augment the nation's implicit supply of less-educated workers, particularly workers with less than a high school education, during the 1980s.⁴ Many production and even routine clerical tasks can be transferred abroad much more easily than in the past. Trade-induced factors became important with the emergence of substantial trade deficits starting in the early 1980s.

Overall, the increased implicit supply of less-educated workers arising from trade deficits may account for as much as 15 percent of the increase in the college/high school wage differential from the late 1970s to the mid-

1980s. But balanced expansions of international trade in which growth in exports matches the growth of imports appear to have fairly neutral effects on relative labor demand, and they appear to lead to some upgrading in the jobs for workers without college degrees, since export-sector jobs tend to pay higher wages for "comparable" workers than import-competing jobs do.

Immigration does not appear to have been a major factor in overall changes in the U.S. wage structure, but increased immigration in the 1980s may have played some role in the extremely poor labor market performance of high school dropouts. NBER researchers have focused on two approaches to examining the impact of immigration on the wage structure. The first is local labor market studies that compare changes in cities receiving many immigrants to those receiving few immigrants. A case study of the Mariel boatlift in Miami and other systematic cross-city studies show small impacts of immigrants on the wages of less-skilled workers.⁵

Nevertheless, immigration could affect aggregate supplies of relative skills and national trends in relative wages by skill groups, but the migration responses of natives to an influx of immigrants into a local labor market may mean that such comparisons will not show up in cross-city comparisons. The skill distribution of new immigrants into the United States in the 1980s was bimodal, with many highly skilled college graduates and many workers with very little formal schooling. The large influx of less-educated immigrants may have had some adverse impact on Americans with fewer than 12 years of schooling. In fact, recent research suggests that wage inequality increased most in the 1980s in the West, the region with the largest inflow of less-educated immigrants.⁶ Overall, the direct effects of trade and immigration account for a sizable minority (perhaps 15 to 25 percent) of the increase in educational wage differentials in the 1980s.

A second primary suspect for recent changes in the wage structure is skill-biased technological change. The increased importance of microcomputers and computer-based technologies appears to favor more-educated over less-educated workers. In the U.S. manufacturing sector, increases in the relative employment of more-educated workers are strongly positively correlated with investment in computer technologies and R and D intensity.⁷ A substantial wage premium for those who use com-

⁵D. Card, "The Impact of the Mariel Boatlift on the Miami Labor Market," NBER Working Paper No. 3069, August 1989, and *Industrial and Labor Relations Review* 43 (January 1980), pp. 245-257.

⁶R. H. Topel, "Wage Inequality and Regional Labor Market Performance in the United States," paper presented at NBER Labor Studies Meeting, Cambridge, MA, November 1992. See "Bureau News" in this issue.

⁷E. Berman, J. Bound, and Z. Griliches. "Changes in the Demand for Skilled Labor Within U.S. Manufacturing Industries: Evidence from the Annual Survey of Manufacturing," NBER Working Paper No. 4255, January 1993.

³L. F. Katz and A. L. Revenga, "Changes in the Structure of Wages: The United States versus Japan," NBER Reprint No. 1354, February 1990, and *Journal of the Japanese and International Economies* 3, 4 (December 1989), pp. 522-553; and Bound and Johnson, "Changes in the Structure of Wages. . . ."

⁴G. J. Borjas, R. B. Freeman, and L. F. Katz, "On the Labor Market Effects of Immigration and Trade," NBER Working Paper No. 3761, June 1991, and in G. J. Borjas and R. B. Freeman, eds., *Immigration and the Work Force*, Chicago: University of Chicago Press, 1992, pp. 213-244.

puters on their jobs helps explain a substantial portion of the increase in the college wage premium in the 1980s.⁸

Overall, the evidence suggests that an unbalanced expansion of trade involving large trade deficits in manufactured goods, and technological changes favoring computer-literate workers with problem-solving skills, explain much of increased wage inequality and educational wage differentials in the United States. Noncollege-educated American workers are becoming increasingly substitutable with foreign workers and new computer technologies. Labor demand is shifting in favor of jobs for college graduates requiring problem-solving skills, and toward jobs that require the "customer-oriented" skills necessary for success in the service sector. Jobs that require direct human contact with customers (such as health services) can't be transferred abroad easily. The separate impacts of technological change and international trade are difficult to identify, since increased international competition could motivate firms to innovate, adopt new technologies, or change work organizations.

A rapid secular trend in relative demand favoring college graduates is apparent over the last 20 years. But the much more rapid growth in the relative supply of college graduates associated with baby-boom cohorts and the Vietnam War meant that supply growth more than offset demand growth in the 1970s, leading to a decline in the returns to college. Slower relative supply growth associated with baby-bust cohorts combined with accelerated demand growth fueled by the trade-deficit and microcomputer revolution led to an explosion in the college wage premium in the 1980s. The rise in the college wage premium has led to increases in college enrollment rates in recent years (especially for women) despite sharply rising tuition costs. Thus a more rapid growth in the supply of college graduates will tend to offset demand increases in the future. The steady increase in within-group inequality over the 1970s and 1980s is consistent with secularly rising relative demand for more-skilled workers as well as with institutional changes, such as declining unionization, that have generated increases in wage differentials for comparable workers across establishments.

The 1940s and the 1980s provide a nice historical contrast in terms of relative wage changes. Educational and establishment wage differentials and overall wage inequality decreased substantially in the 1940s.⁹ Much of the narrowing of the wage structure was driven by the explicit policies of the National War Labor Board to reduce establishment wage differentials. The increased im-

portance of unions also helped to raise blue collar wages. But market forces reinforced these patterns with a manufacturing boom that generated a strong demand growth for blue collar workers as well as a rapid growth in supply of more-educated workers. Institutional changes in the 1980s went in the opposite direction from those in the 1940s and reinforced market tendencies toward rising wage inequality.

Researchers in the NBER project on comparative labor markets have assembled data for many countries (including the United States, Great Britain, Canada, Australia, Japan, Sweden, France, Italy, Germany, Spain, South Korea, and the Netherlands) to systematically compare changes in wage structure among industrial economies.¹⁰

All of the countries studied, including the United States, shared a common pattern of narrowing educational and occupational wage differentials from the late 1960s to the late 1970s. With the exception of the United States, all countries experienced a decline in overall wage dispersion for males during the 1970s. The tendency toward reduced educational wage differentials and a more compressed wage structure had ceased in all OECD countries by the mid-1980s. But the patterns of wage structure changes differed widely among OECD countries during the 1980s.¹¹

Most countries experienced increased wage inequality and increased educational differentials, but the magnitudes of these increases were much smaller than in the United States. The one country with a pattern of widening wage differentials that is both quantitatively and qualitatively similar to the United States is Great Britain. Canada, Australia, Japan, and Sweden have had modest increases in wage inequality and occupational differentials since the early 1980s. Wage differentials continued narrowing in Italy and France through the mid-1980s with some hint of expanding differentials in the late 1980s. There is no evidence of rising wage inequality or educational differentials during the 1980s in either Germany or the Netherlands. Additionally, increased wage

¹⁰R. B. Freeman and L. F. Katz, "Differences and Changes in Wage Structures," forthcoming as an NBER volume to be published by the University of Chicago Press.

¹¹L. F. Katz, G. Loveman, and D. G. Blanchflower, "A Comparison of Changes in the Structure of Wages in Four OECD Countries," Harvard University, July 1992; R. B. Freeman and K. Needels, "Skill Differentials in Canada in an Era of Rising Labor Market Inequality," NBER Working Paper No. 3827, September 1991; P.-A. Edin and B. Holmlund, "The Swedish Wage Structure: The Rise and Fall of Solidarity Wage Policy," NBER Working Paper No. 4287, January 1993; K. G. Abraham and S. Houseman, "Earnings Inequality in Germany," C. Erickson and A. Ichino, "Wage Differentials in Italy: Market Forces, Institutions, and Inflation," and R. Gregory and F. Vella, "Aspects of Real Wage and Employment Changes in the Australian Male Labour Market," papers presented at NBER Conference on Differences and Changes in Wage Structures, Cambridge, MA, July 1992; and J. Hartog, H. Oosterbeek, and C. Teulings, "Age, Wage, and Education in the Netherlands," University of Amsterdam, unpublished paper, 1992.

⁸A. B. Krueger, "How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984-9," NBER Working Paper No. 3858, October 1991.

⁹C. Goldin and Robert A. Margo, "The Great Compression: The Wage Structure in the United States at Midcentury," NBER Working Paper No. 3817, August 1991, and *Quarterly Journal of Economics* 107 (February 1992), pp. 1-34.

inequality in other countries (such as Britain and Japan) has been associated with generally rising levels of real wages, so that real earnings for the bottom half of the distribution have not declined precipitously as they have in the United States.¹²

While changes in the distribution of wages differed substantially among OECD countries in the 1980s, changes in the distribution of jobs were fairly similar. All the countries examined had large, steady shifts in the industrial and occupational distribution of employment over the past two decades toward sectors and jobs that disproportionately use more-educated workers. In fact, the share of employment in manufacturing declined substantially in all the countries except Japan during the 1980s. This suggests that broad economic forces arising from changes in technology and increased internationalization of economic competition have strongly shifted labor demand in all advanced OECD economies in favor of more-educated workers and those with problem-solving skills and against noncollege-educated workers. Despite shifts in labor demand favoring more-educated workers, skill differentials narrowed in the 1970s because of dramatic increases in the supply of highly educated workers associated with rapid expansions of higher education systems, and because of explicit government and union policies to narrow earnings differentials. Similar demand shifts in favor of the more-educated translated into quite different wage structure changes in the 1980s, depending on a nation's educational and training systems and wage-setting institutions.

The experiences of other OECD nations indicate that increased international competition and the implementation of new technologies do *not* lead inevitably to sharp increases in wage inequality and substantial declines in the real earnings of less-educated workers. Two types of national strategies have been associated with little increase in skill differentials and overall wage inequality in the 1980s. The first is the continental European pattern of explicit government intervention in the wage-setting process through increases in minimum wages and extensions of the terms of collective bargaining agreements to firms not directly involved in such agreements. Strategies of this type succeeded during the early 1980s in preventing the wage structures from widening in Italy and France. But these types of policies do not deal directly with the profound changes in the demand for skills.

Eventually they run into serious economic and political difficulties. Policies that directly operate to prohibit market wage adjustments without directly addressing changed labor market conditions can prevent wage inequality from increasing for a while, but they eventually are associated with stagnant employment growth, persistent unemployment for young workers (as in France), and/or a shift of resources to an underground economy to avoid wage regulations (as in Italy).

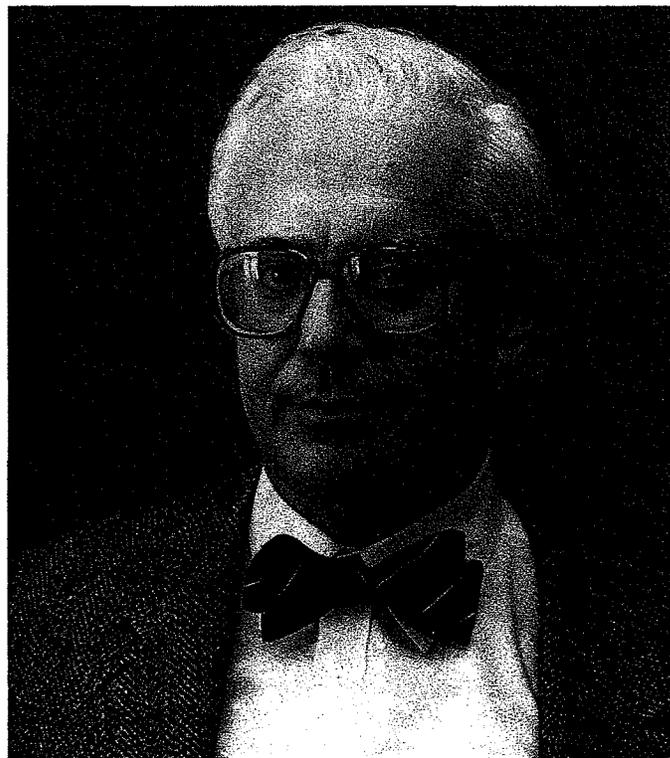
The impact of changing relative skill demands on the wage structure also depends on a nation's educational and vocational training systems. Germany and Japan have educational and training systems that invest heavily in noncollege-educated workers. German and Japanese firms act as if college-educated and other workers were much closer substitutes in production than U.S. or British firms do. The same technology and trade shocks show up less in relative skill demand, and do not generate as much pressure for wage structure changes in these countries.

In summary, the wage structure widened notably in the United States over the last 20 years. Changes in relative labor demand from internationalization and technological changes appear important. U.S. labor market institutions mean these changes translate more directly into wage structure changes than in countries with more centralized wage bargaining and more direct government regulation of wages. These relative wage changes have been a major part of rising inequality of family incomes in the United States.

Profiles

Franklin M. Fisher

Franklin M. Fisher, a professor of economics at MIT, has been a member of the NBER's Board of Directors since 1989. Fisher was also an NBER research associate from 1980 until 1989.



¹²Katz, Loveman, and Blanchflower, "A Comparison of Changes. . . ."

Fisher earned his A.B., M.A., and Ph.D. from Harvard University. He began his teaching career at the University of Chicago, but joined the MIT faculty in 1960 and has taught there ever since. Fisher also has been a visiting professor at Harvard, and at Hebrew University and Tel Aviv University in Israel.

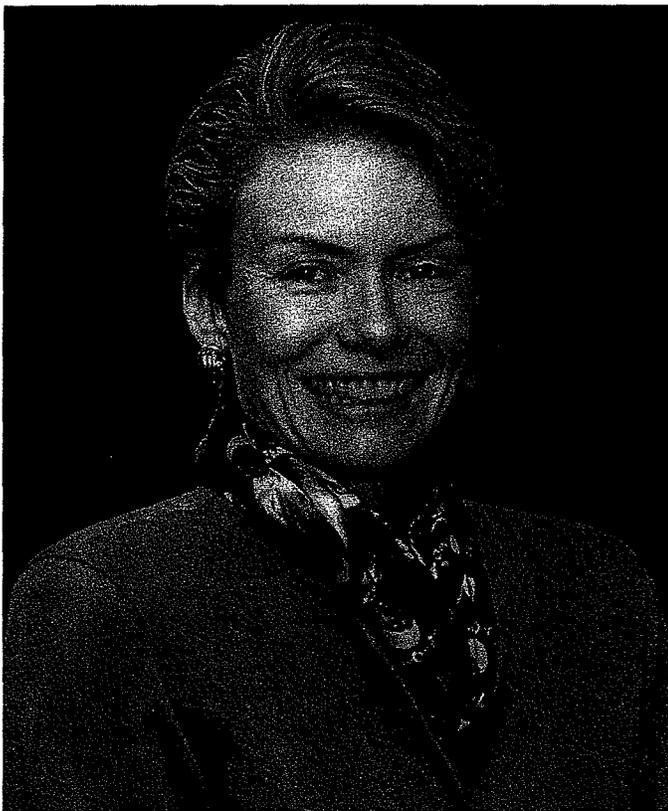
Fisher won the AEA's John Bates Clark Medal in 1973. He is also a Fellow and past president of the Econometric Society, and a Fellow of the American Academy of Arts and Sciences.

