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NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

WINTER 1985/6

Program Report

Taxation

David F. Bradford

The Bureau's Program in Taxation has had a productive two years since my last report, in the Winter 1983/4 *NBER Reporter*. Program members have explored a variety of topics, ranging from basic theory to questions of national tax policy with an emphasis on quantitative work. In this brief article, I cannot give a full review of the research conducted in the tax program. Instead, I shall describe a sampling of this work.

Tax Reform

Although the NBER does not take policy positions, one central objective of the tax program is to assist policymakers by generating estimates of the effects of alternative reforms, including their possible efficiency costs (for example, the lost output that may result from taxes that affect the allocation of capital). Therefore, much of our research has been of direct relevance to the ongoing process of income tax revision in the United States, particularly work by Don Fullerton, Research Associates Jerry A. Hausman, Patric H. Hendershott, and Joel Slemrod, and by Faculty Research Fellows Lawrence B. Lindsey and Louis Kaplow.

In most estimates of the efficiency cost of taxation, the responsiveness of labor supply to incentives is critical. Hausman's empirical work suggests that labor supply is quite sensitive to taxes. Because the efficiency cost tends to increase with the square of the tax rate, policymakers who weigh reforms that might reduce the upper rates of income tax should find Hausman's studies particularly useful. Furthermore, Hausman concludes that it is important to treat husbands and wives as a joint labor supply unit in thinking about the effect of taxes. This finding bears on current moves to eliminate the special deduction, introduced in 1981,

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This issue of the *Reporter* highlights the Bureau's Program in Taxation. Next, William Dickens describes his work on dual labor markets. Then, Jeffrey Frankel discusses exchange rates. After the quarterly Economic Outlook Survey are biographical sketches, news of NBER conferences, the Conference Calendar, and other NBER news and reports. The *Reporter* concludes with short summaries of recent NBER Working Papers.

that excludes 10 percent of the earnings of secondary workers.¹

Fullerton, who was an NBER research associate before becoming Deputy Assistant Secretary of the Treasury for Tax Policy, has studied the effect of taxes on the incentives to deploy capital in various uses. Among his papers is a comparison of the effective rate of tax on a marginal investment in various forms of capital (for example, equipment in the corporate sector, owner-occupied housing) under the income tax as it exists currently and as it might look under the reforms proposed by the Department of the Treasury and the Congress.² Using a model that takes account of state and

¹J. A. Hausman and P. Ruud, "Family Labor Supply with Taxes," NBER Working Paper No. 1271, February 1984.

²D. Fullerton, "The Indexation of Interest, Depreciation, and Capital Gains: A Model of Investment Incentives," NBER Working Paper No. 1655, June 1985.

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local taxes, including property taxes, as well as federal taxes, and that deals with such problems as the effect of inflation on depreciation allowances. Fullerton concludes that all of the reform plans would raise the effective rate of tax on capital overall but would reduce the dispersion of effective rates across different types of capital.

Both Hendershott and Slemrod have used computable general equilibrium models to investigate the effect of major tax changes on the allocation of resources.³ Both are also independently pursuing the integration of the financial and real elements of the economy. The puzzles posed by the apparent failure of firms to follow the financial policies that would seem to be most advantageous when tax rules are taken into account makes this effort all the more important. Slemrod is writing a book about his research. He has also produced what are probably the best available estimates of the cost of complying with the existing income tax.⁴

In addition to Hendershott and Slemrod, Fullerton and Research Associates John B. Shoven and John Whalley have continued to develop computable general equilibrium models. Such models are increasingly used for tax analysis and other practical applications. Fullerton, Shoven, and Whalley have recently coauthored (with Charles L. Ballard) a Bureau book on the subject.⁵

Lindsey has been working on a number of questions relating to tax reform. In particular, he has estimated the responses of taxpayers to the major income tax changes enacted in the Economic Recovery Tax Act of 1981. In the process, he has been making extensive use of the NBER TAXSIM model, which is under the general oversight of Research Associate Daniel R. Feenberg. Lindsey has also studied the effect of the tax law changes on charitable giving,⁶ joining Research Associate Charles T. Clotfelter, whose Bureau book devoted to taxes and charity has recently been published.⁷

Kaplow, who is both an economist and a professor of law, has made a contribution of a quite different kind to the study of tax reform. Kaplow notes that, although the idea of "horizontal equity" is always cited as an objective of tax reform, the attempts to translate this

³J. Slemrod, "A General Equilibrium Model of Taxation That Uses Microunit Data: With an Application to the Impact of Instituting a Flat-Rate Income Tax," *NBER Working Paper No. 1461, September 1984*; and P. H. Hendershott, "Tax Reform and Financial Markets," *NBER Working Paper No. 1707, September 1985*.

⁴J. Slemrod and N. Sorum, "The Compliance Cost of the U.S. Individual Income Tax System," *NBER Reprint No. 612, June 1985*.

⁵C. L. Ballard, D. Fullerton, J. B. Shoven, and J. Whalley, *A General Equilibrium Model for Tax Policy Evaluation*. Chicago: University of Chicago Press, 1985.

⁶L. B. Lindsey, "The Effect of the Treasury Proposal on Charitable Giving: A Comparison of Constant and Variable Elasticity Models," *NBER Working Paper No. 1592, March 1985*.

⁷C. T. Clotfelter, *Federal Tax Policy and Charitable Giving*. Chicago: University of Chicago Press, 1985.

concept into a measurable characteristic of tax systems has left much to be desired. After an extensive review of existing work, Kaplow concludes by wondering whether the idea has any real usefulness in tax analysis.⁸

Taxes, Saving, and Capital Formation

The effect of the tax system on the accumulation of wealth and its allocation in various forms of capital, including claims on foreigners, has been an ongoing concern of the Bureau's tax group, especially for Research Associates Michael J. Boskin, Martin Feldstein, Mervyn A. King, Laurence J. Kotlikoff, Shoven, Lawrence H. Summers, and Faculty Research Fellows B. Douglas Bernheim and Kenneth L. Judd.

Since returning to the Bureau from his position as chairman of the President's Council of Economic Advisers, Feldstein has studied the effect of taxes on capital formation. His papers focus on the effect of overall fiscal policy on, and the trade-off between, the efficiency cost of increased taxation in the present and in the future. Summers and Faculty Research Fellow N. Gregory Mankiw have also studied this issue.⁹ Feldstein has also analyzed the effects of taxation of capital income.¹⁰

Since my last report, King and Kotlikoff have both contributed important overview papers on the determinants of saving, with an emphasis on the role of the public budget.¹¹ Kotlikoff has emphasized the need to recognize the equivalence between spending and tax institutions. He is joined in this view by Boskin, who expects to soon complete a book concerned with the proper way to measure the economic effect of government activity. Boskin and Kotlikoff have also been collaborating on empirical research into the importance of demographic factors in determining the overall level of wealth accumulation.

Kotlikoff, Bernheim, Judd, Shoven, and Summers share another set of interests related to the determinants of wealth: imperfections in annuity markets and the related matter of bequests. They have been exploring the consequences of imperfect annuity markets (reflected in high loading costs, perhaps caused by

adverse selection). Because individuals must make provisions for an uncertain length of life when they decide how much to save, they may tend to make "excessive" bequests, that is, bequests beyond what they would leave if annuities were available on actuarially fair terms. Various possibilities for improving annuity markets, and various substitutes for such markets (such as Social Security or intrafamily agreements), may have important consequences for the overall level of wealth accumulation. Benjamin M. Friedman, who is director of the Bureau's Program in Financial Markets and Monetary Economics, has also studied this issue.¹²

Finally, Fullerton, Hendershott, and King have studied the effect of taxes on the composition of wealth, both in terms of real productive assets and of the financial characteristics of individual portfolios.