Fisher is the author of numerous books and articles, the most recent of which appear in *Industrial Organization, Economics and the Law* and *Econometrics: Essays in Theory and Applications*, both published by the MIT Press.

Fisher and his wife, Ellen, have three children and two grandchildren. Fisher's hobbies include bridge, sailing, and skiing.

Gail D. Fosler

Gail D. Fosler has been on the NBER's Board of Directors since 1989. She represents the Conference Board, where she is vice president and chief economist.



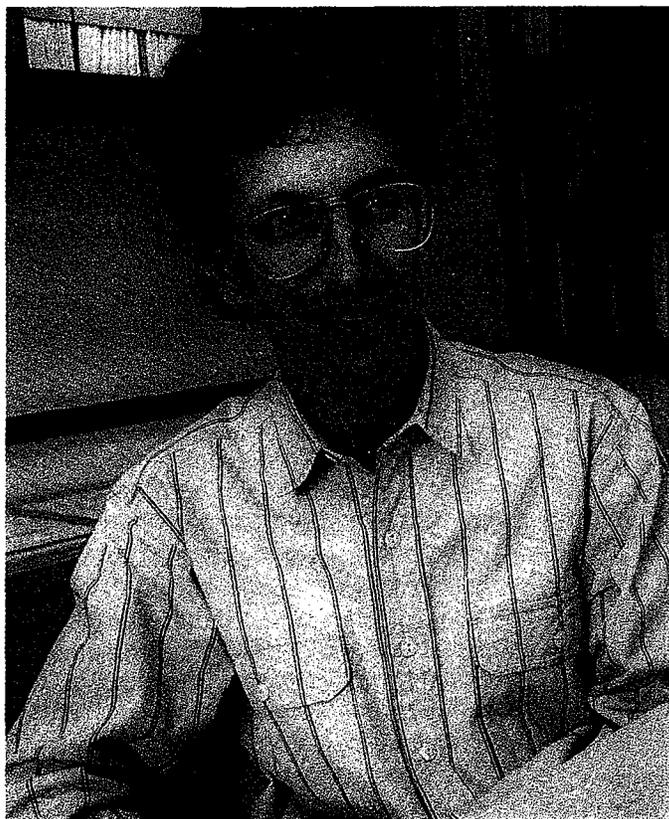
A native of southern California, Fosler holds a B.A. in economics from the University of Southern California, and an M.B.A. in finance from New York University.

Fosler has served as chief economist and deputy staff director for the Senate Budget Committee; was an assistant vice president and economist for the Trust Division of Manufacturers Hanover National Bank; and has been a research associate for ICF, Inc., a Washington consulting firm.

Fosler is also a director of the Institute of Public Administration. She and her husband, R. Scott Fosler, have one son, Michael, who is in college.

Lawrence F. Katz

Lawrence F. Katz, a professor of economics at Harvard University, has been a member of the NBER's labor studies program since 1985. He was an NBER Olin Fellow in 1988-9.



Katz received his A.B. in economics from the University of California, Berkeley, in 1981 and his Ph.D. in economics from MIT in 1986. He came to Harvard University in 1986 after a brief stint at the University of California, Berkeley.

Katz's work in labor economics has been published in NBER books and working papers, and in numerous professional journals. He is also an editor of the *Quarterly Journal of Economics*.

Katz resides in Cambridge where he plays basketball and bird-watches in his "abundant spare time."

Conferences

Economic Historians Gather in Cambridge

The NBER held its second conference on business history, "The Coordination of Economic Activity Within and Between Firms," in Cambridge on October 23–24. Organized by NBER associates Daniel M. Raff, Harvard University, and Peter Temin, MIT, the agenda was:

Daniel Nelson, University of Akron, "Industrial Engineering and the Industrial Enterprise, 1890–1940"
Discussant: Michael Piore, MIT

Daniel M. Raff, "The Puzzling Profusion of Compensation Systems in the Interwar Automobile Industry"
Discussant: Walter Licht, University of Pennsylvania

W. Bernard Carlson, University of Virginia, "The Coordination of Business Organization and Technological Innovation Within the Firm: A Case Study of the Thomson–Houston Electric Company in the 1880s"

Discussant: John Sutton, London School of Economics

David C. Mowery, University of California, Berkeley, "The Boundaries of the U.S. Firm in R and D"
Discussant: Joel Mokyr, Northwestern University

Michael J. Enright, Harvard University, "Organization and Coordination in Geographically Concentrated Industries"

Discussant: Philip Scranton, Rutgers University

Tony Freyer, University of Alabama, "Regulating Big Business: Antitrust in Great Britain and America, 1880–1920"

Discussant: Victor Goldberg, Columbia University

Kenneth A. Snowden, University of North Carolina, Greensboro, "The Evolution of Interregional Mortgage Lending Channels, 1870–1940: The Life Insurance–Mortgage Company Connection"

Discussant: Timothy Guinnane, Princeton University

Charles W. Calomiris, NBER and University of Illinois, "The Costs of Rejecting Universal Banking: American Finance in the German Mirror, 1870–1914"

Discussant: Peter Temin

According to Nelson, the rise of industrial engineering as a profession in American industry was a result of the combined effects of technological and ideological forces, in particular the growth and development of ideas about systematic and scientific management. By the 1930s, the ideological appeal of industrial engineering largely had subsided. Some industrial engineering methods were adopted widely, but they seldom led to impor-

tant changes in the organization of the industrial enterprise or in the work of industrial employees.

Raff notes that virtually every sort of compensation for blue collar labor discussed in the literature was in place for some employees in the American automobile industry during the interwar period. This heterogeneity can be explained by the very incomplete diffusion of mass production techniques and tightly coupled production systems in that industry and time. The optimal choice of a compensation system requires balancing the opportunity costs of uncoordinated activity against the more familiar incentive problems.

Carlson investigates the coordination of business organization and technological innovation in the Thomson–Houston Electric Company in the 1880s. Thomson–Houston quickly came to dominate the electrical manufacturing industry, and in 1892 it absorbed its major rival, the Edison General Electric company, to become the General Electric Company. Carlson narrates the development of an alternating current system by the firm, emphasizing how product innovation was shaped by the evolving interaction of interest groups within the firm.

Mowery observes that firms' in-house R and D investments support both the internal creation of new technologies and the exploitation of technologies from external sources. U.S. manufacturing firms were among the first corporate entities in the industrial world to internalize the development of new industrial technologies by establishing research laboratories. Many large U.S. firms that pioneered in the development of in-house R and D also used their research operations to assess and acquire technologies from external sources.

According to Enright, geographically concentrated, or localized, industries figure prominently in most national economies. Geographic concentration increases the effectiveness of the coordination mechanisms available to firms, and therefore allows for a wider variety of organizational forms and coordination mechanisms than might be observed otherwise. The result is greater fluidity in organizational structures in response to changes in product, technology, demand, competition, and governmental policy.

Freyer focuses on the contrasting roles of law in the development of management structures in Great Britain and the United States between 1880 and 1920. He suggests that, in Great Britain and the United States, the government's policy toward cartels and mergers had a significant bearing on the development of managerial capitalism.

Before 1890, eastern U.S. investors financed property investments in the West through a variety of institutional arrangements. After the mortgage crisis of the 1890s, though, only life insurance companies continued to lend interregionally, relying on mortgage companies to negotiate and enforce loans for them in distant markets.

Snowden explains why, by 1900, the life insurance–mortgage company connection had emerged as the dominant interregional mortgage lending mechanism in the United States, and how it maintained this role until the 1950s.

Calomiris explains that limitations on the scale of U.S. banks effectively restricted the scope of banking activities, prevented banks from playing a direct role in financing large-scale industry, and increased information and transaction costs of issuing securities. In contrast, German industry was financed by large-scale universal banks that maintained long-term relationships with firms, involving ongoing monitoring and “discipline” of management. Low costs of German industrial finance are reflected in lower investment banking spreads on securities issues and a higher propensity to issue equity.

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

Conference on Economic Growth

The NBER held its sixth conference on economic growth on October 30 and 31 in Cambridge. NBER Research Associates Robert J. Barro, Harvard University, and Paul M. Romer, University of California, Berkeley, organized this program:

George J. Borjas, NBER and University of California, San Diego, “Long-Run Convergence of Ethnic Skill Differentials”

Discussant: James Coleman, University of Chicago

Robert C. Feenstra, NBER and University of California, Davis, and James R. Markusen, NBER and University of Colorado, “Accounting for Growth with New Inputs” (NBER Working Paper No. 4114)

Discussant: Zvi Griliches, NBER and Harvard University

Jong-Wha Lee, International Monetary Fund, “Government Interventions and Productivity Growth in Korean Manufacturing Industries”

Discussant: David Dollar, World Bank

Steve Dowrick, Australian National University, “Government and Growth”

Discussant: Sergio T. Rebelo, NBER and University of Rochester

Aaron Tornell, NBER and MIT, “A Model of the Rise and Decline of Economies”

Discussant: Jess Benhabib, New York University

Raymond Atje, New York University, and Boyan Jovanovic, NBER and New York University, “Stock Markets and Development”

Discussant: Jonathan Eaton, NBER and Boston University

Robert G. King, University of Rochester, and Ross Levine, World Bank, “Finance and Growth: Schumpeter Might Be Right”

Discussant: Andrei Shleifer, NBER and Harvard University

Borjas asks whether ethnic skill differentials, introduced into the United States by the inflow of very dissimilar immigrant groups during the Great Migration of 1880–1910, disappeared during the 1900s. He uses the 1910 Census to document the characteristics of the original immigrant groups, and the 1940 and 1980 Censuses and the General Social Surveys to analyze the skill differences among the children and grandchildren of the earliest immigrants. Borjas finds that ethnic differentials converge very slowly: it might take four generations for the skill differentials introduced by the Great Migration to disappear.

Feenstra and Markusen decompose growth into that explained by a higher quantity of existing inputs, and that explained by a greater range of inputs. They obtain this decomposition first for a single firm, and then generalize to the GNP function of an economy.

Lee investigates the impacts of government industrial policy and protection of the manufacturing sector in Korea. Using data for 1963–83 for 38 Korean industries, he finds that trade protection and credit controls reduced the productivity of labor and technological progress, while tax incentives increased them. This evidence implies that less government intervention in trade is linked to higher productivity growth.

Dowrick analyzes panel data on government consumption and GDP growth in 111 countries from 1950–88. The apparent positive impact of government growth on GDP growth is caused by simultaneity bias. The negative cross-national correlation between real government and economic growth in part may reflect an equilibrium relationship. Nominal government size inhibits growth through distortionary taxation, while the partial effect of real government services is positive. Government expenditure crowds out investment by a factor of 0.5 among the rich countries, but it stimulates investment amongst the poorest countries.

Tornell develops a model in which growth rates in poor countries tend to increase with capital per person, while the opposite tends to occur among rich countries. An economy has common access to resources when primitive; shifts to private property when rich enough to defend private profits, but still too poor for “parasites”; then, when very rich, sees redistributive groups take over, and comes full circle back to common access. Meanwhile, the growth rate increases initially, and then after a certain period, decreases.

Atje and Jovanovic measure the effects of financial intermediation, especially the effect of the development of the stock market. Countries that finance their investments more with equities and less with debt tend to

grow faster; stock markets have a substantial effect on growth.

King and Levine show that the services provided by financial intermediaries help promote technological innovation and economic growth. Using data on 90 countries over 1960–89, they find that various measures of the level of financial development are associated strongly with real per capita GDP growth, the rate of physical capital accumulation, and the efficiency with which economies employ physical capital. Also, the predetermined or predictable component of financial development is related robustly to subsequent rates of economic growth.

Also at this conference, Robert Summers and Alan Heston, University of Pennsylvania, described their work on an amended version of the Penn World Table (Mark 5),* called the Mark 5.5 version, which will be released on January 16, 1993. This new updated, expanded, and corrected Mark 5 Table will contain some new variables, and most time series will run to 1990. The new Mark 5.5 version will be distributed by the NBER's Publications Department, 1050 Massachusetts Avenue, Cambridge, MA 02138. A reprint of the underlying article and a 3-1/2-inch high-density diskette containing the Mark 5.5 Table will be sent in response to requests sent to NBER Publications with a payment of \$5. Alternatively, the Table may be obtained via anonymous ftp from NBER.HARVARD.EDU. The files are kept in /pub/nber. On most Internet-connected systems, the files can be obtained by the following command sequence:

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ftp nber.harvard.edu
login: anonymous
password: anonymous
cd pub/nber
type a
mget pwt5 *.*
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*R. Summers and A. Heston, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–87," NBER Working Paper No. 1562, May 1991, and Quarterly Journal of Economics (May 1991).

Tax Policy and the Economy

More than 170 researchers, government policy officials, journalists, and members of the business community gathered for the NBER's Seventh Annual Conference on "Tax Policy and the Economy" in Washington on November 17. James M. Poterba, Director of the NBER's Program on Public Economics, also of MIT, organized this program:

Bronwyn H. Hall, NBER and University of California, Berkeley, "R and D Tax Policy During the Eighties: Success or Failure?" (NBER Working Paper No. 4240)

Leslie E. Papke, NBER and Michigan State University, "What Do We Know About Enterprise Zones?" (NBER Working Paper No. 4251)

B. Douglas Bernheim, NBER and Princeton University, and John Karl Scholz, NBER and University of Wisconsin, Madison, "Private Saving and Public Policy" (NBER Working Paper No. 4215)

Patricia Anderson, Dartmouth College, and Bruce D. Meyer, NBER and Northwestern University, "The Unemployment Insurance Payroll Tax and Interindustry and Interfirm Subsidies"

Daniel R. Feenberg, NBER, and James M. Poterba, "Income Inequality and the Incomes of Very High Income Taxpayers: Evidence from Tax Returns" (NBER Working Paper No. 4229)

Hall estimates that the amount of additional R and D spending induced by the R and D tax credit in the 1980s was greater than its cost in foregone tax revenue. On average, the tax credit reduced federal revenues by about \$1 billion per year and increased private R and D spending by \$2 billion. She concludes that the R and D tax credit had the intended effect, although it took several years for firms to fully adjust to it.

Papke finds that most businesses in British enterprise zones are relocations, with an annual cost per job of approximately \$15,000. In the United States, much zone activity comes from expansions of existing businesses, with the average cost per zone job ranging from \$4564 to \$13,000 annually. In Indiana, the enterprise zone program appears to have increased inventory investment and reduced unemployment claims.

Bernheim and Scholz conclude that many Americans, particularly those without a college education, save too little. It should be possible to increase total personal saving among lower-income households by encouraging the formation and expansion of private pension plans. However, the expansion of private pensions probably would have little effect on saving by higher-income households; they are more likely to increase saving significantly in response to favorable tax treatment of capital income. The Premium Saving Account described by Bernheim and Scholz might be a cost-effective vehicle for providing saving incentives to all households, particularly those in the top quintile of the income distribution.

Anderson and Meyer note that certain firms and industries receive many more dollars in unemployment benefits than they pay in taxes. The same patterns of large interindustry subsidies have persisted for over 30 years, mostly because of differences in layoff rates across industries. There is also a persistent pattern of interfirm subsidies across several years. Anderson and Meyer conclude that efficiency would increase and unemployment would be lower if the unemployment insurance system moved toward increased experience rating: that is, if the taxes paid by firms reflected more closely the cost of benefits paid to their workers.

Feenberg and Poterba use tax return data for 1951 to 1990 to investigate the rising share of adjusted gross income (AGI) reported on very high income tax returns. They find that most of the increase in the share of AGI reported by taxpayers in the top 1 percent of the AGI distribution comes from increased income among the top *one-tenth* of 1 percent of taxpayers. The share of total AGI reported on those tax returns rose throughout the 1980s, but the largest increases by far were in 1987 and 1988. Feenberg and Poterba conclude that the rise in reported incomes for top AGI recipients in part may reflect greater incentives to report taxable income after the rate reductions in the Tax Reform Act of 1986.

A conference volume, published by the MIT Press, will be available in May 1993.

Conference on Political Economics

The NBER held its fifth in a series of conferences on political economics in Cambridge on November 20 and 21. The following program was organized by Alberto F. Alesina, NBER and Harvard University; Morris P. Fiorina, Harvard University; and Roger Noll, Stanford University:

Morris P. Fiorina, "Divided Government in the American States: An Unintended Consequence of 'Non-political' Reform?"

Discussant: Linda Cohen, University of California, Irvine

James E. Alt and Robert C. Lowry, Harvard University, "Divided Government and Budget Deficits: Evidence from the States"

Discussant: William R. Keech, University of North Carolina

James M. Poterba, NBER and MIT, "State Responses to Fiscal Crisis: 'Natural Experiments' for Studying the Effects of Budgetary Institutions"

Discussant: Roberto Perotti, Columbia University

Gene M. Grossman, NBER and Princeton University, and Elhanan Helpman, NBER and Tel Aviv University, "Protection for Sale" (NBER Working Paper No. 4149)

Discussant: Susanne Lohmann, Stanford University

Alessandra Cassella, NBER and University of California, Berkeley, "Arbitration in International Trade" (NBER Working Paper No. 4136)

Discussant: Jeffrey Frieden, University of California, Los Angeles

John E. Roemer, University of California, Davis, "A Partial Theory of the Link Between Economic Development and Political Democracy"

Discussant: Michael D. Whinston, NBER and Harvard University

Raquel Fernandez, NBER and Boston University, and Richard Rogerson, NBER and University of Minnesota, "Income Distribution, Communities, and the Quality of Public Education: A Policy Analysis" (NBER Working Paper No. 4158)

Discussant: Dennis Epple, Carnegie-Mellon University

After the 1990 elections, only five state legislatures were controlled by Republicans. Fiorina examines the argument that the professionalization of state legislatures makes them more attractive to Democratic candidates and less attractive to Republican candidates, because full-time legislators must give up outside careers, and Democrats have lower opportunity costs on average than Republicans do. His analysis on post-World War II legislative elections outside the South suggests that every \$10,000 increase in real biennial legislative compensation is associated with at least a 1 percent increase in the proportion of Democratic legislators.

Using data covering the American states from 1968-87, Alt and Lowry conclude that aggregate state budgets are driven by different factors under Democrats and Republicans, with the net result being that Democrats probably spend and tax more. Further, particularly where parties control different chambers of the legislature, divided government is less able to react to revenue shocks that may lead to budget deficits. Finally, outside of the South, unified party governments with restricted ability to carry deficits into the next fiscal year tend to have lower spending levels and sharper reactions to negative revenue shocks than those without restrictions.

Poterba asks how state fiscal institutions and political circumstances affect the dynamics of state taxes and spending during periods of fiscal stress. He focuses on the late 1980s, when sharp economic downturns in several regions, coupled with increased expenditure demands, led to substantial state budget deficits. State fiscal institutions, such as "no deficit carryover" rules, appear to have real effects on the speed and nature of fiscal adjustment. States with depleted general fund balances also adjust much more rapidly to expenditure overruns and revenue shortfalls. Political factors are important too: when a single party controls the state house and the governorship, the reaction to state deficits is much faster than when party control is divided.

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

The great majority of international contracts provide that any disputes that may arise will be decided by arbitration. Casella reviews the provisions and the practice

of international arbitration, and models the relationship between the adoption of arbitration and the expansion of international trade. She finds that arbitration alters the size and composition of markets. In addition, the legal services provided by the courts deteriorate in the presence of arbitration. Still, Casella predicts that the share of traders using arbitration will rise as markets expand.

Roemer constructs a model to analyze the link between economic development and democracy. Development raises the capital stock, workers' skills, the average and marginal product of labor, and equality of wealth holdings. Two political parties compete for votes. Coalitions of voters also can support a right wing dictatorship over a democracy. Roemer finds that development may not induce a growing social preference for democracy.

Fernandez and Rogerson analyze three types of policies that affect the financing of public education: subsidies for residency of specific income groups in particular communities; ceilings or floors on community level educational spending; and income redistribution. They examine the consequences of these policies for both welfare and the quality of education across communities. Finally, they identify several policies that make all individuals better off and increase the quality of education in all communities.

The following NBER associates also participated in the conference: Geoffrey Carliner; Kathryn Dominguez and James R. Hines, Jr., Harvard University; Sule Özler, Stanford University; Dani Rodrik, Columbia University; and Aaron Tornell, MIT. Also participating were Nathaniel Beck, University of California, San Diego; Gerald Cohen, Joseph Kalt, Peng Lian, Lisa Martin, Kenneth A. Shepsle, Enrico Spolaore, and Shang-Jan Wei, Harvard University; Geoffrey Garrett and Sharyn O'Halloran, Stanford University; Gregory D. Hess and Howard Rosenthal, Carnegie-Mellon University; Thomas Romer, Princeton University; and Charles Stewart and Thierry Verdier, MIT.

Bureau News

1993-4 Olin Fellow

The NBER Olin Fellow for 1993-4 is Alwyn Young. The Fellows program is supported by a grant from the John M. Olin Foundation. Young will develop detailed estimates of total factor productivity growth in the four Asian newly industrialized countries (Hong Kong, Singapore, South Korea, and Taiwan). He received his Ph.D. from Columbia University in 1990, and has been an NBER faculty research fellow since 1991. He teaches at MIT's Sloan School of Management.

Economic Fluctuations Program Holds Fall Meeting

Over 50 members and guests of the NBER's Program on Economic Fluctuations met in Cambridge on October 23. NBER associates Steven J. Davis, University of Chicago, and Martin S. Eichenbaum, Northwestern University, organized the following program:

Robert G. King, University of Rochester, and Mark W. Watson, NBER and Northwestern University, "Testing Long-Run Neutrality" (NBER Working Paper No. 4156)

Discussant: Bennett T. McCallum, NBER and Carnegie-Mellon University

Orazio Attanasio, NBER and Stanford University, and Guglielmo Weber, University College, London, "Consumption Growth and Excess Sensitivity to Income: Evidence from U.S. Microdata"

Discussant: John H. Cochrane, NBER and University of Chicago

Julio J. Rotemberg, NBER and MIT, and Michael Woodford, NBER and University of Chicago, "Imperfect Competition and the Effects of Energy Price Increases on Economic Activity"

Discussant: James D. Hamilton, University of California, San Diego

Roland Bénabou, NBER and MIT, "Heterogeneity, Stratification, and Growth"

Discussant: Steven N. Durlauf, NBER and Stanford University

Robert J. Gordon, NBER and Northwestern University, "Are Procyclical Productivity Fluctuations a Fragment of Measurement Error?"

Discussant: Robert E. Hall, NBER and Stanford University

Laurence M. Ball, NBER and Princeton University, and N. Gregory Mankiw, NBER and Harvard University, "Relative Price Changes as Aggregate Supply Shocks" (NBER Working Paper No. 4168)

Discussant: Ricardo J. Caballero, NBER and MIT

King and Watson show that permanent shifts in historical data can be uncovered, and neutrality can be tested when there is a priori knowledge of one of the structural impact multipliers, or one of the structural long-run multipliers. They find that the U.S. postwar data are consistent with the neutrality of money and a vertical long-run Phillips curve, but not with the supeneutrality of money and the long-run Fisher relationship (permanent changes in inflation have no long-run effect on real interest rates). The sign of the estimated effect of money growth on output depends on the particular identifying assumption used. Also, nominal interest rates move

less than one-for-one with inflation in the long run for a wide range of plausible identifying restrictions.

Attanasio and Weber find that consumption is “excessively sensitive” to income but insensitive to the interest rate. Using data for 1980-90 on consumption of nondurables other than food for the five youngest of nine cohorts (households whose head was born between 1935 and 1959), they estimate that the elasticity of intertemporal substitution is 0.6–0.7.

Rotemberg and Woodford argue that imperfect competition in product markets plays an important role in explaining the effects of oil price increases on economic activity and real wages. They estimate that, for the United States between 1947 and 1980, a 10 percent innovation in nominal oil prices forecasts a decline in real output of about 2.5 percent and a decline in real wages of about 1 percent. Both variables decline the most about six quarters after the innovation. A model of oligopolistic collusion best explains declines of the magnitude observed in both output and real wages (while only assuming a 20 percent average markup of prices over marginal cost), and also predict much sharper declines in the second year following an innovation.

Bénabou studies economies where heterogeneous agents interact through local externalities or public goods (school funding, neighborhood effects) and economywide linkages (complementary skills in production, knowledge spillovers). He compares growth and welfare when families are stratified into homogeneous local communities, and when they are integrated. Segregation tends to minimize the losses from a given amount of heterogeneity, but integration reduces heterogeneity faster. Society thus may face an intertemporal trade-off; mixing leads to slower growth in the short run, but to higher output or even productivity growth in the long run. This trade-off occurs in particular when comparing local and national funding of education.

Gordon examines the extent to which procyclical movements in multifactor productivity (MFP) can be explained by variations in the utilization of capital, by unmeasured changes in work effort, and by unmeasured investment activities in recessions and the postponement of such activities in booms. Using U.S. quarterly data for the private nonfarm business and manufacturing sectors over 1955–92, he shows that hours react with a lag to output rather than vice-versa, and that productivity leads output. Gordon identifies three components of MFP movements: a long-run growth component, an intermediate component at the business cycle frequency, and a high-frequency component with a duration of three quarters or less. His analysis implies that procyclical technology shocks are not relevant at the business cycle frequency. The technology shocks that provide the modus vivendum of real business-cycle models are absent in U.S. data.

Ball and Mankiw propose a theory of supply shocks based on relative-price changes and frictions in nominal

price adjustment. When price adjustment is costly, firms adjust to large shocks but not to small shocks, and large shocks thus have disproportionate effects on the price level. Therefore, aggregate inflation depends on the distribution of relative-price changes. The authors show that this result explains a large fraction of movements in postwar U.S. inflation.

Asset Pricing Program Convenes

The NBER’s Program in Asset Pricing met on November 6 to discuss the following agenda:

Nelson C. Mark, Ohio State University, “Exchange Rates and Fundamentals: Evidence on Long-Horizon Predictability and Overshooting”

Discussant: Robert E. Cumby, New York University

John Y. Campbell, NBER and Princeton University, “Why Long Horizons? Asymptotic Power Against Persistent Alternatives”

Discussant: James H. Stock, NBER and Harvard University

Tim Bollerslev and Robert J. Hodrick, NBER and Northwestern University, “Financial Market Efficiency Tests” (NBER Working Paper No 4108)

Discussant: John H. Cochrane, NBER and University of Chicago

Sanford J. Grossman, NBER and University of Pennsylvania, and Zhongquan Zhou, University of Pennsylvania, “Optimal Investment Strategies for Controlling Drawdowns”

Discussant: Andrew W. Lo, NBER and MIT

Dimitri Vayanos and Jean-Luc Vila, MIT, “Equilibrium Interest Rate and Liquidity Premium Under Proportional Transactions Costs”

Discussant: Mark Gertler, New York University

Josef Lakonishok, University of Illinois, Urbana-Champaign; Andrei Shleifer, NBER and Harvard University; and Robert W. Vishny, NBER and University of Chicago, “Contrarian Investment, Extrapolation, and Risk”

Discussant: K. C. Chan, Ohio State University

In recent years economists have developed many new methods for predicting asset returns. One popular technique is to regress an asset return, measured over a long horizon, such as a year or even several years, onto information known in advance. Often such long-horizon regressions deliver stronger evidence of forecastability than more standard procedures in which asset returns are measured over short periods: for example, a

month or so. Mark shows that monetary variables forecast four-year movements in exchange rates between the U.S. dollar and the Deutschemark, Swiss franc, and Japanese yen. This is a striking result, since many economists have found that it is impossible to improve on the simple forecast that the future exchange rate will equal the current exchange rate.

Campbell studies the econometric properties of long-horizon regressions. He shows that, when a highly persistent variable forecasts an asset return, then the explanatory power of a regression of the return onto this variable will increase with the horizon over which the return is measured. If the persistence of the forecasting variable is known, then a long-horizon regression also can have greater power to reject the hypothesis that the return cannot be forecast.

Bollerslev and Hodrick provide a selective survey of the literature on forecasting U.S. stock returns. They explore the properties of many different tests of predictability in returns. They argue that time-varying uncertainty in dividend growth, linked to time-variation in discount rates, is necessary to explain stock market behavior.

Grossman and Zhou study the investment behavior of a trader who wishes to place a floor on his wealth equal to some percentage of its maximum previous level. This constraint approximates the system of "drawdown" control used by some financial firms to regulate the activities of their traders. Grossman and Zhou show that, if the investor faces constant expected returns, he chooses an investment in risky assets proportional to the surplus of current wealth over the floor level. The investor's trading strategy is dependent on the history of past returns, and Grossman and Zhou suggest that this may have interesting effects on market price determination if many investors follow such strategies.

Vayanos and Vila study the effects of transactions costs on asset prices. They develop a model in which long-lived individuals accumulate liquid and illiquid assets to smooth consumption over their lifetimes. They show that an increase in transactions costs drives down the rate of return on liquid assets and increases the premium on illiquid assets over liquid assets. The overall effect on the illiquid asset return is ambiguous.

Much recent research has shown that, historically, it has been possible to obtain superior average returns by investing in "value stocks" (which have low prices relative to earnings, dividends, historical prices, book assets, or other measures of value). Some have argued that this is because value stocks are riskier than other stocks. Lakonishok, Shleifer, and Vishny present evidence against this view, showing that value stocks are not unusually risky. They argue instead that the superior performance of value strategies is caused by the fact that the market extrapolates past growth performance, overpricing glamour stocks and underpricing value stocks.

Also participating in the conference were: NBER associates David S. Bates, Karen K. Lewis, A. Craig MacKinlay, Robert F. Stambaugh, and Stephen P. Zeldes, University of Pennsylvania; Stephen G. Cecchetti and Rene M. Stulz, Ohio State University; Kathryn M. E. Dominguez and Kenneth A. Froot, Harvard University; Bernard Dumas, Hautes Ecoles Commerciales; John C. Heaton, MIT; Miles S. Kimball, University of Michigan; Blake D. LeBaron, University of Wisconsin, Madison; Bruce N. Lehmann, University of California, San Diego; and Daniel Nelson, University of Chicago. Guests of the NBER included: Marshall Blume, Janice Eberly, Krishna Ramaswamy, and Matthew Richardson, University of Pennsylvania; and Enrique Sentana, Centro de Estudios Monetarios y Financieros.