Finance

Program members particularly interested in issues of finance include: Research Associates Alan J. Auerbach, David F. Bradford, Roger H. Gordon, Jerry R. Green, Stewart C. Myers, James M. Poterba, Joseph E. Stiglitz, and Summers. Myers has written on the behavior of firms in their choice of financial structure.¹³ Poterba and Gordon have both investigated the behavior of demanders and suppliers in the tax-exempt bond market, and Poterba and Summers have studied the puzzle of why firms pay dividends.¹⁴ Finally, Stiglitz has analyzed the influence of information costs in the structure and decisions of organizations such as business corporations.¹⁵

Auerbach is currently directing a Bureau project on mergers and acquisitions, including effects of tax rules on such activity. That work is described in an article on NBER's Summer Institute in this issue of the *NBER Reporter*.

State, Local, and Open-Economy Public Finance

Because the economics of public finance in a U.S. state or local government have so much in common

⁸L. Kaplow, "Horizontal Equity: Measures in Search of a Principle," NBER Working Paper No. 1679, August 1985.

⁹M. Feldstein, "Debt and Taxes in the Theory of Public Finance," NBER Working Paper No. 1433, August 1984, and "Can an Increased Budget Deficit Be Contractionary?" NBER Working Paper No. 1434, August 1984; and N. G. Mankiw and L. H. Summers, "Are Tax Cuts Really Expansionary?" NBER Working Paper No. 1443, September 1984.

¹⁰M. Feldstein, "On the Theory of Optimal Taxation in a Growing Economy," NBER Working Paper No. 1435, August 1984.

¹¹M. A. King, "The Economics of Saving," NBER Working Paper No. 1247, December 1983; and L. J. Kotlikoff, "Taxation and Savings—A Neoclassical Perspective," NBER Reprint No. 585, April 1985.

¹²B. M. Friedman and M. Warshawsky, "The Cost of Annuities: Implications for Saving Behavior and Bequests," NBER Working Paper No. 1682, August 1985, and "Annuity Prices and Saving Behavior in the United States," NBER Working Paper No. 1683, August 1985.

¹³S. C. Myers, "Capital Structure Puzzle," NBER Working Paper No. 1393, July 1984.

¹⁴J. M. Poterba and L. H. Summers, "New Evidence That Taxes Affect the Valuation of Dividends," NBER Reprint No. 578, April 1985; and L. H. Summers, "The Aftertax Rate of Dividends," NBER Reprint No. 513, August 1984.

¹⁵R. K. Sah and J. E. Stiglitz, "The Architecture of Economic Systems: Hierarchies and Polyarchies," NBER Working Paper No. 1334, April 1984; and B. Greenwald, J. E. Stiglitz, and A. Weiss, "Informational Imperfections in the Capital Market and Macroeconomic Fluctuations," NBER Reprint No. 560, January 1985.

with those of a single country in a large world economy, the two research areas may be compared. In fact, Gordon does combine the two subjects in his work. His analysis of the maximizing choices of individuals and governments in an open world capital market draws attention to another set of puzzles for which some sort of model of market imperfection is required to provide a satisfactory explanation.¹⁶ His analysis (with John D. Wilson) of the effects of state corporation income taxes with formula apportionment of taxable income similarly emphasizes the unexpected incentives for both firms and governments that arise in that context.¹⁷

Research Affiliate David G. Hartman's interests are explicitly international. His work on the taxation of capital in an open economy demonstrates how much difference it may make for the usual sorts of policy prescriptions to take account of the international mobility of capital.¹⁸ Hartman's results draw attention to the importance of the regularity discovered by Feldstein (partly in joint work with Charles Horioka) that marginal domestic savings are allocated to marginal domestic investment (that is, that developed economies are functionally closed). Summers, among others, has examined the possible explanations and consequences of Feldstein's results, but there is clearly more research to be done.¹⁹

In work partly done jointly with George R. Zodrow, Research Associate Peter M. Mieszkowski has continued his earlier work on the incidence and allocation effects of local property taxation. Mieszkowski is generally credited as the creator of the "new view" of property taxation, whereby the levy is seen as partly a general tax on capital and partly a tax on the local provision of housing services. In his recent work, he has sought to take into account the interjurisdictional competition and endogenous determination of local government services.²⁰

Research Associate Harvey S. Rosen has also been active in research on questions of state and local public finance. He and Feenberg have used the Bureau's TAXSIM model to study state tax systems.²¹ That work

will form the foundation of a major research effort to investigate a series of issues on state and local public financing, including questions of the structure of state income taxes and their relationship to the federal tax, state experiments with tax indexing, capacities of states for redistributive taxation, and state capabilities for forecasting revenues. Under Rosen's leadership, the research will also take up questions of spending—such as how communities have reacted to demographic changes (when the number of children declines, do school systems contract?) and how grants from the federal government affect local government behavior—as well as questions about the effectiveness of local government financial choices.

Program Activities

The activities of the program have included regular two-day meetings (usually in the Cambridge office) and occasional gatherings of subgroups for particular purposes. In addition, tax workshops are held at the Summer Institute. Last summer there were three week-long workshops: one on mergers and acquisitions, under the leadership of Auerbach; one on taxation and finance, led by King; and one on analysis of pending tax law changes, directed by Fullerton. For summer 1986, I anticipate a similar structure, with the probable topics being mergers and acquisitions (II), state and local finance, and taxation in open economies.

A major project on the effect of taxes on capital formation, under Feldstein's direction, will discuss a first set of results in February 1986. The invited papers are devoted to two broad subjects, both emphasizing recent policy developments. The first set of papers will examine the ways in which tax changes enacted in the early 1980s are now influencing the process of capital formation. Recognizing the difficulty of discerning the effect of tax changes so soon after their enactment, we hope the magnitudes in this instance will make it possible to learn from recent experience. The second set of studies will attempt to project the likely effect on capital formation of tax law changes of the sort that have been under discussion for the past year or two. In view of the action in the House of Representatives at the close of 1985 and the consequent likelihood of action in the Senate in early 1986, it appears that any light that can be shed at the February conference will be very welcome.

A new venture is also planned for the coming year. A volume on tax subjects, compiled in connection with a conference held in Washington, DC, to which policymakers will be invited, is anticipated. Under the leadership of Summers, the conference should provide an attractive way for researchers to develop the sort of quantitative tax analysis that is needed to support policy decisions but that is often unsuitable for publication in the existing scholarly journals. If the initial effort is successful, the conference and the volume will become annual events.

¹⁶R. H. Gordon, "Taxation of Investment and Savings in a World Economy: The Certainty Case," NBER Working Paper No. 1723, October 1985.

¹⁷R. H. Gordon and J. D. Wilson, "An Examination of Multijurisdictional Corporate Income Taxes under Formula Apportionment," NBER Working Paper No. 1369, June 1984.

¹⁸D. G. Hartman, "On the Optimal Taxation of Capital Income in an Open Economy," NBER Working Paper No. 1550, January 1985, and "The Welfare Effects of a Capital Income Tax in an Open Economy," NBER Working Paper No. 1551, January 1985.

¹⁹L. H. Summers, "Issues in National Savings Policy," NBER Working Paper No. 1710, September 1985.

²⁰P. M. Mieszkowski and G. R. Zodrow, "The New View of the Property Tax: A Reformulation," NBER Working Paper No. 1481, October 1984; and P. M. Mieszkowski, "The Incidence of the Local Property Tax: A Reevaluation," NBER Working Paper No. 1485, October 1984.

²¹D. R. Feenberg and H. S. Rosen, "State Personal Income and Sales Taxes: 1977-83," NBER Working Paper No. 1631, June 1985.