This article was prepared with the assistance of Program Director John Y. Campbell.

Labor Economists Gather at NBER

Lawrence F. Katz, NBER and Harvard University, organized a meeting of the NBER's labor studies program that took place in Cambridge on November 6. The papers discussed were:

Robert H. Topel, NBER and University of Chicago, "Wage Inequality and Regional Labor Market Performance in the United States"

George J. Borjas and Valerie A. Ramey, NBER and University of California, San Diego, "Foreign Competition, Market Power, and Wage Inequality: Theory and Evidence"

David Neumark, NBER and University of Pennsylvania, "Sex Discrimination and Women's Labor Market Interruptions"

Joseph G. Altonji, NBER and Northwestern University; Fumio Hayashi, NBER and University of Pennsylvania; and Laurence J. Kotlikoff, NBER and Boston University, "The Effects of Income and Wealth on Time and Money Transfers Between Parents and Children"

Henry S. Farber, NBER and Princeton University, "The Analysis of Interfirm Worker Mobility"

Topel examines changes in relative wages within regional labor markets in the United States. He finds no strong evidence that changing patterns of demand, or patterns of regional specialization, have been important. However, technical change, changing net supplies of la-

bor, and women's labor force participation have driven changes in wage inequality in regional labor markets. The effects of technical change are neutral across regions, but labor supply and female participation have differential impacts across regions. Topel finds that rising labor force participation of women accounts for most of the decline in the wages of unskilled men.

Borjas and Ramey argue that foreign competition can explain most of the trend in wage inequality during the 1980s. They find that the long-run trend in wage inequality is linked intimately to the trade deficit in durable goods in general, and in automobiles in particular. They also show that the more concentrated an industry is, the greater is the impact of trade on general wage inequality. Finally, they test their model using both the cross-sectional and the time-series variation in relative wages across Standard Metropolitan Statistical Areas.

Neumark argues that sex discrimination in labor markets leads to interruptions in women's labor market participation. Working women who report experiencing discrimination subsequently accumulate less experience in the labor market than otherwise similar women, although this effect is small and not statistically significant. However, discrimination has a statistically significant effect on employee turnover: women who experience discrimination are more likely to change employers. Also, women who experience sex discrimination at work are more likely to have additional children, or to have a first child if they have not done so already. But those women who experience discrimination, and who consequently have a greater tendency for career interruptions because of childbirth or child rearing, do not have lower wage growth than other women do.

Altonji, Hayashi, and Kotlikoff study the effects of income and wealth on transfers of money and time between individuals and their parents. They also relate the relative incomes of parents and parents-in-law to transfers given and received by married couples. Finally, they study how the relative incomes of divorced parents affect transfers to such parents from their children. They find that transfers of money tend to reduce inequality in household incomes, and that transfers of time are related only weakly to income differences. Richer siblings also give more to their parents and receive less than poorer siblings do.

Farber uses a sample of over 14,000 full-time jobs of workers in the National Longitudinal Survey of Youth to examine mobility patterns. He finds that mobility is related positively and strongly to the frequency of job change prior to starting the job in question. Second, job change in the most recent year before starting the current job is related more strongly than earlier job change to mobility on the current job. Third, the monthly likelihood of job ending increases to a maximum at three months and declines thereafter. Also, females hold fewer jobs per year than males do, because females have a lower exit rate from the first job after entry into the labor force.

Public Economics Program Meets

Members and guests of the NBER's Program on Public Economics met in Cambridge on November 12 and 13. Program Director James M. Poterba, also of MIT, organized this agenda:

Victoria P. Summers, Harvard University, "Doing Well While Doing Good: An Analysis of Tax Subsidies to Not-for-Profit Hospitals"

Discussant: David M. Cutler, NBER and Harvard University

Jerry A. Hausman, NBER and MIT, and Whitney K. Newey, MIT, "Nonparametric Estimation of Consumers' Surplus and Deadweight Loss"

Discussant: Bruce D. Meyer, NBER and Northwestern University

Jonathan Gruber, NBER and MIT, "The Efficiency of a Group-Specific Mandated Benefit: Evidence from Hospital Insurance for Maternity (NBER Working Paper No. 4157)

Discussant: Henry Aaron, Brookings Institution

R. Glenn Hubbard, NBER and Columbia University; Jonathan S. Skinner, NBER and University of Virginia; and Stephen P. Zeldes, NBER and University of Pennsylvania, "Precautionary Saving and Social Insurance"

Discussant: B. Douglas Bernheim, NBER and Princeton University

William T. Bogart, Case Western Reserve University, and William M. Gentry, NBER and Duke University, "Capital Gains Taxes and Realizations: Evidence from Interstate Comparisons" (NBER Working Paper No. 4254)

Discussant: Jeffrey K. MacKie-Mason, NBER and University of Michigan

James R. Hines, Jr., NBER and Harvard University, and Kristen L. Willard, Princeton University, "Trick or Treaty: Bargains and Surprises in International Tax Agreements"

Discussant: Roger H. Gordon, NBER and University of Michigan

Alan J. Auerbach, Joint Committee on Taxation; Laurence J. Kotlikoff, NBER and Boston University; and David N. Weil, NBER and Brown University, "The Increasing Annuitization of the Elderly: Estimates and Implications for Intergenerational Transfers, Inequality, and National Saving" (NBER Working Paper No. 4182)

Discussant: John B. Shoven, NBER and Stanford University

NBER Monetary Economists Meet in December

Summers examines various rationales for providing tax exemptions to not-for-profit hospitals. She finds that most not-for-profit hospitals in fact do not behave in more socially beneficially ways than for-profit hospitals. She describes a new test for tax exemption, under which only large not-for-profit teaching hospitals would receive tax exemptions.

Hausman and Newey estimate consumers' surplus and deadweight loss, which are the most widely used welfare and economic efficiency measures in certain areas of economics, such as public finance. They then apply their methodology to gasoline demand and find that different techniques yield quite different estimates of the deadweight loss of raising gasoline prices by 30 to 50 cents.

Gruber studies several 1976 state mandates that stipulated that childbirth be covered comprehensively in health insurance plans. These mandates increased the cost of insuring women of childbearing age by as much as 5 percent of their wages. He finds substantial shifting of these costs to the wages of the targeted group. Correspondingly, he finds little effect on total labor input: hours rise and employment falls.

Hubbard, Skinner, and Zeldes explain why substantial numbers of low-income households have virtually no financial assets. Social insurance programs provide a "floor" below which consumption cannot fall, and, because these programs are often wealth-tested, they place very high marginal tax rates on household wealth holdings. This suggests that social insurance programs may contribute to the low net worth of low-income households.

Bogart and Gentry document the interstate variation in capital gains tax rates and examine the relationship between capital gains taxes and aggregated state-level realizations. For each state, they construct marginal tax rates on capital gains for those in the highest state income tax bracket for 1982-90. They confirm that capital gains realizations are related negatively to capital gains tax rates. The estimated elasticity is -0.67 .

Hines and Willard examine tax treaties in place in 1990 and find that many countries display a rigidity in negotiating those treaties. Through the adept use of tax treaties, countries have opportunities to mitigate some of the effects of uncoordinated taxation of international investment income.

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

Members of the NBER's Program on Monetary Economics met in Cambridge on December 4. NBER Research Associates Benjamin M. Friedman and N. Gregory Mankiw, both of Harvard University, organized this program:

Bennett T. McCallum, NBER and Carnegie-Mellon University, "A Reconsideration of the Uncovered Interest Parity Relationship" (NBER Working Paper No. 4113)

Casey B. Mulligan, University of Chicago, and Xavier Sala-i-Martin, NBER and Yale University, "U.S. Money Demand: Surprising Cross-Sectional Estimates"

David B. Gordon, Clemson University, and Eric M. Leeper, Federal Reserve Bank of Atlanta, "The Dynamic Impacts of Monetary Policy: An Exercise in Tentative Identification"

Pierluigi Balduzzi and Silverio Foresi, New York University, and Giuseppe Bertola, NBER and Princeton University, "A Model of Target Changes and the Term Structure of Interest Rates"

Allan Drazen, NBER and University of Maryland, and Paul R. Masson, IMF, "Credibility of Policies Versus Credibility of Policymakers"

Olivier J. Blanchard, NBER and MIT, "The Vanishing Equity Premium"

McCallum suggests why the uncovered interest parity (UIP) relationship may be more useful in predicting future spot exchange rates than the unbiasedness of forward rates. Then he presents some evidence pertaining to the unbiasedness test, and rejects unbiasedness. Finally, he finds that two explanations involving systematically irrational expectations, and an additional relationship that reflects monetary policy, are consistent with UIP. The hypothesis that monetary authorities manage interest rate differentials so as to resist rapid changes in exchange rates and in these differentials explains several notable features of the data.

Mulligan and Sala-i-Martin estimate money demand in the United States between 1929 and 1990. They find that income elasticity lies between 1.3 and 1.5. Further, money demand is stable over the entire period. Income per capita turns out to be a better scale variable than consumption. Finally, during some time periods, agricultural regions have demanded more money than would be predicted, given their income, the authors find.

Gordon and Leeper identify supply and demand shocks in the markets for reserves and M2 in the 1980s,

and contrast them with results from the 1970s. Monetary policy shocks in the reserves market have dynamic impacts on short- and long-term interest rates, output, prices, and unemployment that are fully consistent with the predictions of traditional analyses. Identified policy shocks are an important source of fluctuations in prices, output, and commodity prices, and a relatively unimportant source of fluctuations in reserves and the federal funds rate. Policy shocks account for a small fraction of the variance of supply shocks in the M2 market, however.

Balduzzi, Foresi, and Bertola show that there have been long-lived departures between U.S. overnight and short-term interest rates. They suggest that overnight rates are targeted tightly by the monetary authorities, but that expectations of unrealized changes in the target introduce term-structure spreads with high persistence. They use three- and six-month T-bill and Fed funds target data to measure changes in the expected target during 1974–9, 1979–82, and 1985–91.

Drazen and Masson investigate whether a policy being carried out depends upon the state of the economy, so that even a “tough” policymaker may renege on an announced policy in adverse circumstances. In their analysis, a policymaker maintains fixed parity in good times, but devalues if the unemployment rate gets too high. They conclude that, if there is persistence in the process driving unemployment, then following a tough policy in a given period may lower the credibility of a no-devaluation pledge in subsequent periods.

Looking at evidence from the major OECD countries, Blanchard argues that, since the early 1980s, the real interest rate on bonds has increased, but the expected rate of return on equities has changed very little. Put another way, the equity premium appears to have nearly vanished. He finds little evidence that changes in the stochastic structure of bond and stock returns, or changes in relative supplies—the famed “debt explosion”—can explain the decrease in the equity premium. He then shows that the equity premium traditionally has been much lower in times of low inflation. So, conditioning on inflation, the 1980s is less unusual than it looks at first. One potential explanation for the relationship between real rates on bonds, required rates of return on stocks, and inflation is partial money illusion.

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1758. “The Search for R and D Spillovers,” by Zvi Griliches (NBER Working Paper No. 3768)
1759. “How Does It Matter?” by Benjamin M. Friedman (NBER Working Paper No. 3929)
1760. “Three Models of Retirement: Computational Complexity Versus Predictive Validity,” by Robin L. Lumsdaine, James H. Stock, and David A. Wise (NBER Working Paper No. 3558)
1761. “International Macroeconomic Policy Coordination When Policymakers Do Not Agree on the True Model: Reply,” by Scott Erwin, Jeffrey A. Frankel, and Katharine E. Rockett (NBER Working Paper No. 3747)
1762. “Price Margins and Capital Adjustment: Canadian Mill Products and Pulp and Paper Industries,” by Jeffrey I. Bernstein (NBER Working Paper No. 3982)
1763. “Information Spillovers, Margins, Scale, and Scope: With an Application to Canadian Life Insurance,” by Jeffrey I. Bernstein (NBER Working Paper No. 3979)
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“Taxes, Housing, and Capital Accumulation in a Two-Sector Growing Economy,” by Toshiyuki Okuyama and Stephen J. Turnovsky

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The following volumes may be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628. 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.

Bretton Woods Volume Published

A Retrospective on the Bretton Woods System: Lessons for International Monetary Reform, edited by Michael D. Bordo and Barry J. Eichengreen, is now available from the University of Chicago Press.

This volume is particularly relevant to current discussions concerning the future of the European Monetary System and the turbulence it experienced this fall. Nearly 50 years ago, in 1944, delegates from 44 countries assembled in Bretton Woods, New Hampshire, to attend a United Nations Monetary and Financial Conference. The focus of their meeting was negotiation of a "new world order," to help industrialized countries emerging from World War II to cope with trade and capital imbalances and to supervise a system of fixed exchange rates that came to be known as the Bretton Woods System. In August 1971, President Nixon suspended the system by ending the convertibility of dollars into gold, thus cutting exchange rates loose.

The papers in the Bordo/Eichengreen volume were presented at a 1991 NBER conference that brought together academics and policymakers to discuss the historical impact of the Bretton Woods System. The research studies provide an overview of the operation of the Bretton Woods System, chronicling its successes and the causes of its collapse. The volume also analyzes the Bretton Woods experience in light of subsequent monetary regimes. Substantial interpretive essays by Bordo and an epilogue by Eichengreen summarize the volume's main findings and their implications for monetary reform today.

Both Bordo and Eichengreen are NBER research associates in the monetary economics program. Bordo is also a professor of economics at Rutgers University; Eichengreen is a professor of economics at the University of California, Berkeley. This volume is priced at \$75.

U.S. Growth and Living Standards Before the Civil War

American Economic Growth and Standards of Living Before the Civil War, edited by Robert E. Gallman and John J. Wallis, has been published by the University of Chicago Press.

This volume examines the effects of early industrialization on the standard of living in the decades before the Civil War. It demonstrates that the aggregate economy grew faster than had any other large economy before. In addition to settling the ongoing debate over the pace and pattern of pre-Civil War growth, the authors examine the general quality of life in this era: how the improvement in income that resulted from growth was shared; how the opening of markets influenced the nature of agricultural activities; and how higher levels of income led to improved health and longevity. The book includes careful analyses of new estimates of labor force participation, real wages, and productivity, as well as of the distribution of income, height, and nutrition. The authors also make available much of the historical data to encourage economists and historians to extend their research and analyses.

Both Gallman and Wallis are NBER research associates in the Program on Development of the American Economy. Gallman is also the Kenan Professor of Economics and History at the University of North Carolina, Chapel Hill. Wallis is an associate professor of economics at the University of Maryland, College Park. The Gallman/Wallis volume is priced at \$70.

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pers 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 October are presented below. For previous papers, see past issues of the *NBER Reporter*. Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. They are not reviewed by the Board of Directors of the NBER.

NBER Working Papers

Measuring the Cyclicity of Real Wages: How Important Is Composition Bias?

**Robert B. Barsky, Jonathan A. Parker,
and Gary Solon**

NBER Working Paper No. 4202

October 1992

JEL No. E32

Economic Fluctuations, Monetary Economics

Since the 1960s, as in earlier periods, aggregate time series on real wages have shown only modest cyclicity. Therefore, macroeconomists have described the weak cyclicity of real wages as a salient feature of the business cycle. However, our analysis of longitudinal microdata indicates that real wages have been substantially procyclical since the 1960s. We also find that the procyclical nature of men's real wages even pertains to workers who stay with the same employer. Women's real wages are less procyclical than men's.

Numerous other longitudinal studies have documented the substantial procyclicity of real wages, but none has adequately explained the discrepancy with the aggregate time-series evidence. We show that there is a composition bias in aggregate time series: the aggregate statistics give more weight to low-skill workers during expansions than during recessions. We conclude that, because real wages actually are much more procyclical than they appear in aggregate statistics, theories designed to explain the supposed weakness of real wage cyclicity may be unnecessary. Theories that predict substantially procyclical real wages thus become more credible.

Accuracy in the Determination of Liability

Louis Kaplow and Steven Shavell

NBER Working Paper No. 4203

October 1992

JEL No. K42

Law and Economics

Many legal rules, notably rules of procedure and evidence, are concerned with achieving accuracy in the outcome of adjudication. In this paper, we study accuracy in the conventional model of law enforcement. We consider why reducing error in determining liability is socially valuable, and how reducing error affects the optimal probability and magnitude of sanctions.

Turnover and the Dynamics of Labor Demand

Daniel S. Hamermesh and Gerard Pfann

NBER Working Paper No. 4204

October 1992

JEL Nos. J23, E32

Labor Studies

The theory of the dynamics of labor demand is based either on the costs of adjusting the level of employment or on the costs of hiring or firing (gross changes in employment). We construct a generalized cost-of-adjustment function that includes both types of cost and allows for asymmetries in those costs.

Identifying the two types of costs requires complete data on turnover, which were available for the United States through 1981. We use these data for manufacturing to demonstrate that both types of adjustment cost affect the representative firm's profit-maximizing decisions about employment, and that both types of cost are asymmetric (leading here to quicker increases than decreases in employment).

Privatizing, Risk-Taking, and the Communist Firm

Dominique Demougins and Hans-Werner Sinn

NBER Working Paper No. 4205

November 1992

JEL Nos. P13, D44

Public Economics

This paper studies alternative methods of privatizing a formerly communist firm in the presence of imperfect risk markets. The methods include cash sales, a giveaway scheme, and a participation contract, in which the government retains a sleeping fractional ownership in the firm. We show that, with competitive bidding, the participation contract dominates cash sales because it generates both more private investment in restructuring and a higher expected present value of revenue for the government. Under weak conditions, the participation contract will induce more investment than the giveaway scheme, and it even may share the cash sales' virtue of incentive compatibility.

Capital Mobility in Neoclassical Models of Growth

**Robert J. Barro, N. Gregory Mankiw,
and Xavier Sala-i-Martin**

NBER Working Paper No. 4206

November 1992

JEL Nos. E1, D9, F2

Economic Fluctuations, Growth

The empirical evidence shows that economies grow faster per capita if they start further below their steady-state positions. For a homogeneous group of economies—such as the U.S. states, regions of western European countries, and the OECD countries—the poor economies grow faster than the rich ones. The neoclassical growth model for a closed economy fits these facts if capital is viewed broadly to encompass human invest-

ments, so that diminishing returns to capital set in slowly, and if differences in government policies or preferences about saving lead to heterogeneity in steady-state positions. Yet if the model is opened to allow for full capital mobility, then the predicted rates of convergence for capital and output are much higher than those observed empirically. We show that the open-economy model conforms with the evidence if an economy can use foreign debt to finance only a portion of its capital, even if 50 percent or more of the total. The problems in using human capital as collateral can explain the required imperfection in the credit market.

Why Exchange Rate Bands? Monetary Independence in Spite of Fixed Exchange Rates

Lars E. O. Svensson

NBER Working Paper No. 4207

November 1992

JEL Nos. F31, F32, F41, F42

International Finance and Macroeconomics

This paper argues that the reason fixed exchange rate regimes in the real world usually have finite bands instead of completely fixed rates between realignments is that exchange rate bands give central banks some monetary independence, even with free mobility of international capital. I specify the nature and amount of monetary independence, informally and in a formal model, and quantify it with data on the Swedish krona. The amount of monetary independence appears sizable. For instance, an increase in the Swedish krona band from zero to about plus or minus 2 percent may reduce the standard deviation of the krona interest rate by about 50 percent.

Business Cycle Volatility and Openness: An Exploratory Cross-Section Analysis

Assaf Razin and Andrew K. Rose

NBER Working Paper No. 4208

November 1992

JEL Nos. E32, F31

International Finance and Macroeconomics

This paper links business cycle volatility to barriers on international mobility of goods and capital. Theory predicts that capital market integration should lower consumption volatility while raising investment volatility, if most shocks are country-specific and transitory. The removal of barriers to trade in goods should enhance specialization and hence output volatility. We test these ideas using a unique panel dataset that includes indicators of barriers to trade in both goods and capital flows. However, our empirical results indicate that neither the degree of capital mobility, nor the degree of goods mobility, is strongly correlated with the volatility of consumption, investment, or output. This may reflect the fact that many business cycle shocks are both persistent and common to many countries.

What Direction for Labor Market Institutions in Eastern and Central Europe?

Richard B. Freeman

NBER Working Paper No. 4209

November 1992

Labor Studies

I examine the evolution of labor institutions during the initial phase of marketization in Poland, Hungary, and Czechoslovakia and develop a model of changing support for reforms during the transition to a market economy. I find surprising stability in labor institutions in the first stage of transition, but dramatic changes in labor outcomes. Successors to the official trade unions remain on the union scene. The central government taxes wage increases so enterprises will not give increases that match or exceed inflation. It also institutes tripartite forums to seek consensus on labor issues, as was done under reform communism.

By contrast, labor market outcomes change greatly. State-owned enterprises reduce employment even without privatization, producing sizable joblessness and eliminating massive vacancies. The dispersion of wages increases substantially in Hungary and Poland, although not in Czechoslovakia.

My model of changing support for reforms predicts a U-shaped curve of support for a successful reform program, with support falling among those who fail to advance rapidly in the new economic environment. Given this pattern, I assess how different labor arrangements are likely to affect workers' tolerance for the costs of transition. Also, are those who suffer in transition able to undertake mass protests, and to provide information to governments to change marketization programs that are failing through "voice"?

While many labor relations experts favor tripartite agreements that create a social consensus during transition, my analysis suggests that the most likely labor relations outcome in eastern European marketizing economies will be quite different: weak and fragmented unionism, concentrated in the public sector, and little or no unionism in the growing private sector, except in large joint ventures.

Can the Markov-Switching Model Forecast Exchange Rates?

Charles M. Engel

NBER Working Paper No. 4210

November 1992

JEL No. F31

International Finance and Macroeconomics

I fit a Markov-switching model for 18 exchange rates at quarterly and monthly frequencies. This model fits well in-sample on quarterly data for many exchange rates. By the mean-squared-error or mean-absolute-error criterion, the forecasts of the Markov model are not superior to a random walk or to the forward rate, but may be superior at predicting the direction of change of the exchange rate.

Credit Conditions and the Cyclical Behavior of Inventories: A Case Study of the 1981–2 Recession

Anil K. Kashyap, Owen A. Lamont, and Jeremy C. Stein

NBER Working Paper No. 4211

November 1992

Corporate Finance, Monetary Economics

This paper examines microdata on U.S. firms' inventories during different macroeconomic episodes. Much of the analysis focuses on the 1981–2 recession, which apparently was precipitated by tight monetary policy. We find important cross-sectional effects in this period: firms that were "bank-dependent" were much more prone to shed inventories than their counterparts who were not dependent on banks. In contrast, such cross-sectional differences are largely absent during a period of "loose" monetary policy later in the 1980s. Our findings are consistent with the view that: 1) there is a bank lending channel of monetary policy transmission; and 2) the lending channel is particularly important in explaining inventory fluctuations during downturns.

Alcohol, Marijuana, and American Youth: The Unintended Effects of Government Regulation

John DiNardo and Thomas Lemieux

NBER Working Paper No. 4212

November 1992

JEL Nos. I18, K42

Health Economics

This paper analyzes the impact of increases in the minimum drinking age on the prevalence of alcohol and marijuana consumption among high school seniors in the United States. The empirical analysis is based on a large sample of students from 43 states from 1980 to 1989. We find that increases in the minimum drinking age did reduce the prevalence of alcohol consumption. However, the increased legal minimum drinking ages had the unintended consequence of *increasing* the prevalence of marijuana consumption. Our estimates also suggest that an increased drinking age helps to create a climate of societal disapproval for all drug use, not simply for alcohol use. But this effect is not large enough to offset the substitution of marijuana for alcohol.

Are Rising Wage Profiles a Forced-Saving Mechanism?

David Neumark

NBER Working Paper No. 4213

November 1992

JEL No. J3

Labor Studies

Are rising earnings profiles a mechanism by which individuals engage in forced saving? I examine the cross-sectional relationship between overwithholding on in-

come tax payments—behavior that is consistent with a preference for forced saving—and the slopes of age-earnings profiles. The forced-saving hypothesis receives some support from estimates of earnings regressions. Individuals who receive tax refunds are on earnings profiles that are steeper and have lower intercepts, although the evidence is statistically significant in only a subset of the specifications estimated. On average, individuals who receive refunds have about 1 percentage point faster earnings growth per year than other individuals.

Convergence in Growth Rates: The Role of Capital Mobility and International Taxation

Assaf Razin and Chi-Wa Yuen

NBER Working Paper No. 4214

November 1992

JEL Nos. F40, F41

Growth, International Finance and Macroeconomics, Public Economics

We consider the role of capital mobility and international taxation in explaining the observed diversity in long-term growth rates. Our major finding is that, under capital mobility, international differences in taxes will not matter for differentials in total growth. Policy differences play a role in differentials in per capita growth, however, when they lead to a divergence in the aftertax rates of return on capital across countries, as when the residence principle is adopted universally. When this is the case, how tax differences affect the growth rates of population and human capital will depend on the relative preference of the individual household toward these two engines of growth. Optimal tax policies equalize growth with and without policy coordination.

Private Saving and Public Policy

B. Douglas Bernheim and John Karl Scholz

NBER Working Paper No. 4215

November 1992

JEL Nos. D91, H24

Public Economics

This paper supports the view that many Americans, particularly those without a college education, save too little. Our analysis also indicates that it should be possible to increase total personal saving among lower-income households by encouraging the formation and expansion of private pension plans. It is doubtful that favorable tax treatment of capital income would stimulate significant additional saving by this group. Conversely, the expansion of private pensions probably would have little effect on saving by higher-income households. However, these households are more likely to increase saving significantly in response to favorable tax treatment of capital income.

Currently, eligibility for IRAs is linked to an adjusted gross income (AGI) cap, and pension coverage is more common among higher-income households than among low-income households. The most effective system for promoting personal saving would have precisely the op-

posite features. Extending tax incentives for saving to higher-income households is problematic. We discuss three competing policy options: IRAs with AGI caps, the universal IRA, and the Premium Saving Account (PSA). Our analysis reveals that the PSA system is a more cost-effective vehicle for providing saving incentives to all households, particularly those in the top quintile of the income distribution.

Union Membership in the United States: The Decline Continues

Henry S. Farber and Alan B. Krueger
NBER Working Paper No. 4216
November 1992
JEL No. J51
Labor Studies

We use a demand/supply framework to analyze the decline in union membership in the United States since 1977 and the difference in unionization rates between the United States and Canada. We analyze new data for 1991 from the General Social Survey, and for 1992 from our own household survey on worker preferences for union representation. Using data for 1977 from the Quality of Employment Survey, and for 1984 from a survey conducted for the AFL-CIO as well, we are able to decompose changes in unionization into changes in demand and changes in supply. We also have data for 1990 from a survey conducted for the Canadian Federation of Labor on the preferences of Canadian workers for union representation.

We find that virtually all of the decline in union membership in the United States between 1977 and 1991 is caused by a decline in worker demand for union representation. There was almost no change over this period in the relative supply of union jobs. Additionally, very little of the decline in unionization in the United States can be accounted for by structural shifts in the composition of the labor force. Further, we find that all of the higher unionization rate in the U.S. public sector than in the public sector in 1984 can be accounted for by higher demand for unionization, and that there is actually more frustrated demand for union representation in the public sector. Finally, we conclude tentatively that the difference in unionization rates between the United States and Canada is explained roughly equally by differences in demand and supply.

Foreign Equity Investment Restrictions and Shareholder Wealth Maximization

Rene M. Stulz and Walter Wasserfallen
NBER Working Paper No. 4217
November 1992
JEL Nos. G12, G15
Asset Pricing, International Finance and Macroeconomics

This paper provides a theory of restrictions on foreign equity investment. When the demand for domestic shares differs between domestic and foreign investors, domestic entrepreneurs can maximize firm value by discriminating between those investors. Evidence from

Switzerland supports this theory. The model correctly predicts that the relaxation of restrictions on foreign equity investment decreases the value of shares available to foreign investors.

Home Bias and the Globalization of Securities Markets

Linda L. Tesar and Ingrid M. Werner
NBER Working Paper No. 4218
November 1992
JEL Nos. F21, G15
International Finance and Macroeconomics

This paper documents the available evidence on international portfolio investment in five OECD countries. We draw three conclusions from the data. First, there is strong evidence of a home bias in national investment portfolios despite the potential gains from international diversification. Second, to the extent that investors hold international securities, the composition of the portfolio of foreign securities seems to reflect factors other than diversification of risk. Third, the high volume of cross-border capital flows and the high turnover rate on foreign equity investments relative to domestic equity markets suggests that transactions costs and incomplete information are not important deterrents to international investment.

A Dynamic Spatial Model

Paul R. Krugman
NBER Working Paper No. 4219
November 1992
JEL Nos. F12, R1
International Trade and Investment

Any interesting model of economic geography must involve a tension between "centripetal" forces that tend to produce agglomerations and "centrifugal" forces that tend to pull them apart. This paper explores one such model, and shows that it links a number of themes in the geography literature including: the role of market access, as measured by "market potential," in determining manufacturing location; the role of forward and backward linkages in producing agglomerations; the potential for "catastrophes," (that is, discontinuous changes in location in response to small changes in exogenous variables); and the idea that the economy is a "self-organizing system" that evolves a self-sustaining locational structure.

Permanent International Productivity Growth Differentials in an Integrated Global Economy

Willem H. Buiter and Kenneth M. Kletzer
NBER Working Paper No. 4220
November 1992
JEL Nos. F20, E62, F43, O41
Growth, International Trade and Investment

We analyze differences in household behavior as a

source of persistent, and even permanent, differences between national or regional rates of productivity growth when there are constant, static returns to scale in production and international diffusion of technology is costless. A binding self-financing constraint on human capital formation can explain permanent differentials in international productivity growth. An alternative mechanism is the "nontradedness" of an essential input, such as human capital, in the growth process. Differences in national policies toward private saving (whether through lump-sum intergenerational redistribution or through the taxation of financial asset income), toward the subsidization of human capital formation (student loans), and toward the free provision of public sector inputs in the human capital formation process also influence long-run growth differentials.