Dual Labor Markets

William T. Dickens

There are two main thrusts in my research on labor markets: First is the empirical study of labor market institutions, including dual markets, the growth of unions, and labor supply in the presence of constraints on hours. Second is the development of theoretical models of labor market phenomena. These models help us to understand how observed behavior arises as a consequence of individual choice, and what its implications are for economic welfare and policy. This second focus encompasses my work on union threats and wages discussed here, and past work on safety regulation and irrational behavior.

The modern view of labor market segmentation was first developed to explain the failure of the war on poverty. It argued that the labor market offers two types of jobs—those with good working conditions, high pay, rewards for education, and opportunity for advancement (primary jobs), and those with low wages, poor working conditions, and no rewards for education or job experience (secondary jobs). Further, researchers who advanced the dual market hypothesis argued that there was nonwage rationing of jobs and that minorities and women, in particular, found it difficult to secure employment in the primary sector. The failure of the poverty program was ascribed to their inability to alter this basic dual structure of the labor market.

More recently, interest in dual markets has been revived. Several authors have explored its implications for the behavior of the economy over the business cycle, for the efficacy of countercyclical monetary and fiscal policy, and for trade and industrial policy.¹ Dual markets have also been linked to theories of involuntary unemployment.

Early work on dual markets was largely descriptive and based on case studies. During the 1970s many researchers tried to generalize the dual market view by using data on individuals' wages and personal characteristics. These attempts were frustrated by three problems: (1) the researchers could not identify which workers were in good jobs and which were in bad jobs on the basis of the data they had; (2) they could not distinguish between the hypothesis that people in secondary jobs received no rewards for education and job experience and the hypothesis that people with education and job experience tended to move into the primary sector; and (3) they could find no convincing way to test for the ex-

istence of rationing of primary sector jobs. My recent work with Kevin Lang solves all three of these problems.²

We apply the statistical technique of switching regressions with unknown regimes; this technique does not require a priori knowledge of which sector a person is in. Rather, it determines the probabilities of sectoral attachment for each individual in the sample on the basis of his or her wage and personal characteristics. Thus the first problem noted with previous studies is solved. The second and third problems are overcome by specifying a structural economic model of free choice between two sectors and using the switching regression technique to estimate the parameters of the model.

To test the dual market hypothesis, we examined whether the two wage equations estimated by the switching regression fit the data significantly better than the standard, single-equation model. We found that two equations do fit better and that they have the properties that advocates of the dual market view would expect—one sector has high wages and significant returns to education and job experience and the other has low wages and no apparent compensation for education or experience.

We also examined the hypothesis that people are free to choose between the two sectors and found that blacks are more likely to be in secondary jobs than would be expected if they were free to choose. This result suggests that there is nonprice rationing of primary sector jobs.

In a second paper, we extended this work in several ways.³ First, we replicated the results with a different sample of workers and with several different specifications for the mechanism that determines wages. Second, we examined the industrial and occupational composition of the primary and secondary sectors predicted by our statistical model and found it to be in substantial agreement with the earlier descriptive work. Finally, we have reviewed previous studies of dual markets. These studies had often produced results that were less supportive of the view than our work. We found that these studies often classified workers in the wrong sector. We also found some evidence that those who did a better job of classifying workers got results that were more supportive of dual market theory.

Several additional projects are now underway. We are estimating a model of the labor market with three wage equations including a distinct union sector. Since nearly all union jobs are thought to be in the primary sector, and since union jobs are believed to be rationed, it is possible that all the rationing found in the earlier studies was of union jobs. Also, past studies have often found that union workers receive large wage premiums.

²W. T. Dickens and K. Lang, "A Test of Dual Labor Market Theory," *NBER Reprint No. 646, September 1985*, and *American Economic Review* 75, 4 (September 1985), pp. 792-805; and "Testing Dual Labor Market Theory: A Reconsideration," *NBER Working Paper No. 1670, July 1985*.

³W. T. Dickens and K. Lang, "Testing Dual Labor Market Theory: A Reconsideration."

¹J. I. Bulow and L. H. Summers, "A Theory of Dual Labor Markets with Application to Industrial Policy, Determination, and Keynesian Unemployment," *NBER Working Paper No. 1666, July 1985*.

It is possible that union workers receive no more than other workers in the primary sector but do receive more than workers in the secondary sector. Preliminary results from our study suggest that both of these contentions are false. Union workers earn more than both primary and secondary nonunion workers. We also replicate the rationing results of the earlier studies.

In another project, we are examining how the composition of the sectors, and the proportion of the labor force in each sector, has changed over time and over recent business cycles. Finally, we are using an extension of the switching regression technique to look at the ways in which people enter and escape the secondary sector.

I am also developing theoretical explanations for the existence of dual markets and the analysis of their policy implications. Some authors have suggested that efficiency wage models—in which some workers are paid high wages to elicit efficient levels of work effort—may explain the existence of dual markets. However, there are serious theoretical and empirical problems with such explanations. From the theoretical perspective, there are many devices that could be used instead of high wages to ensure that workers contribute adequate work effort. The workers could be required to post bonds, or they could be paid lower starting wages and higher wages over time as a reward for their good performance. From an empirical perspective, such models could explain why some sectors pay high wages and others do not. But the particular pattern of high- and low-wage industries that I observe probably could not be anticipated on the basis of these theories.

In a paper presented at the NBER Summer Institute, I proposed an alternative model in which firms that face a serious threat of collective action by their workers (primarily unionization) pay higher wages to prevent it. Threats can raise wages in both monopolistic and competitive industries. The firms that face the most serious threats are those with the greatest profits per worker; thus, firms with significant monopoly power or with high capital-labor ratios face the most serious threats and will have to pay the highest wages to avoid unionization. This is consistent with the findings of past studies of industry wage patterns and with my work with Lang on the industry distribution of primary and secondary jobs. I am now working with Larry Katz to see which theories can best account for existing patterns of nonunion wages across industries and occupations.

In a departure from this work, a recent paper with Shelly Lundberg argues that past attempts to measure the response of workers' labor supply to changes in the tax and transfer system have failed to take account of institutional constraints on the number of hours people can work.⁴ We built a model that allows for the possibility that people do not have an unrestricted

choice of how much labor to supply. Changes in the tax system that do not induce a change in the distribution of offered hours of work yield much smaller effects, we estimate, than those of traditional labor supply models. If the hours distribution does change, the effects of a small change in the tax rate could be far greater than traditional models would predict.

Exchange Rates

Jeffrey A. Frankel

The dollar's path in recent years has shattered more than historical records and the financial health of some speculators. It has also helped to shatter faith in economists' models of the determination of exchange rates. We have understood for some time that under conditions of high international capital mobility, currency values will move sharply and unexpectedly in response to new information. Even so, actual movements of exchange rates have been puzzling in two major respects. First, we seem unable to predict any changes in exchange rates. This is true of both models based on economic fundamentals and the predictions of market participants as reflected either in the forward discount rate or in survey data.¹

Second, the proportion of exchange rate movements that can be explained even *after the fact*, using contemporaneous macroeconomic variables, is disturbingly low. Much of my NBER research over the past five years falls within the framework of these two problems. Here I first consider the question of explaining exchange rates *ex post*, and then take up the question of *ex ante* predictions.

Models of Exchange Rate Determination

Five years ago I surveyed and empirically tested the models of exchange rate determination that had been developed in the mid-1970s.² I distinguished between

¹On the predictions of the models (and of the forward rates), see R. Meese and K. Rogoff, "The Out-of-Sample Failure of Empirical Exchange Rate Models: Sampling Error or Misspecification?" in *Exchange Rates and International Macroeconomics*, J. A. Frankel, ed. Chicago: University of Chicago Press, 1983, pp. 67-105. On the predictions of survey data (and of the forward rate), see J. A. Frankel and K. Froot, "Using Survey Data to Test Some Standard Propositions Regarding Exchange Rate Expectations," NBER Working Paper No. 1672, July 1985.