Expenditures on Health Care for Children and Pregnant Women

Eugene M. Lewit and Alan C. Monheit

NBER Working Paper No. 4221

December 1992

JEL No. I10

Health Care

The chronic health care crisis in the United States is primarily the result of rapidly rising health care costs that leave millions of children and pregnant women without health insurance, with restricted access to health care, and at risk for poor health. A better understanding of the current system is key to any reform effort. We analyze estimates of annual expenditures on medical care services for children covering the period from conception through age 18, including expenditures on pregnancy and delivery. We focus on the distribution of health care expenditures by type of service and source of payment, on how expenditures differ for children of different ages and for adults, and on the rate of growth in expenditures on health care for children.

We suggest that, because there has been a decline in the relative share of expenditures accounted for by children, efforts to expand third-party financing of their health care are less likely to overwhelm the system than efforts to expand coverage to other groups. Families who have children with major illnesses and are exposed to catastrophic costs are especially in need of extended health care coverage. Efforts at cost containment may be most effective if focused on pregnancy and newborn care, areas in which expenditures have grown extremely rapidly in recent years. Finally, we conclude that, if expansion of health insurance coverage for children in the near term were to be incremental, then expanded coverage for children aged 3 to 12 probably would have the smallest budgetary impact of any expansion in access to care.

Wages, Profits, and Rent-Sharing

David G. Blanchflower, Andrew J. Oswald, and Peter Sanfey

NBER Working Paper No. 4222

December 1992

JEL No. J31

Labor Studies

This paper uses data from 1964 to 1985 to test for rent-sharing in U.S. labor markets. We find that changes in wages are explained by movements in lagged levels of profitability and unemployment. The results appear to be consistent with rent-sharing theory (or a labor contract framework with risk-averse firms) and to be inconsistent with the competitive labor market model. We estimate the unemployment elasticity of pay at approximately -0.03 , and the profit elasticity of pay at between 0.02 and 0.05 .

Fiscal Policy and Economic Growth

Eric Engen and Jonathan S. Skinner

NBER Working Paper No. 4223

December 1992

Growth, Public Economics

One view of government fiscal policy is that it stifles dynamic economic growth through the distortionary effects of taxation and inefficient government spending. Another view is that government plays a central role in economic development by providing public goods and infrastructure. This paper develops a generalized model of fiscal policy and output growth that allows for: a positive or negative effect of government spending on private productivity; increasing or decreasing returns to scale; a transition path away from the equilibrium growth path; and intratemporal tax distortions. Using data from 107 countries during 1970 to 1985, and correcting for the potentially serious problem of endogeneity in government policy, we find that a balanced-budget increase in government spending and taxation will reduce output growth rates.

The Gender Earnings Gap:

Some International Evidence

Francine D. Blau and Lawrence M. Kahn

NBER Working Paper No. 4224

December 1992

JEL Nos. J16, J31, J71

Labor Studies

This paper uses microdata to analyze international differences in the gender pay gap in a sample of ten industrialized nations. We focus particularly on the surprisingly low ranking of the United States in comparison to other industrialized countries. Empirical research on gender pay gaps traditionally has focused on the role of gender-specific factors, particularly differences in qualifi-

cations and in the treatment of otherwise equally qualified male and female workers (that is, labor market discrimination). An innovative feature of our study is its focus on the role of wage structure—the array of prices set for various labor market skills—in influencing the gender gap.

The striking finding of this study is the enormous importance of overall wage structure in explaining the lower ranking of U.S. women. Our results suggest that the U.S. gap would be similar to that in such countries as Sweden, Italy, and Australia (the countries with the smallest gaps) if the United States had their level of wage inequality. This insight helps to resolve three puzzling sets of facts: 1) U.S. women compare favorably with women in other countries in terms of human capital and occupational status; 2) the United States has had a longer and often stronger commitment to equal pay and equal employment opportunity policies than have most of the other countries in our sample; but 3) the gender pay gap is larger in the United States than in most industrialized countries. An important part of the explanation of this pattern is that the labor market in the United States places a much larger penalty on those with lower levels of labor market skills (both measured and unmeasured) than the labor markets of other countries do.

The State of North American and Japanese Motor Vehicle Industries: A Partially Calibrated Model to Examine the Impacts of Trade Policy Changes

Melvyn A. Fuss, Stephen Murphy, and Leonard Waverman

NBER Working Paper No. 4225

December 1992

JEL Nos. L12, F12

International Trade and Investment, Productivity

We simulate the impacts of various trade policies, including changes in tariffs and quotas, on the U.S. and Canadian motor vehicle sectors as compared to their Japanese competitors. Our models contain economies of scale in production, imperfect competition, and product differentiation. As a result of these details, we are able to capture quantitatively a number of outcomes stressed in the strategic trade literature.

We find that scenarios that expand a country's output reduce unit costs of production, both in the short and long run. Protectionist policies adopted by North American governments result in rent transfers to these countries. The price and output effects of scenarios that favor North American producers at the expense of Japanese producers, however, are moderated by the Japanese practices of partial pass-through and pricing-to-market. The welfare implications of the various scenarios are in accord with the strategic trade literature, in the sense that protectionist policies in some cases can increase aggregate welfare in North America at the expense of Japan.

Trade and Technical Progress

John F. Helliwell

NBER Working Paper No. 4226

December 1992

JEL Nos. O3, O4, O5, F4

Growth, International Trade and Investment

Using annual data from 1963–89 for technical progress in OECD countries, I show that there has been significant international convergence in the rates of technical progress, with the initially poorer countries progressing faster. Country effects are more significant than year effects, so I go on to analyze the effects of trade on the growth of technology using 27 annual cross sections of 19 countries each. My results suggest that both the level and the rate of increase in trade intensity lead to more rapid technical progress, with some additional effect from country size. Finally, countries with higher investment rates do not have faster rates of technical progress, once the capital-deepening effects of investment have been taken into account.

Tax Distortions to the Choice of Organizational Form

Roger H. Gordon and Jeffrey K. MacKie-Mason

NBER Working Paper No. 4227

December 1992

JEL Nos. H25, E62, G3

Public Economics

Income from corporate and noncorporate firms is treated very differently under the tax law. To what degree do firms change their form of organization in response? Since relative tax treatment depends on the investor's tax bracket, the answer will vary by the bracket of the firm's owners. We estimate the size of the nontax advantage to incorporating in each industry, so that forecasted choices for organizational form, aggregated over investors in different tax brackets, are consistent with the evidence. While these nontax costs can be large, noncorporate activity tends to be concentrated in industries in which these costs are small, leading to little excess burden from the tax distortion to organizational form.

Entrepreneurship, Happiness, and Supernormal Returns: Evidence from Britain and the United States

David G. Blanchflower and Andrew J. Oswald

NBER Working Paper No. 4228

December 1992

JEL No. J24

Labor Studies

Do entrepreneurs earn supernormal returns, or does competitive pressure ensure that they receive the same level of utility as workers do? If those who run their own businesses get supernormal returns (or "rents"), they should be happier than those who work as employees. We use survey data from Britain and the United States to show that, in comparison with those in regular forms

of employment, the self-employed do report significantly higher levels of utility, as proxied by data on overall satisfaction.

Income Inequality and the Incomes of Very High Income Taxpayers: Evidence from Tax Returns

Daniel R. Feenberg and James M. Poterba
NBER Working Paper No. 4229
December 1992
JEL Nos. E25, H24
Labor Studies, Public Economics

This paper uses tax return data for 1951–90 to investigate the rising share of adjusted gross income (AGI) that is reported on very-high-income tax returns. We find that most of the increase in the share of AGI reported by high income taxpayers is caused by an increase in reported income for the 0.25 percent of taxpayers with the highest AGIs. The share of total AGI reported by these taxpayers rose slowly in the early 1980s, and increased sharply in 1987 and 1988.

This pattern suggests that at least part of the increase in the income share of high-AGI taxpayers was caused by the changing tax incentives that were enacted in the 1986 Tax Reform Act. By lowering marginal tax rates on top-income households from 50 percent to 28 percent, the '86 Act reduced the incentive for these households to avoid taxes.

We also find substantial differences in the growth of the income share of the highest 0.25 percent of taxpayers, and the income share of other very high income taxpayers. This suggests that the increasing inequality of reported incomes at very high levels may *not* be driven by the same factors that have generated widening wage inequality throughout the income distribution and over a longer time period.

International Migration and International Trade

Assaf Razin and Efraim Sadka
NBER Working Paper No. 4230
December 1992

International Trade and Investment, Labor Studies

International migration can be a complement to international flows of commodities. In the presence of a productivity difference that is generated by an external effect of human capital, physical capital has weak incentives to flow from developed to underdeveloped countries, while pressures for international migration from poor to rich countries are strong. The balancing factors underlying an efficient global dispersion of population both generate advantages to size—such as public goods or increasing returns to scale—and generate disadvantages to size—such as immobile factors or congestion effects in the utilization of public services. The modern welfare state typically redistributes income from the rich to the poor, thus attracting poor migrants from

the less developed countries. Since migration could impose a toll on the redistribution policy of the “Developed Country,” it might benefit from foreign aid to the “Less Developed Country” if this aid financed a subsidy to workers there and thus contained migration.

Real Exchange Rates and Relative Prices: An Empirical Investigation

Charles M. Engel
NBER Working Paper No. 4231
December 1992
JEL No. F30
International Finance and Macroeconomics,
International Trade and Investment

This paper uncovers a striking empirical regularity: the consumer price of one good relative to another within a country tends to be much less variable than the price of that good relative to a similar good in another country. This seems to hold for all goods except very simple, homogeneous products. Models of real exchange rates are likely to predict this relationship, so the fact may provide a useful gauge for discriminating among those models.

Currency Substitution

Alberto Giovannini and Bart Turtelboom
NBER Working Paper No. 4232
December 1992
JEL Nos. E41, E52, F36, F41
International Finance and Macroeconomics

After discussing the ambiguity surrounding the definition of currency substitution, this paper illustrates the causes of substitutability of different currencies using a cash-in-advance model and a model in which money yields liquidity services. We discuss the effects of currency substitutability on exchange rates, international adjustment, and the inflation tax. We also review the empirical facts on the size of currency substitution in developed and developing countries. Whereas currency substitution is sizable in some developing countries, and is on the rise in the European Community, the estimated ability to substitute foreign for domestic currency is often unreliable because of problems with methodology and concept.

Specification of Policy Rules and Performance Measures in Multicountry Simulation Studies

Bennett T. McCallum
NBER Working Paper No. 4233
December 1992
JEL Nos. F47, E17
International Finance and Macroeconomics

Much recent analysis of international monetary and fiscal policy issues, such as the choice of an exchange

rate regime or the design of a policy coordination scheme, has been conducted by stochastic simulations with multicountry econometric models. In these studies it has become standard practice to consider alternative policy rules of a particular form that calls for departures of a policy instrument from some "baseline" reference path, proportional to deviations of a specified target variable from its own baseline path. However, this paper argues that this standard rule form is seriously defective for evaluating such issues because the implied rules often fail to be operational, and have associated performance measures that can be misleading in important cases. I present an example that concerns the international "assignment problem" of optimally pairing instruments with policy objectives.

The Effect of News on Bond Prices: Evidence from the United Kingdom, 1900–20

**Douglas W. Elmendorf, Mary L. Hirschfeld,
and David N. Weil**

NBER Working Paper No. 4234

December 1992

JEL Nos. G13, E43

Asset Pricing

We study the relationship of nonquantitative news to bond prices. We select a set of major news events, based solely on their significance as judged by historians, and examine the corresponding bond price movements. We find strong evidence that news has some influence on bond price movements, but no evidence that news can explain more than a small fraction of those movements.

Capital Budgets, Borrowing Rules, and State Capital Spending

James M. Poterba

NBER Working Paper No. 4235

December 1992

Public Economics

This paper uses cross-section data on the U.S. states to test the hypothesis that budgeting and borrowing rules affect the level and composition of public spending. It employs a 1963 dataset with detailed information on state capital budgeting practices to compare capital spending in states that maintain separate budgets for capital and operating expenditures in states that employ a unified budget. It also investigates the impact of financing rules, in particular pay-as-you-go rules for capital projects, on the level of spending. States with capital budgets tend to spend more on public capital, especially if they do not impose pay-as-you-go requirements for financing capital projects.

The Recent Failure of U.S. Monetary Policy

Martin Feldstein

NBER Working Paper No. 4236

December 1992

JEL No. E42

Monetary Economics

Since the spring of 1990, the rates of growth of real income, nominal income, and of the broad monetary aggregate (M2) have been substantially less than the Federal Reserve's targets and less than most observers regard as appropriate. The breakdown of the traditional economic relationship has not been between M2 and subsequent nominal GDP, but rather between the increase in reserves caused by open market operations and the subsequent level of M2. Changes in bank reserves brought about by open market operations have had much less effect on the money supply than the Federal Reserve had anticipated.

Because Federal Reserve requirements apply to only about one-fifth of M2, the Fed lacks a reliable way of predicting the effect of open market operations on the subsequent change in M2. The Fed therefore has emphasized the statistical relationship between changes in the federal funds rate and subsequent changes in the monetary aggregate and in economic activity. The federal funds rate once again has turned out to be a misleading indicator of monetary conditions and a poor way to guide M2.

The new bank capital standards and associated regulatory supervision may be the primary reasons for the reduced sensitivity of commercial bank lending and total nominal spending to changes in open market operations. Banks have responded to open market purchases by increasing the ratio of M1 (which is subject to reserve requirements) to M2.

License Price Paths: I. Theory; II. Evidence from Hong Kong

Kala Krishna and Ling Hui Tan

NBER Working Paper No. 4237

December 1992

International Trade and Investment

In the first of the two companion papers, we show that the dynamic aspects of the license utilization decision in an uncertain environment, together with the usual policy of rewarding high license utilization with future license allocations, creates four components of the license price: scarcity, asset, option, and renewal value. We identify and explore each, as well as the effect of imperfections in the license market on license price paths.

In the second paper, we use monthly data on license prices and utilization to test for the presence of imperfect competition in the market for apparel quota licenses in Hong Kong. We develop a competitive structural model that respects the dynamic aspects of the problem. We argue that concentration could affect the supply side as well as the demand side by affecting the cost associated with the search.

Our regressions indicate that concentration of license holdings affects the supply of licenses as predicted by models of imperfect competition. Since the implementation scheme encourages full utilization, imperfect competition affects the supply path of licenses rather than total supply. Concentration does not affect the demand side, which means that search costs are not an important consideration.

Trade Policy and the Third World Metropolis

Raul Livas Elizondo and Paul R. Krugman

NBER Working Paper No. 4238

December 1992

JEL Nos. R11, R12, F12, F13

International Finance and Macroeconomics,
International Trade and Investment

Many of the world's largest cities are now in developing countries. We develop a simple theoretical model, inspired by the case of Mexico, which explains the existence of such giant cities as a consequence of the strong forward and backward linkages that arise when manufacturing tries to serve a small domestic market. The model implies that these linkages are much weaker when the economy is open to international trade—in other words, the giant Third World metropolis is an unintended by-product of import-substitution policies, and will tend to shrink as developing countries liberalize.

State-Mandated Benefits and Employer-Provided Health Insurance

Jonathan Gruber

NBER Working Paper No. 4239

December 1992

Health Care, Public Economics

Numerous state regulations mandate that group health insurance plans must include certain benefits. By raising the minimum costs of providing any health insurance coverage, these mandated benefits make it impossible for firms to offer minimal health insurance at a low cost.

I use data on insurance coverage among employees in small firms to investigate whether this problem explains the lack of insurance for employees. I find that mandates have little effect on the rate of insurance coverage (this finding is robust to a variety of specifications of the regulations). This may be because mandates are not binding, since most firms appear to offer the mandated benefits even in the absence of regulation.

R and D Tax Policy During the Eighties: Success or Failure?

Bronwyn H. Hall

NBER Working Paper No. 4240

December 1992

JEL Nos. O32, H25

Productivity, Public Economics

This paper evaluates R and D tax policy in the United States during the 1980s, in particular quantifying the im-

pact of the R and D tax credit on the R and D investment of manufacturing firms. Using publicly available data on R and D spending at the firm level, I estimate a short-run average price elasticity for R and D spending of around one. Although the effective credit rate is small (less than 5 percent until 1990), this relatively strong price response means that the amount of additional R and D spending thus induced was greater than the cost in foregone tax revenue.

I also review the recent evolution of features of the U.S. corporate tax system that affect R and D. I conclude that the R and D tax credit had the intended effect, although it took several years for firms to fully adjust to it. I also argue that, although the high correlation over time of R and D spending at the firm level makes it difficult to estimate long-run effects precisely, the same high correlation makes it probable that these effects are large.

Aggregate Fluctuations from Independent Sectoral Shocks: Self-Organized Criticality in a Model of Production and Inventory Dynamics

Peter Bak, Kan Chen, José A. Scheinkman,

and **Michael Woodford**

NBER Working Paper No. 4241

December 1992

JEL No. E32

Economic Fluctuations

This paper illustrates how fluctuations in aggregate economic activity can result from many small, independent shocks to individual sectors. The effects of the small, independent shocks do not cancel in the aggregate because of two assumptions: local interaction between productive units (linked by supply relationships); and nonconvex technology. Neither feature would suffice on its own, we argue.

Dynamics of the Trade Balance and the Terms of Trade: The S-Curve

David K. Backus, Patrick J. Kehoe,

and **Finn E. Kydland**

NBER Working Paper No. 4242

December 1992

JEL Nos. E32, F40

International Finance and Macroeconomics

We interpret two features of international data: the countercyclical movements in net exports; and the tendency for the trade balance to be correlated negatively with current and future movements in the terms of trade, but positively with past movements. We document these same properties in a two-country model in which trade fluctuations reflect, in large part, the dynamics of capital formation. We find that the general equilibrium perspective is essential: the relationship between the trade balance and the terms of trade depends critically on the source of fluctuations.

**Relative Price Movements in
Dynamic General Equilibrium
Models of International Trade**

**David K. Backus, Patrick J. Kehoe,
and Finn E. Kydland**

NBER Working Paper No. 4243

December 1992

JEL Nos. F11, F30, F41

International Trade and Investment

We examine the behavior of international relative prices, emphasizing the variability of the terms of trade and the relationship between the terms of trade and net exports. We highlight aspects of the dynamic general equilibrium theory that are critical in determining these properties, contrast our perspective with that of the Marshall–Lerner condition and the Harberger–Laursen–Metzler effect, and point out features of the data that have proved difficult to explain within existing dynamic general equilibrium models.

**A Tax-Based Test of the Dividend
Signaling Hypothesis**

B. Douglas Bernheim and Adam Wantz

NBER Working Paper No. 4244

December 1992

JEL Nos. G35, H25

Corporate Finance, Public Economics

We study the effect of dividend taxation on the “bang-for-the-buck,” which we define as the share price response per dollar of dividends. Most dividend signaling models imply that an increase in dividend taxation should increase the bang-for-the-buck. In contrast, other dividend preference theories imply that an increase in dividend taxation should *decrease* the bang-for-the-buck. Since there recently has been considerable variation in the tax treatment of dividends, we are able to study dividend announcement effects under different tax regimes. Our central finding is that there is a strong positive relationship between dividend tax rates and the bang-for-the-buck. This result supports the dividend signaling hypothesis, and is consistent with alternatives. We also corroborate our results using the relationship between the bang-for-the-buck and bond ratings.

**International Growth Linkages:
Evidence from Asia and the OECD**

John F. Helliwell

NBER Working Paper No. 4245

December 1992

JEL Nos. O4, O5, F43

International Finance and Macroeconomics

This paper first shows how the convergence model generally applicable to the OECD and in augmented form to global samples, fails to reflect the post-1960 experience of the Asian economies. Then I consider some of the factors explaining the differences. Investment rates in physical capital appear to be more important in explain-

ing growth differences among the Asian economies, while education matters less. Various measures of openness to imports contribute importantly to explaining relative growth rates in Asia, with the more open economies generally having significantly faster growth rates, even after allowing for differences in investment rates. After allowing for differences in openness and investment rates, there also appears to be a trade-off between democracy and growth, with the initially less democratic Asian countries having faster subsequent growth, leading eventually to increasing effective demand for democratization.

Exchange Rates as Nominal Anchors

Sebastian Edwards

NBER Working Paper No. 4246

December 1992

JEL No. F31

International Finance and Macroeconomics,
International Trade and Investment

This paper discusses the use of nominal exchange rates as nominal anchors in stabilization programs. The first section deals with the dynamics of inflation in highly indexed economies. I show that credible exchange rate anchors will reduce the degree of inflationary inertia. However, if some residual inertia is maintained in some contracts, then real exchange rate overvaluation will result. I use data from Chile, Mexico, and Yugoslavia to test the implications of the model. The second section of the paper deals with the long run, and uses a 56-country dataset to investigate whether fixed exchange rates have been associated with greater financial discipline.

**Corporate Control, Portfolio Choice,
and the Decline of Banking**

Gary Gorton and Richard Rosen

NBER Working Paper No. 4247

December 1992

JEL No. G21

Corporate Finance

In the last two decades, U.S. banks have become systematically less profitable and riskier as nonbank competition has eroded the profitability of banks' traditional activities. Bank failures, insignificant from 1934, when the Glass–Steagall Act was passed, until 1980, rose exponentially in the 1980s. The leading explanation for the persistence of these trends centers on fixed-rate deposit insurance: the insurance gives bank shareholders an incentive to take on risk when the value of bank charters falls. We propose and test an alternative explanation based on corporate control considerations. We show that managerial entrenchment, more than moral hazard associated with deposit insurance, explains the recent behavior of the banking industry.

Stoking the Fires? CO₂ Emissions and Economic Growth

Douglas Holtz-Eakin and Thomas M. Selden

NBER Working Paper No. 4248

December 1992

JEL Nos. D62, E61, H10, Q25, F01, O13

International Trade and Investment, Public Economics

Over the past decade, concern over potential global warming has focused attention on the emission of greenhouse gases into the atmosphere. There is still an active debate concerning the desirability of reducing emissions. At the heart of this debate is the future path of both greenhouse gas emissions and economic development among nations. We use global panel data to estimate the relationship between per capita income and carbon dioxide (CO₂) emissions, and then use the estimated trajectories to forecast global emissions of CO₂.

Our analysis yields four major results. First, the evidence suggests a diminishing marginal propensity to emit (MPE) CO₂ as economies develop. Second, despite the diminishing MPE, our forecasts indicate that global emissions of CO₂ will continue to grow at an annual rate of 1.8 percent. Third, continued growth of emissions stems from the fact that economic and population growth will be most rapid in the lower-income nations that have the highest MPE. For this reason, there will be inevitable tension between policies to control greenhouse gas emissions and those toward the global distribution of income. Finally, we suggest that the pace of economic development does not alter dramatically the future annual or cumulative flow of CO₂ emissions.

Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing

John Heaton and Deborah J. Lucas

NBER Working Paper No. 4249

January 1993

JEL No. E44

Asset Pricing, Economic Fluctuations

We examine asset prices and consumption patterns in a model in which agents face both aggregate and idiosyncratic income shocks, and insurance markets are incomplete. Agents reduce the variability of consumption by trading in a stock and bond market to offset idiosyncratic shocks, but transactions costs in both markets limit the extent of trade. We estimate an empirical model of labor and dividend income, using data from the Panel Survey of Income Dynamics and the National Income and Product Accounts.

The model predicts a sizable equity premium and a low risk-free rate. By simultaneously considering aggregate and idiosyncratic shocks, we decompose this effect of transactions costs on the equity premium into two components. The direct effect stems from the fact that individuals equate net-of-cost margins, so an asset with lower associated transactions costs will have a lower market rate of return. A second, indirect effect occurs because transactions costs result in individual consumption that tracks individual income more closely than aggregate consumption.

Real Effects of Monetary Shocks in an Economy with Sequential Purchases

Robert E. Lucas, Jr. and Michael Woodford

NBER Working Paper No. 4250

January 1993

JEL No. E3

Economic Fluctuations

We study the effects of monetary disturbances in an economy in which sellers must deal with potential buyers in sequence. Because of the structure of trading assumed, sellers do not know the current state of demand until after the process of sequential transactions has concluded. As a consequence, unanticipated changes in nominal spending flows induce less-than-proportional responses in nominal transaction prices, and changes in the same direction in real output. These effects are similar to those obtained if sellers must commit themselves in advance to money prices, but do not depend upon any cost of changing prices. We also show how the ex ante distribution of monetary shocks affects sellers' pricing strategies, and hence the equilibrium relationships among the money supply, the distribution of transaction prices, and the degree to which available productive capacity is utilized.

What Do We Know About Enterprise Zones?

Leslie E. Papke

NBER Working Paper No. 4251

January 1993

JEL No. H71

Public Economics

In the last decade, most states have targeted certain depressed areas for revitalization by providing a combination of labor and capital tax incentives to firms operating in an enterprise zone (EZ). I analyze the effects of various EZ incentives on zone wages and employment. First I review empirical evidence on the operational success of EZ programs in Britain and the United States, and then I present new evidence from the 1990 Census on the success of the Indiana program.

Most British zone businesses are relocations, with an annual cost per job of approximately \$15,000. U.S. surveys find that much zone activity comes from expansions of existing businesses, with the average cost per zone job ranging from \$4564 to \$13,000 annually (about \$31,113 per zone resident job).

How do zones perform relative to what they would have done without zone designation? I summarize evidence on this for Indiana, where the zone program appears to have increased inventory investment and reduced unemployment claims. However, new evidence based on the 1990 Census indicates that the economic well-being of zone residents in Indiana has not improved appreciably.

The Lifetime Incidence of State and Local Taxes: Measuring Changes During the 1980s

Gilbert E. Metcalf

NBER Working Paper No. 4252

January 1993

JEL Nos. H22, H30

Public Economics

I compute the lifetime tax incidence of the major state and local taxes used in the United States during the 1980s. Using data from the Consumer Expenditure Survey, I show that over the life cycle, general sales taxes are progressive and equally as progressive as state and local income taxes. While the progressivity of sales taxes has not changed between 1984 and 1989, income taxes have become less progressive over that five-year period. Property taxes, on the other hand, have become more progressive. The system of state and local taxes is mildly progressive over the life cycle and has become slightly more progressive between 1984 and 1989. Finally, eliminating deductibility for sales taxes in 1986 appears to have had little effect on the overall progressivity of the tax system.

Progressivity of Capital Gains Taxation with Optimal Portfolio Selection

Michael Haliassos and Andrew B. Lyon

NBER Working Paper No. 4253

January 1993

JEL Nos. H21, G11

Public Economics

We provide new data on capital gains realizations using a five-year panel of taxpayers covering 1985–9. As earlier studies have found, we also find that capital gains realizations are very concentrated among the highest income groups. We use these data and data from the Federal Reserve Board *Survey of Consumer Finances* to draw inferences from a model of the effects of alternative tax treatment of capital gains on progressivity and efficiency.

Tax payments alone are not an accurate indication of the burden of a tax. Taxes generally create costs beyond the dollar value collected because they cause people to change their behavior to avoid the tax. Risk also is affected by the tax system. Beneficial risk-sharing characteristics of the tax system frequently are overlooked when examining the treatment of capital gains. We find that reforms that reduce the capital gains tax rate, offset by increases in the tax rate on other investment income, *reduce* efficiency. Surprisingly, we find that, for taxpayers for whom loss limits are not binding, a switch to accrual taxation also *reduces* efficiency. For taxpayers for whom loss limits are potentially binding, we find that large efficiency gains can be achieved by increasing the amount of capital losses that may be deducted against ordinary income. These results are partly attributable to changes in risk-sharing encompassed in these reforms.

Capital Gains Taxes and Realizations: Evidence from Interstate Comparisons

William T. Bogart and William M. Gentry

NBER Working Paper No. 4254

January 1993

JEL No. H24

Public Economics

Despite numerous studies of the relationship between income taxes and capital gains realizations, the revenue consequences of reducing capital gains tax rates remain unclear. One important source of variation has been neglected in this line of research: since both the tax base and the tax rate vary among states, the marginal tax rate on capital gains differs among otherwise identical individuals located in different states. The interstate variation in the tax consequences of realizing capital gains implies that the incentive to realize gains varies across states.

We document the interstate variation in capital gains taxation and examine the relationship between capital gains taxes and aggregated state-level realizations. For each state, we construct marginal tax rates on capital gains for the highest state income tax bracket for 1982 through 1990. Using state-level aggregated data rather than data on individual taxpayers alleviates the problem that the marginal tax rate is endogenous to the amount of capital gains realized. We find that capital gains realizations are related negatively to capital gains tax rates. The estimated elasticity is -0.67 in our basic specification.

Changes in the Demand for Skilled Labor Within U.S. Manufacturing Industries: Evidence from the Annual Survey of Manufacturing

Eli Berman, John Bound, and Zvi Griliches

NBER Working Paper No. 4255

January 1993

JEL Nos. J24, J23

Labor Studies

We investigate the shift in demand toward skilled labor in U.S. manufacturing. Between 1979 and 1989, employment of production workers in manufacturing dropped by 2.2 million or 15 percent while employment of non-production workers rose by 3 percent. A decomposition of changing employment patterns in each of 450 industries reveals that the defense buildup and trade deficits can account for only a small part of the shift in demand toward nonproduction workers. We conclude that production labor-saving technological change is the most likely explanation for the shift in demand toward nonproduction workers, since the shift is caused mostly by changes in labor demand within industries rather than by reallocation of employment toward industries with higher shares of skilled labor. Strong correlations between within-industry skill upgrading, and increased investment in computers on the one hand and R and D on the other, provide further evidence for technological change that saves production labor.

Substitution and Complementarity in Endogenous Innovation

Alwyn Young

NBER Working Paper No. 4256

January 1993

JEL Nos. O41, O31

Growth

Historical examples of technological change suggest that new technologies may complement older technologies, thus creating, rather than destroying, rents. Acknowledgement of the potential for both substitution and complementarity among inventions allows for a much richer characterization of the growth process, creating the possibility of threshold effects and multiple equilibriums, and bringing to the forefront the important role played by the expectations of inventive entrepreneurs.