²J. A. Frankel, "Monetary and Portfolio-Balance Models of Exchange Rate Determination," in *Economic Interdependence and Flexible Exchange Rates*, J. Bhandari and B. H. Putnam, eds. Cambridge, MA: M.I.T. Press, 1983; and "Tests of Monetary and Portfolio-Balance Models of Exchange Rate Determination," in *Exchange Rate Theory and Practice*, J. F. O. Bilson and R. C. Marston, eds. Chicago: University of Chicago Press, 1984.

⁴W. T. Dickens and S. J. Lundberg, "Hours Restrictions and Labor Supply," NBER Working Paper No. 1638, June 1985.

monetary and portfolio-balance models, according to whether or not domestic and foreign bonds were assumed to be perfect substitutes. In one version of the monetary approach, the "overshooting" model, the real exchange rate is assumed to be closely related to the real interest differential.³ In some ways this model held up well to subsequent events: Between 1980 and 1982, when the Federal Reserve Board tightened monetary policy to fight inflation, the U.S. real interest rate rose and attracted capital into the country, causing the dollar to appreciate in real terms just as the overshooting theory predicted.⁴

Initially there was some skepticism that the observed higher nominal interest rates actually represented higher real interest rates, rather than higher rates of expected inflation. The skeptics either believed that monetary policy was incapable of affecting real interest rates, or that the Fed had not earned the confidence of the markets in its commitment to inflation-fighting monetary targets. But during 1980-82, on those Fridays when the Fed's money stock announcement caused interest rates to climb, the dollar prices of the deutsche-mark and other currencies tended to fall. The same was true of prices of gold and other commodities. This is evidence that the increases in interest rates were real rather than nominal, and that the overshooting view of exchange rates (and commodity prices) was accurate.⁵

The problem posed by the 1980s for the overshooting model of exchange rates is that the appreciation of the dollar was not a one-time event that was gradually reversed over subsequent years. Rather, the dollar continued to appreciate year after year. The obvious explanation was unexpected further increases in real interest rates, most readily attributable to enormous and growing structural deficits in the federal budget. Indeed, by any of several measures of expected inflation, the differential between U.S. and foreign long-term real interest rates continued to climb in 1983 and 1984.⁶ However, it became harder to use the fundamentals to explain the continued appreciation in its later stages, especially after mid-1984, when most measures of the long-term real interest differential peaked.

³R. Dornbusch, "Expectations and Exchange Rate Dynamics," *Journal of Political Economy* (December 1976); and J. A. Frankel, "On the Mark: A Theory of Floating Exchange Rates Based on Real Interest Differentials," *American Economic Review* (September 1979).

⁴If one takes as given the monetary contraction to fight inflation, the resulting reallocation of demand from exports to nontraded goods might even have been considered desirable. See J. A. Frankel, "The Desirability of a Dollar Appreciation Given a Contractionary U.S. Monetary Policy," NBER Working Paper No. 1110, April 1983.

⁵C. Engel and J. A. Frankel, "Why Money Announcements Move Interest Rates: An Answer from the Foreign Exchange Market," NBER Working Paper No. 1049, December 1982, and *Journal of Monetary Economics* 10, 1 (January 1984); and J. A. Frankel and G. A. Hardouvelis, "Commodity Prices, Overshooting, Money Surprises, and Fed Credibility," NBER Working Paper No. 1121, May 1983, and *Journal of Money, Credit and Banking* 17, 4, 1 (November 1985).

⁶J. A. Frankel, "International Capital Mobility and Crowding Out in the U.S. Economy: Imperfect Integration of Financial Markets or of Goods Markets?" NBER Working Paper No. 1777, December 1985.

According to the portfolio-balance models in particular, the enormous and growing trade deficits should have begun to bring the dollar down. By early 1985, such considerations had led a few economists to suggest that the dollar had departed from the path implied by fundamentals and that it was on a "speculative bubble." Krugman made projections of future current account deficits and concluded that a situation in which the dollar depreciates indefinitely at only 3 percent per annum, the rate implied by the forward discount against the mark or yen, leads to impossibly high ratios of external debt to GNP.⁷ "It appears that the market has simply not done its arithmetic, and has failed to realize that its expectations about continued dollar strength are not feasible," he states. Another way of phrasing this conclusion is that the rationally expected rate of future depreciation exceeds the forward discount rate.

The Forward Discount

Econometricians consistently reject the hypothesis that the forward rate is an unbiased forecaster of the future spot exchange rate. The most popular test of the hypothesis has a regression of the ex post change in the spot rate against the forward discount. The hypothesis of unbiasedness implies a coefficient of 1.0, but the coefficient is usually significantly lower than that. In fact, the coefficient is usually close to zero, suggesting that the forward market contains little or no information about the future spot rate.

One explanation of this finding is that the systematic component of the apparent errors in prediction is really a risk premium that separates the forward rate from investors' true expectations. From 1980 to early 1985, when the dollar consistently sold at a forward discount against the mark and yen but the much-discussed dollar depreciation failed to materialize, the expected rate of depreciation was in fact close to zero. The forward discount constituted a positive risk premium paid to holders of dollar assets; and there was no obvious violation of rational expectations.

This is a difficult argument either to refute or confirm, because expectations are not directly observable. More information is needed. The most appealing source of additional information is the theory of optimal portfolio diversification. That theory says that the risk premium, if that is what the systematic prediction errors are, should be related to such factors as the degree of investor risk aversion, the "outside" supplies of nominal assets denominated in various currencies, the variance-covariance matrix of exchange rates, and the covariances with returns on other assets and investment opportunities. It seems plausible that a positive risk premium of this type explains some fraction of the 1985 forward discount (or interest differential) given the recent increase in the supply of dollar assets as a share of the world portfolio, relative to the likely

⁷P. R. Krugman, "Is the Strong Dollar Sustainable?" NBER Working Paper No. 1644, June 1985.

determinants of demand (that is, given the record deficits in the federal budget and current account without corresponding movements in residents' minimum-variance portfolios).

In a recent series of papers, I developed an econometric technique for identifying the risk premium. I used nonlinear, maximum-likelihood estimation (MLE) to exploit fully the hypothesis that investors determine their portfolios by diversifying optimally. My first application of this technique to a portfolio of six currencies found no evidence at all of a relationship between the systematic prediction errors and the variables on which the risk premium is supposed to depend; I could not reject the hypothesis that investors are risk-neutral.⁸ On the other hand, risk neutrality, literally interpreted, is not a likely description of investor behavior. In a more recent paper, I explore the theoretical implications of assuming a coefficient of risk aversion on the order of 2.0, the most popular value in the literature.⁹ Even when one accepts the theory of risk-averse portfolio optimization, the risk premium is very small. For example, an increase in the supply of dollar assets equal to 1 percent of the world portfolio (which could be an increase as large as \$54 billion, as of 1985) would drive up the risk premium paid on dollar assets by no more than 2.4 basis points per year. Such magnitudes are small compared to the current 300-basis-point forward discount of the dollar against the mark or yen. Unless the true coefficient of risk aversion is much higher than is conventionally thought, the risk premium appears unable to explain more than a negligible amount of the bias in the forward discount.

The conclusion that international substitutability is very high, and thus that the risk premium is very small, depends entirely on the optimal portfolio argument. A second application of the MLE technique to the portfolio of six currencies, in a paper with Charles Engel, tested the constraint of portfolio optimization rather than imposing it on the data.¹⁰ I find that the optimization hypothesis is rejected statistically.

An application of the MLE technique to a more diverse portfolio of U.S. assets produces the same conclusions. First, the hypothesis of optimal diversification is rejected. Second, if one imposes the hypothesis of optimal diversification on the data, estimates of the parameters are close to zero; in other words, one cannot reject the hypothesis of perfect substitutability. Third, if the coefficient of risk aversion is assumed to be 2.0, then one can conclude a priori that the risk premi-

um on equities versus bonds, for example, is as small as that in a portfolio that includes only foreign exchange.¹¹

It should be acknowledged that the entire framework of mean-variance optimization omits some factors that are emphasized by modern finance theory, such as changes over time in the investment opportunity set. These complications of the model are difficult to implement empirically. But some econometric constraints implied by international optimization in the more general intertemporal framework are rejected by Hodrick and Srivastava.¹²

There appears to be little in the intertemporal considerations to rescue the proposition that a large fraction of the forward discount should be attributed to a risk premium on dollars insisted upon by optimally diversifying investors.

An Unconventional View of Exchange Rate Expectations

If we abandon the portfolio optimization hypothesis, then there are few alternative sources of information to help distinguish the risk premium component of the forward discount from the expected depreciation component. Surveys of expectations of international bankers and other participants in the foreign exchange market are perhaps the most promising possibility. Such surveys have been conducted by the *American Express Bank Review* and *The Economist*. I analyze the data in a recent paper with Kenneth Froot.¹³ We find that the statistically significant prediction bias present in the forward discount data occurs even more strongly in the survey data, where it cannot be attributed to an exchange risk premium. From June 1981 to March 1985, the survey respondents on average expected the dollar to depreciate at an annual rate of about 12 percent against either the mark, yen, or Swiss franc (somewhat less against the pound and French franc). Because the depreciation did not materialize, the survey respondents' expectations fail the standard tests of rationality.

In subsequent work we have examined and tentatively rejected two possible explanations for the apparent bias in expectations. The first is random measurement error in the survey responses. The second is the "peso problem": the invalidation of the standard errors that would occur if the probability distribution of the dollar exchange rate were characterized (as in the theory of stochastic speculative bubbles) by a small probability in any given month of a large decline in equilibrium (the bubble bursting), together with a large probability of continued appreciation (the bubble lasting one more

⁸J. A. Frankel, "In Search of the Exchange Risk Premium: A Six-Currency Test Assuming Mean-Variance Optimization," *Journal of International Money and Finance*, December 1982.

⁹J. A. Frankel, "The Implications of Mean-Variance Optimization for Four Questions in International Macroeconomics," *NBER Working Paper No. 1617*, May 1985, and *Journal of International Money and Finance*, forthcoming.

¹⁰C. Engel and J. A. Frankel, "Do Asset Demand Functions Optimize Over the Mean and Variance of Real Returns? A Six-Currency Test," *NBER Reprint No. 574*, April 1985, and *Journal of International Economics* (December 1984).

¹¹J. A. Frankel and W. T. Dickens, "Are Asset-Demand Functions Determined by CAPM?" *NBER Working Paper No. 1113*, May 1983; "Portfolio Shares as 'Beta-Breakers': A Test of CAPM," *Journal of Portfolio Management* (Summer 1985); and "Portfolio Crowding Out and Related Issues in Finance," *NBER Working Paper No. 1205*, September 1983, and *Quarterly Journal of Economics* (December 1985).

¹²R. Hodrick and S. Srivastava, "An Investigation of Risk and Return in Forward Foreign Exchange," *NBER Working Paper No. 1180*, August 1983, and *Journal of International Finance* (1984).

¹³J. A. Frankel and K. Froot, "Using Survey Data . . ."

Economic Outlook Survey

month). We find that the bias in either the forward discount or the survey data over 1981–85 was too persistent to be statistically attributable to either random measurement error or to a speculative bubble/peso problem. We are left with the conclusion, always an uncomfortable one for economists, that expectations have been biased.

Such a conclusion might seem to support Krugman's view of an *irrational* speculative bubble. But there is a difficulty: the results of the unbiasedness tests on either the forward discount or survey data suggest that the rationally expected rate of depreciation is *less* than the forward discount, that it is something much closer to zero. The Krugman view is that the rationally expected rate of dollar depreciation must be something *greater* than the 3 percent annual rate implied by the current forward discount. How can we reconcile these two apparently conflicting arguments for relaxing the assumption of rational expectations?

Froot and I have proposed a framework for reconciling the conflicting challenges to the standard rational expectations models.¹⁴ Our model features three classes of actors: fundamentalists, chartists, and portfolio managers. Fundamentalists' forecasts are based on an overshooting model that would be rational *if* there were no chartists in the world. (They are presumably the ones who have been forecasting a dollar depreciation in our survey data.) Chartists extrapolate recent trends based on an information set that includes no fundamentals. Portfolio managers take positions in the market and thus determine the exchange rate, based on expectations that are a weighted average of the fundamentalists' and chartists' forecasts, with the weights changing over time in a Bayesian manner.

This model endogenously generates speculative bubbles. If the fundamentalists misforecast because of a few years of successive unexpected increases in the interest differential, for example, then they lose credibility. Over time, the portfolio managers put less weight on the fundamentalists and more weight on the chartists. As they do, they cause the dollar to rise even beyond the level justified by the fundamentals.

We construct simulations showing that during most of the period since 1981, the rationally expected rate of dollar depreciation has been less than the rate expected by any of the three sets of agents considered individually. Yet, if current account fundamentals are built in, the bubble ultimately and endogenously must burst. In our (rigged) simulation the turnaround comes in late 1984. From that point on, there is a "fundamentalist revival": as the dollar starts to come down and the predictions of the fundamentalists at last begin to come true, there is a shift in weight back to their views, and the decline accelerates. In this framework, the rationally expected rate of depreciation as of 1985 can indeed be greater than the 3 percent forward discount, as Krugman says, notwithstanding that the reverse was true in the preceding four years.

¹⁴J. A. Frankel and K. Froot, "The Dollar as an Irrational Speculative Bubble: A Tale of Fundamentalists and Chartists," forthcoming.

Fourth Quarter 1985

Victor Zarnowitz

According to the November survey of 25 professional forecasters taken by NBER and the American Statistical Association, the economy is unlikely to suffer either a recession or a substantial increase in inflation during 1986. Predictions of real growth are slightly higher now on the average than in the previous (September) survey, while predictions of inflation are slightly lower. However, most forecasters expect only moderate and partial improvements. In particular, they see business investment in plant and equipment as weakening.

Recent Developments and Their Interpretations

The latest estimate of real GNP growth in 1985:3 is 4.3 percent, a full percentage point higher than both the previous preliminary figure and the long-term trend rate of U.S. output. If this is upheld and followed by sufficiently large advances in output, it will put an end to the slowdown, or "growth recession," of 1984:3–1985:2. Auto sales were very strong in August and September because of special financial incentives; they dropped thereafter when the cut-rate deals stopped. Many forecasters think that the relatively high levels of consumer debt and slow growth of personal income will tend to discourage household spending, while the low levels of capacity utilization and the uncertainty about the tax treatment of business capital formation will tend to discourage investment spending. These are the reasons for predictions of lower real growth in the near future. Thus, the median forecasts from the present survey show growth rates of 2.8–3.2 percent at annual rates (a.r.) for the five quarters 1985:4–1986:4. It should be noted that the replies to the survey were largely constructed prior to the latest news on monetary accommodation, interest rates, the dollar, and shaky oil prices, which spread much cheer and stimulated strong rallies in the financial asset markets. Yet even the most recent forecasts are still rather cautious in large part.