The Swedish Wage Structure: The Rise and Fall of Solidarity Wage Policy?

Per-Anders Edin and **Bertil Holmlund**

NBER Working Paper No. 4257

January 1993

Labor Studies

Wage inequality in Sweden declined precipitously during the 1960s and the 1970s. There was a sharp reduction in overall wage dispersion and in the relative earnings advantage of highly educated workers, a marked narrowing of wage differences between men and women, and a trend increase in the relative wages of youth. There was also a substantial narrowing of wage differentials among workers within broad occupational and educational groups. The trend decline in wage inequality was broken in the 1980s. Wage differentials along several dimensions have widened modestly from the mid-1980s to the early 1990s. Much of the Swedish discussion has taken for granted that the pay compression has been driven by the egalitarian ambitions of strong and coordinated trade unions. Our analysis of the Swedish wage structure suggests that institutions are only part of the story. We show that conventional demand and supply factors can go a substantial way toward explaining some key relative wage movements in Sweden.

What Do Firms Do with Cash Windfalls?

Olivier J. Blanchard, **Florencio López-de-Silanes**,
and **Andrei Shleifer**

NBER Working Paper No. 4258

January 1993

Corporate Finance

Suppose that a firm receives a cash windfall that does not change its investment opportunity set, or equivalently its marginal Tobin's Q . What will this firm do with the money? We answer this question empirically, using a sample of firms that received such windfalls in the form of a lawsuit that was won or settled. Our evidence is broadly inconsistent with the perfect capital markets

model. The results need to be stretched considerably to fit the asymmetric information model, in which managers act in the interest of shareholders. Instead, the evidence supports the agency model of managerial behavior, in which managers try to ensure the long-run survival and independence of the firms with themselves at the helm.

Are OLS Estimates of the Return to Schooling Biased Downward? Another Look

McKinley L. Blackburn and **David Neumark**

NBER Working Paper No. 4259

January 1993

JEL Nos. D31, J24, J31

Labor Studies

We examine evidence on omitted ability bias in estimates of the economic return to schooling. We consider measurement error in proxies for unobserved ability, as well as the potential endogeneity of both experience and schooling. We also examine wages at labor market entry and later.

Including ability proxies reduces the estimate of the return to schooling, and instrumenting for these proxies reduces the estimated return still further. Instrumenting for schooling leads to considerably higher estimates of the return to schooling, although only for wages at labor market entry. This estimated return generally reverts to being near (although still above) the ordinary least squares (OLS) estimate if we allow experience to be endogenous. In contrast, for observations at least a few years after labor market entry, the evidence indicates that OLS estimates of the return to schooling that ignore omitted ability, if anything, are biased upward rather than downward.

Sex Discrimination and Women's Labor Market Interruptions

David Neumark

NBER Working Paper No. 4260

January 1993

JEL Nos. J16, J22, J24, J71

Labor Studies

According to the human capital explanation of sex differences in wages, women intend to be in the labor market more intermittently than men do, and therefore invest less in education and training. This lower investment leads to lower wages and wage growth. The alternative "feedback" hypothesis suggests that women experience labor market discrimination and respond with career interruptions and work within the home.

This paper explores the relationship between self-reported discrimination and subsequent labor market interruptions to test this hypothesis. The evidence is consistent with the feedback hypothesis. Working women who report experiencing discrimination are significantly more likely to change employers, and to have additional

children (or a first child). On the other hand, women who report experiencing discrimination, and who consequently have a greater tendency for career interruptions of these types, do not subsequently have lower wage growth.

Intertemporal Analysis of State and Local Government Spending: Theory and Tests

Douglas Holtz-Eakin, Harvey S. Rosen, and Schuyler Tilly

NBER Working Paper No. 4261
January 1993
JEL No. H70
Public Economics

Do state and local governments smooth their consumption spending across years, or is their spending driven mainly by contemporaneous changes in resources? We design a test to determine which view of state and local spending is more consistent with the data. We find that state and local spending is determined primarily by current (as opposed to permanent) resources. That is, despite their apparent ability to skirt balanced budget laws, states and localities typically do not smooth their expenditures over time.

The Analysis of Interfirm Worker Mobility

Henry S. Farber

NBER Working Paper No. 4262
January 1993
JEL No. J63
Labor Studies

Using a sample of over 14,000 full-time jobs held by workers in the National Longitudinal Survey of Youth, I examine mobility patterns and evaluate theories of interfirm worker mobility. I also investigate the roles of heterogeneity and state dependence in determining mobility rates for young workers, and find both to be very important.

My main findings are: first, that mobility is related positively and strongly to the frequency of job change prior to the start of the current job. Second, job change in the most recent year prior to the start of the current job is related more strongly than earlier job change to mobility on the current job. Third, the monthly hazard of job ending is not decreasing monotonically in tenure as most earlier work using annual data has found. Rather, it increases to a maximum at three months, and declines thereafter.

The first two findings suggest that there is important heterogeneity in mobility that is not fixed over time (that is, workers may mature). The third finding is consistent with heterogeneous match quality that cannot be observed ex ante.

I also find that females hold fewer jobs per year in the labor force than males do. This is because females have a lower exit rate from the first job after entry into the labor force than males do.

Shifting Plaintiffs's Fees Versus Increasing Damage Awards

Louis Kaplow

NBER Working Paper No. 4263
January 1993
JEL No. K41
Law and Economics

Shifting successful plaintiffs' fees to defendants and increasing damage awards are alternative ways to achieve similar results: increasing plaintiffs' incentives to sue and raising defendants' expected payments. This paper shows that relying on higher damage awards is more efficient than shifting plaintiffs' fees. The reason is that fee-shifting is, perversely, more valuable for plaintiffs with higher litigation costs. Thus, it is possible to substitute higher damage awards for fee-shifting in a manner that leaves deterrence unaffected while eliminating the suits of plaintiffs with the highest litigation costs.

Automobile Prices in Market Equilibrium: Parts I and II

Steven Berry, James A. Levinsohn, and Ariel Pakes

NBER Working Paper No. 4264
January 1993
Industrial Organization, Productivity

This paper develops new techniques for empirically analyzing demand and supply in differentiated products markets, and then applies these techniques to the U.S. automobile industry. We present a framework for obtaining estimates of demand, and cost parameters, for a broad class of oligopolistic markets for differentiated products. These estimates can be obtained using widely available product-level and aggregate consumer-level data; they are consistent with a structural model of equilibrium in an oligopolistic industry. When we apply the techniques developed here to the U.S. automobile market, we obtain cost and demand parameters for (essentially) all models marketed over a 20-year period.

Gender Gaps in Benefits Coverage

Janet Currie

NBER Working Paper No. 4265
January 1993
JEL Nos. J32, J16
Labor Studies

This paper explores the existence of gender gaps in the provision of four common benefits offered by employers: pensions, health insurance, sick leave, and disability plans. I find gender differences in whether or not benefits are offered: these differences remain statistically significant even after I control for observable characteristics, such as age, education, marital status, and number of children. Women are less likely to be offered pensions, health coverage, and disability. However, they

are 10 percent more likely to have paid sick leave. When I control for the wage, differences in offered pensions and health insurance disappear. This suggests that much of the difference in benefits coverage is associated with the fact that women work in low-wage jobs.

Labor and the Emerging World Economy

David E. Bloom and Adi Brender

NBER Working Paper No. 4266

January 1993

International Trade and Investment, Labor Studies

This paper explores the emergence of a world economy since 1950 and its implications for the world's labor force. There are four main sets of conclusions.

First, although there has been considerable integration of national economies since 1950, the world economy is still in its adolescence. Rapid integration has occurred among the industrial economies, but, among the developing economies and between the industrial and developing economies, integration has proceeded slowly.

Second, international labor mobility can account for little, if any, economic integration since 1950. The economic integration that has been achieved is mainly the result of the increased flow of capital across international boundaries, and to a dramatic increase in trade, especially among the industrial countries. These developments have been driven by technological and institutional changes that have reduced the transactions costs for trade and capital mobility while maintaining or increasing barriers to international labor mobility.

Third, these patterns of integration are associated with a sharp decline in income inequality among the industrial economies, but not in world income inequality, because the income gap between the industrial and developing countries has increased.

Finally, the large increase in developing economies' share of the world labor force projected for the next few decades will magnify their incentives to integrate more closely among themselves and with the industrial economies. World income per capita will be promoted by such integration.

160 inventors credited with important technological discoveries. Biographical information and complete patent histories through 1865 indicate that these "great inventors" were entrepreneurial and responded systematically to market demand. Their inventions were procyclical and originated disproportionately from localities linked with extensive markets. Although not exceptional in terms of schooling or technical skills, the inventors pursued the returns to their inventions vigorously, redirected their inventive activity toward emerging needs, and were distinguished by high geographical mobility toward districts conducive to invention.

What Drove the Mass Migrations from Europe in the Late Nineteenth Century?

Timothy J. Hatton and Jeffrey J. Williamson

NBER Historical Paper No. 43

November 1992

JEL Nos. J31, J61, N30

This paper examines the determinants of overseas mass migration from 11 European countries in the late 19th century. There was typically something like a half-century life cycle: a steep rise in emigration rates from low levels in preindustrial decades, followed by a plateau of very high emigration, and then a subsequent fall during more mature stages of industrialization. Using a new real wage database, we isolate the impact of economic and demographic forces (associated with the Industrial Revolution) on this emigration experience. The steep rise in emigration rates was driven mainly by a fertility boom and a decline in infant mortality. These events early in the demographic transition, with a two-decade lag, tended to glut the age cohort most responsive to wage gaps between the labor-abundant Old World and the labor-scarce New World. The steep fall in emigration rates was driven mainly by the forces of convergence and catching up: more rapid real wage growth at home encouraged an increasingly large share to stay at home. We show elsewhere that these mass migrations contributed significantly to an impressive late 19th century economic convergence; they can be viewed as an important part of a long-run equilibrium adjustment manifested by an evolving global labor market.

Historical Factors in Long-Run Growth

"Schemes of Practical Utility": Entrepreneurship and Innovation Among "Great Inventors" in the United States, 1790-1865

B. Zorina Khan and Kenneth L. Sokoloff

NBER Historical Paper No. 42

November 1992

JEL No. O00

We explore the growth in inventive activity during early American industrialization by examining the careers of

Technical Papers

A Utility-Based Comparison of Some Models of Exchange Rate Volatility

Dongchul Cho, Hali J. Edison, and Kenneth D. West

NBER Technical Paper No. 128

November 1992

JEL No. F31

Asset Pricing, International Finance and Macroeconomics

When used to make asset allocation decisions, underestimates of population variances lead to lower ex-

pected utility than equivalent overestimates: a utility-based criterion is asymmetric, unlike standard criteria such as mean squared error. To illustrate how to estimate a utility-based criterion, we use five bilateral weekly dollar exchange rates for 1973–89, and the corresponding pair of Eurodeposit rates. Of homoskedastic, GARCH, autoregressive, and nonparametric models for the conditional variance of each exchange rate, GARCH models tend to produce the highest utility, on average. A mean squared error criterion also favors GARCH, but not as sharply.

Asymptotic Filtering Theory for Univariate ARCH Models

Dean P. Foster and Daniel B. Nelson

NBER Technical Paper No. 129

November 1992

JEL No. C22

Asset Pricing

Many researchers have employed ARCH models to estimate conditional variances and covariances. How successfully can these models carry out this estimation when they are misspecified? This paper uses continuous record asymptotics to approximate the distribution of the measurement error. This allows us to compare the efficiency of various ARCH models, characterize the impact of different kinds of misspecification (for example, “fat-tailed” errors, misspecified conditional means) on efficiency, and characterize asymptotically optimal ARCH conditional variance estimates. We use our results to derive optimal ARCH filters for three diffusion models, and to examine in detail the filtering properties of GARCH(I,I), AR(I) EGARCH, and the model of Taylor (1986) and Schwert (1989).

Efficient Tests for an Autoregressive Unit Root

Graham Elliott, Thomas J. Rothenberg, and James H. Stock

NBER Technical Paper No. 130

December 1992

JEL No. C22

Economic Fluctuations

This paper derives the asymptotic power envelope for tests of a unit autoregressive root for various trend specifications and stationary Gaussian autoregressive disturbances. We propose a family of tests, members of which are asymptotically similar under a general $I(1)$ null (allowing nonnormality and general dependence) and which achieve the Gaussian power envelope. One of these tests, which is asymptotically point optimal at a power of 50 percent, is (numerically) approximately uniformly most powerful (UMP) in the case of a constant deterministic term, and approximately uniformly most powerful invariant (UMPI) in the case of a linear trend, although strictly no UMP or UMPI test exists. We also examine a modification, suggested by the expression for the power envelope, of the Dickey–Fuller (1979) t -statistic; this test is also approximately UMP (constant deterministic term case) and UMPI (time trend case). The power improvement of both new tests is large: in the demeaned case, the Pitman efficiency of the proposed

tests relative to the standard Dickey–Fuller t -test is 1.9 at a power of 50 percent. A Monte Carlo experiment indicates that both proposed tests, particularly the modified Dickey–Fuller t -test, exhibit good power and small size distortions in finite samples with dependent errors.

Measuring Asset Values for Cash Settlement in Derivative Markets: Hedonic Repeated Measures, Indexes, and Perpetual Futures

Robert J. Shiller

NBER Technical Paper No. 131

December 1992

JEL No. G13

Asset Pricing

I propose two ways to create derivative market instruments, such as futures contracts, that are cash-settled based on economic indexes. The first concerns index number construction: indexes based on infrequent measurements of nonstandardized items may control for quality change by using a hedonic repeated-measures method: that is, an index number construction method that follows individual assets or subjects through time and also takes account of measured quality variables. My second proposal is to establish markets for perpetual claims on cash flows matching indexes of dividends or rents. Such markets may help us to measure the prices of the assets generating these dividends or rents, even when the underlying asset prices are difficult or impossible to observe directly. I propose a perpetual futures contract that cash-settles every day in terms of both the change in the futures price and the dividend or rent index for that day.

Filtering and Forecasting with Misspecified ARCH Models II: Making the Right Forecast with the Wrong Model

Dean P. Foster and Daniel B. Nelson

NBER Technical Paper No. 132

December 1992

JEL No. C22

Asset Pricing

A companion paper—Nelson (1992)—showed that, in data observed at high frequencies, an ARCH model may do a good job at estimating conditional variances, even when the ARCH model is severely misspecified. While such models may perform reasonably well at *filtering*, that is, at estimating unobserved instantaneous conditional variances, they may perform disastrously at medium- and long-term *forecasting*. In this paper, we develop conditions under which a misspecified ARCH model successfully performs both tasks: filtering and forecasting. The key requirement (in addition to the conditions for consistent filtering) is that the ARCH model correctly specifies the functional form of the first two conditional moments of all state variables. We apply these results to a diffusion model employed in the options pricing literature: the stochastic volatility model of Hull and White (1987), Scott (1987), and Wiggins (1987).

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