Not surprisingly, in view of continuing debates and uncertain policies concerning the large problems of fiscal and trade deficits, domestic financial instability, and foreign debts, the dispersion of current forecasts is unusually high. However, forecasts of a recession in 1986 have almost disappeared. This is consistent with the evidence from the rising stock market (which should

Projections of GNP and Other Economic Indicators, 1985-86

	Annual				
				Percent Change	
	1984 Actual	1985 Forecast	1986 Forecast	1984 to 1985	1985 to 1986
1. Gross National Product (\$ billions)	3662.8	3890.8	4143.0	6.2	6.5
2. GNP Implicit Price Deflator (1972 = 100)	223.4	231.6	239.6	3.7	3.5
3. GNP in Constant Dollars (billions of 1972 dollars)	1639.3	1679.4	1728.0	2.4	2.9
4. Unemployment Rate (percent)	7.5	7.2	7.1	-0.3 ¹	-0.1 ¹
5. Corporate Profits After Taxes (\$ billions)	145.9	140.0	151.0	-4.0	7.9
6. Nonresidential Fixed Investment (billions of 1972 dollars)	204.9	218.0	223.0	6.4	2.3
7. New Private Housing Units Started (annual rate, millions)	1.7	1.7	1.8	-0.1 ²	1.7 ²
8. Change in Business Inventories (billions of 1972 dollars)	24.8	9.2	13.2	-15.6 ³	3.9 ³
9. Treasury Bill Rate (3-month, percent)	9.6	7.5	7.1	-2.1 ¹	-0.4 ¹
10. Consumer Price Index (annual rate)	4.3	3.4	3.6	-0.9 ¹	0.2 ¹

	Quarterly							Percent Change	
	1985 Q3 Actual	1985 Q4	Q1	1986 Forecast			Q3 85 to Q3 86		
				Q2	Q3	Q4			
1. Gross National Product (\$ billions)	3916.1	3982.9	4041.3	4104.0	4179.0	4254.8	6.7	6.8	
2. GNP Implicit Price Deflator (1972 = 100)	232.4	234.0	236.3	238.2	240.6	243.3	3.5	4.0	
3. GNP in Constant Dollars (billions of 1972 dollars)	1684.8	1698.0	1709.9	1721.2	1735.0	1748.0	3.0	2.9	
4. Unemployment Rate (percent)	7.1	7.1	7.1	7.1	7.1	7.1	0.0 ¹	0.0 ¹	
5. Corporate Profits After Taxes (\$ billions)	144.7	142.0	144.7	146.7	150.0	153.4	3.7	8.0	
6. Nonresidential Fixed Investment (billions of 1972 dollars)	217.7	221.0	222.0	223.7	224.0	225.0	2.9	1.8	
7. New Private Housing Units Started (annual rate, millions)	1.7	1.8	1.8	1.8	1.8	1.8	7.0 ²	1.7 ²	
8. Change in Business Inventories (billions of 1972 dollars)	-2.1	9.0	9.8	12.4	13.8	14.1	15.9 ³	5.1 ³	
9. Treasury Bill Rate (3-month, percent)	7.1	7.1	7.1	7.1	7.2	7.1	0.1 ¹	0.0 ¹	
10. Consumer Price Index (annual rate)	3.0	3.2	3.5	3.7	4.0	4.2	1.0 ¹	1.0 ¹	

SOURCE: National Bureau of Economic Research and American Statistical Association, Business Outlook Survey, December 1985. The figures on each line are medians of twenty-five individual forecasts.

¹Change in rate, in percentage points.

²Apparent discrepancy in percent change is caused by rounding.

³Change in billions of dollars.

have positive effects on consumer wealth, optimism, and spending) and from the leading economic indicators generally (which have been predominantly increasing for six months through October).

Predicted Growth in Real GNP: Modest but Sustained

Growth in total output (GNP in 1972 dollars) will be 2.9 percent in 1985-86, according to the new median forecast. (In the September survey, the corresponding figure was 2.7 percent.) The projected gain for 1984-85 is unchanged at about 2.4 percent. There is no systematic pattern to the group's predictions on average quarterly growth.

A standing feature of the survey is a question about the probabilities attached to alternative intervals of annual percentage changes in real GNP. The means of these assessments have the following distributions:

<i>Percentage Change in Real GNP</i>	<i>Percentage of Responses</i>	
	1984-85	1985-86
6.0 percent or more	0.4	2.0
4.0 to 5.9 percent	6.3	13.6
2.0 to 3.9 percent	80.3	56.7
0 to 1.9 percent	11.9	22.3
Negative	1.1	5.4

The probabilities that output will decline average 13, 16, 18, and 21 percent for the four successive quarters of 1986. These figures are relatively low, and they represent downward revisions from their counterparts in the previous survey.

Small Changes Up or Down in the Unemployment Rate

Forecasters are divided about the direction of change in unemployment: twelve predict declines, ten predict

increases, and two predict no change in the jobless rate between 1985:4 and 1986:4. The individual changes cancel each other out in the group averages, which stay at, or very near to, 7.1 percent. They are also generally small, except for a few outliers. The range for 1986:4 is 6.4-7.7 percent.

More Inflation Expected but Fears of a Large Rise Abate

The rates of change in the consumer price index (CPI) average 3.4 percent for 1985 and 3.6 percent for 1986. The quarterly figures rise from 3.2 percent a.r. in 1985:4 to 4.2 percent in 1986:4. These medians are all about 0.3-0.5 percent lower than the corresponding numbers in the September survey.

The averages for the GNP implicit price deflator (IPD) present a similar picture of inflation rising, but slowly, during the year ahead: 3.7 percent in 1985, 3.5 percent in 1986, 4.0 percent in 1985:4-1986:4, and 3.2-4.4 percent in the four quarters of 1986. These figures also show small downward revisions from the previous survey levels.

The percentage distributions of means of the individual probabilistic forecasts of IPD inflation, presented below, illustrate well the usual increase in uncertainty associated with the lengthening of the predictive horizon. These figures show a shift in the prevailing expectations toward higher inflation rates next year, but in the September forecasts that shift too was much more strongly articulated.

Percentage Change in IPD	Percentage of Responses	
	1984-85	1985-86
8.0 percent or more	2.6	10.2
6.0 to 7.9 percent	20.5	34.0
4.0 to 5.9 percent	75.4	51.5
Less than 4.0 percent	1.5	4.3

A Shift to Forecasts of Lower Interest Rates

In September, a clear majority predicted that interest rates would increase in the year ahead. Now ten respondents anticipate that the three-month Treasury bill rate will be lower in 1986:4 than in 1985:4; four believe that it will be unchanged; and eleven, that it will be higher. The range is 6.2-8.4 percent for both 1986:4 and 1986 as a whole. The quarterly averages are all very close to 7.1-7.2 percent; the annual ones are 7.5 percent for 1985 and 7.1 percent for 1986.

As to the yield on new high-grade corporate bonds, twelve forecasters see it lower in 1986:4 than now; three see it unchanged; and seven, higher. The respective averages for 1985:4 and 1986:4 are 11.0 percent and 10.7 percent; for 1985 and 1986, 11.5 percent and 10.6 percent.

The implied average forecasts of real interest rates are definite, as illustrated in the following tabulation. Herein presumably lies one important reason for the cautious optimism of many of the surveyed forecasts.

Average Forecasts of Real Interest Rates (percent)

	1985:4	1986:4	1985	1986
Bill rate minus				
CPI inflation	4.0	2.9	4.1	3.5
Bond yield minus				
CPI inflation	7.8	6.5	8.1	7.0

Some Improvements in Industrial Production, Inventory Investment, and Net Exports

Output of manufacturing, mining, and utilities is forecast to rise 2.6 percent in 1984-85 but 3.2 percent in both 1985-86 and 1985:4-1986:4, a modest improvement. The large decline of real inventory investment in 1984:3-1985:3 is predicted to be partially reversed in 1985:3-1986:4. Net exports of goods and services, also in real terms, are expected to be negative in 1986, as in the two preceding years, but to decline in absolute magnitude. These developments are seen in the aggregated forecasts, are reflected in most of the individual forecasts, and are presumably related to each other and linked to the recent and anticipated declines in interest rates and the exchange value of the dollar.

Corporate Profits Stronger; Nonresidential Investment Weaker

The median forecasts show profits after taxes (in current dollars) declining 4 percent in 1984-85 and nearly 2 percent a.r. in 1985:3-1985:4 but gaining about 8 percent in 1985:4-1986:4. For this volatile series, this would be a mild but significant turnaround.

Constant-dollar outlays on business plant and equipment are expected to rise 6.4 percent in 1984-85 but only 2.3 percent in 1985-86 and 1.8 percent in 1984:4-1985:4. These averages conceal a lot of dispersion among the individual forecasts. For example, the predictions for 1985:4-1986:4 average 2.4 percent with a standard deviation of 2.6 and a range of -5.6 percent to 6.3 percent.

The Cautious Consumer and Home Buyer

Growth in real consumption expenditures is expected to moderate from 4.1 percent in 1984-85 to 2.4 percent in 1985-86 and 2.5 percent in 1985:4-1986:4. The latter figures are below the corresponding forecasts for growth in total output.

In September, housing starts on the average were predicted to decline 3.2 percent in 1985-86. The current survey forecasts are much more optimistic, showing a small increase of 1.7 percent for the same period. Residential fixed investment in 1972 dollars is seen as rising 6.4 percent in 1984-85, 2.3 percent in 1985-86, and 1.6 percent in 1985:4-1986:4.

Less Growth in Government Spending and Other Policy Assumptions

Federal government purchases of goods and services are predicted to grow 9.5 percent in 1984-85, 4.0 percent in 1985-86, and 2.1 percent in 1985:4-1986:4. For state and local governments, the corresponding median forecasts are 3.0 percent, 2.2 percent, and 1.6 percent. Evidently, a time for some reckoning and belt-tightening is expected on the assumption that the problem of budget deficits will have to be tackled.

Fourteen respondents assume no significant change in the current tax law; others think some changes are possible but they are divided on the effects of the changes on tax revenues (plus, minus, or neutral). Only a few now expect any large percentage increases in defense outlays. The views on monetary policy seem to vary considerably, but the most common assumptions are that M1 and M2 will grow by 5-9 percent.

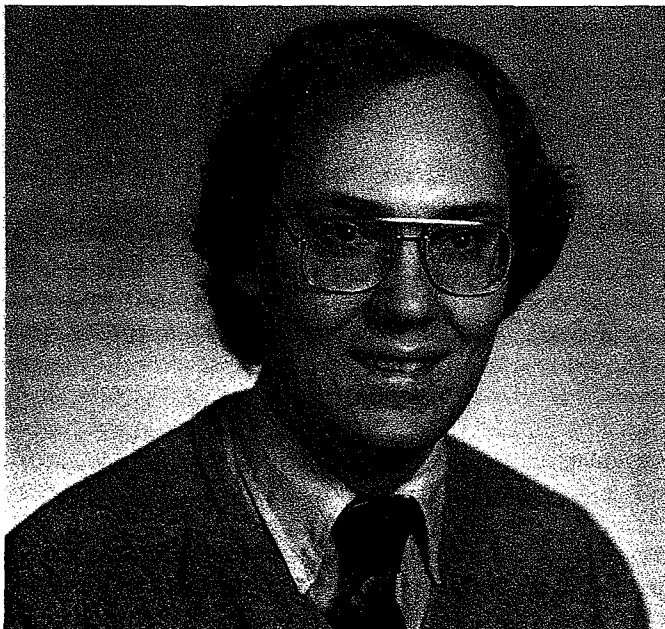
Many survey participants assume that the dollar will decline gradually. Energy price reductions are also widely anticipated.

This report summarizes a quarterly survey of predictions by 25 business, academic, and government economists who are professionally engaged in forecasting and are members of the Business and Economics Statistics Section of the American Statistical Association. Victor Zarnowitz of the Graduate School of Business of the University of Chicago and NBER, assisted by Robert E. Allison of NBER, was responsible for tabulating and evaluating this survey.

NBER Profiles

William T. Dickens

Bill Dickens, assistant professor of economics at the University of California at Berkeley, has been a member of NBER's Program in Labor Studies since 1982. He



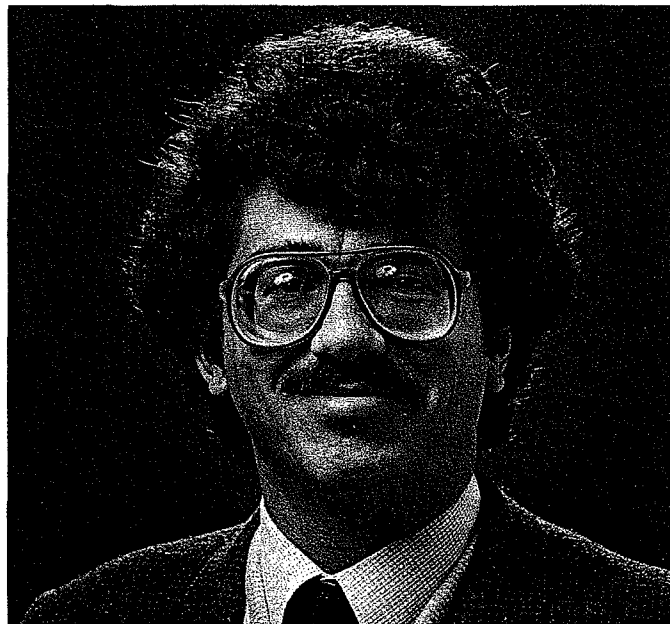
received his B.A. in social studies and mathematics from Bard College in 1976 and his Ph.D. in economics from MIT in 1981.

At Berkeley, in addition to his teaching responsibilities, Dickens is a research associate of the Institute of Industrial Relations. He also serves on the Board of Reviewers of *Industrial Relations* and has been a consultant and expert witness in the areas of labor economics and statistics.

Dickens's work has been published in a number of journals, including the *American Economic Review*. He has also written several papers that are part of the NBER Working Papers series.

Dickens and his wife live in Berkeley. As a hobby, they make their own beer and ice cream. They also enjoy hiking and flying their radio-controlled glider in the Berkeley Hills.

Jeffrey A. Frankel



Jeff Frankel, an associate professor of economics at the University of California at Berkeley, has been a research associate in NBER's Program in International Studies since 1982. Frankel received his degree in economics from Swarthmore College in 1974 and his Ph.D. from MIT in 1978. In addition to his post at Berkeley, he has had visiting appointments at the World Bank, the Institute for International Economics, the International Monetary Fund, the Federal Reserve Board, and Yale University. Also, from August 1983 to August 1984, Frankel served as senior staff economist for international economic policy at the President's Council of Economic Advisers.

Frankel's fields of interest include international finance and macroeconomics, especially the determination of exchange rates. He is currently studying portfolio

optimization, the quantification of worldwide capital mobility, the liberalization of Japanese financial markets, and the recent behavior of the dollar.

Frankel, who lives in Berkeley, belongs to nine frequent-flyer clubs. He likes to get his exercise, he tells the *NBER Reporter*, "lifting ideas, running regressions, and jumping to conclusions."

Conferences

Current Trade Policy Issues

On August 8 NBER's trade relations project held a conference in Cambridge on "Current Trade Policy Issues." The program was organized by NBER Research Associates Robert E. Baldwin and J. David Richardson, both of the University of Wisconsin at Madison. Five papers were presented:

C. Michael Aho, Council on Foreign Relations, and Jonathan Aronson, University of Southern California, "Trade Talks: Opportunities and Pitfalls"

Discussant: Myer Rashish, Rashish Associates, Inc. Lawrence Krause, Brookings Institution, "Agenda for a New GATT Round"

Discussant: Emery Simon, Office of the U.S. Trade Representative

Rachel McCulloch, NBER and the University of Wisconsin at Madison, and J. David Richardson, "U.S. Trade and the Dollar: Evaluating Current Policy Options"

Discussant: Sven Arndt, American Enterprise Institute

Lee Price, Staff Member, Subcommittee on Economic Stabilization, House Banking Committee, "Trade Problems and Policy from a U.S. Labor Perspective"

Discussant: Mark Anderson, Department of Economic Research, AFL-CIO

Raymond Ahearn and Alfred Reifman, both of the Congressional Research Service, "U.S. Trade Policy: Congress Sends a Message"

Discussants: Kent Hughes, Joint Economic Committee, U.S. Congress, and Susan Schwab, U.S. Senator Danforth's office

The first two papers dealt with the possible agenda for a new round of multilateral trade negotiations sponsored by GATT (General Agreement on Tariffs and Trade). Aho and Aronson explain why recent economic developments make the next negotiation more difficult than previous ones; then they survey the trade policy objectives and national constraints of the major partic-

ipants. Finally, they outline the elements of a global package that they believe might bring the negotiations to a successful conclusion. They are fairly optimistic about the chances of developing codes and sets of general principles with regard to services trade, counterfeiting, and intellectual property. However, they feel that progress is less likely in agriculture, high technology products, and trade-related investment issues.

Aho and Aronson stress that in order to involve the less developed countries in the negotiations, it will be necessary for the developed countries to provide greater access to their markets for labor-intensive products. To ease the adjustment of domestic producers to the opening of such markets, they suggest establishing global quotas for those labor-intensive products now heavily protected, auctioning off the import rights to domestic importers, and using the proceeds to help workers and firms adjust to the changed competitive conditions. They also propose that a definite date be set for the termination of the quota system.

In his paper, Krause reports on the results of a survey carried out by the Pacific Economic Cooperation Conference (PEEC) of the views of public and private leaders on priorities for the next multilateral trade negotiation. Within the U.S. government, the issues of agriculture, services, safeguards, trade-related investment regulations, subsidies, access to low-penetrated developed country markets (mainly Japan), full participation of the developing countries in the GATT system, and high technology products top the list of agenda items. Issues not given a high rating by U.S. officials include GATT enforcement of the nontariff codes and trade restraints on natural resource products. Krause also finds that members of the U.S. business community are not enthusiastic about a new negotiating round because of the loss of competitiveness brought about by the high level of the dollar. Moreover, American labor unions believe this is not the appropriate time for a multilateral trade negotiation.

For the Pacific Basin countries as a whole—a group with many developing countries—gaining access to markets for manufactured goods, especially the Japanese market, is the most important agenda item. The second and third most significant issues are protection on processed natural resource products and subsidies/countervailing duties. The trade task force of PEEC also accepted the views of the United States and Japan that new issues, such as services and high technology, should be given priority on the agenda.

Krause points out that not only are there important differences between the United States and the developing countries of the Pacific Basin but also that the European Community is reluctant to negotiate on agriculture and wishes to ignore the subsidies issue. Furthermore, the Community favors selective safeguards. Because of the divergent views among the likely participants, for a successful negotiation to take place, all countries will have to accept some risks and agree to include items in the agenda on which it will be politically difficult to make concessions.

As McCulloch and Richardson point out, our \$150 billion trade deficit is the prime justification given for the many recent proposals to improve the international competitiveness of U.S. exporters and to increase protection for U.S. import-competing industries. However, most of the proposals aimed at reducing the U.S. trade deficit rest on an incomplete and flawed evaluation of the underlying problems and their causes. In particular, McCulloch and Richardson argue that the trade deficit is largely determined by macroeconomic conditions in this country and abroad, especially including the rates of return that determine international capital movements. Some of the proposals may increase employment and profits in particular industries, but only at the cost of lower employment and profits in other industries. Without changes in macroeconomic factors, there will be no net gain in employment nor any improvement in the trade balance.

McCulloch and Richardson note that some of the proposals will result in increased gains from trade, an outcome that is quite consistent with an unchanged trade balance. Macroeconomic policies that reduce the budget deficit and policies aimed at reducing the differential between returns to productive capital in the United States and abroad, would actually affect the trade deficit. Such policies include measures affecting research and development and working conditions; the tax treatment of household savings, corporate profits, outlays on education, real capital gains, and productive investment; and the regulation of close substitutes for real capital in the portfolios of holders of wealth.

A novel analytical feature of the McCulloch-Richardson paper is their emphasis on the link between the determinants of the capital account and changes in the current account. In an appendix they present a framework for analyzing the influence of exchange rates and trade policy as determinants of changes in the international ownership of productive capital and thus in changes in the current account.

As the survey by Krause brought out, organized labor in the United States does not believe that this is an appropriate time for a new trade negotiation and is very much dissatisfied with recent government policies in the trade field. In his paper, Price presents the case for this position. He argues first that only a small amount of trade is brought about by Ricardian comparative cost differences based on differences in technology or climate. The ability to transfer technology and capital easily across national borders means that cost differentials are increasingly caused by differences in wages and in government support alone. Many developing country governments keep wages down by severely restricting their workers' rights to organize and bargain collectively. Furthermore, many governments pursue mercantilistic policies that artificially promote exports and keep out imports. Under these conditions, increased trade aggravates unemployment by displacing less-skilled Americans without creating new jobs for them.

Price challenges the view that the U.S. trade deficit is caused primarily by the overvalued dollar and points

out that our deficits with Japan and Taiwan have been among the fastest growing even though the dollar appreciation against their currencies has been among the lowest. Another theme of his paper is that the U.S. government continues to subordinate the goal of production *in* the United States to the goal of production *by* U.S. companies—whether here or abroad. He illustrates this point by citing the actions of the government in helping the banks reschedule Third World debts, in emphasizing services trade as a major agenda item in the upcoming trade negotiations, and in dealing with the Japanese on autos and telecommunications equipment.

In Price's view, labor unions have no illusions that trade policy alone can assure lower unemployment and income growth. However, the unions believe that unimpeded imports do not represent progress at a time of serious unemployment for production workers, downward pressure on pay scales, and large trade imbalances. Moreover, he concludes, unions observe bankers, farmers, and nonunion industries receiving government assistance to maintain their international positions, and so unions turn to makeshift restraints on imports as among the few politically viable avenues open to them to gain assistance.

The theme of the paper by Ahearn and Reifman is that Congress is sending the message to foreign countries and the White House that the status quo in trade policy is no longer acceptable. Pressured by basic industries for protection from import competition, urged by export-oriented industries to offset the adverse effects of the overvalued dollar and the subsidies of foreign governments, and frustrated by the perceived lack of leadership on trade policy by the administration, many members of Congress now favor unilateral actions to help achieve trade reciprocity and a "level playing field" for international competition. They believe that "the president doesn't care about trade"; they point to administration proposals to terminate the direct loan facility of the Export-Import Bank, the Trade Adjustment Assistance program, and the accelerated depreciation schedule and investment tax credit.

Trade legislation proposed in the 99th Congress vividly demonstrates the message being sent by the Congress. The authors divide the proposals into those dealing with market access for U.S. exports, those aimed at reforming existing trade law, and those designed to protect American industry. There is a widespread belief that U.S. markets are much more open than foreign ones and that the use of selective access to the U.S. market is necessary to obtain equal access to foreign markets. Proposals for trade law reform include: permitting import relief if imports are merely a "cause of injury" rather than, as now, a "substantial cause of injury"; reassigning the final relief authority under this law from the president to the U.S. Trade Representative; and extending the countervailing duty law to cover so-called natural resource subsidies. Increased protection to American industry would be provided by the various proposals for an import surcharge,

for further restrictions on textile imports, and for protecting such industries as softwood lumber and shoes.

The administration takes a very different position on most trade issues from the Congress, and the president has threatened to veto such protectionist legislation as that which further restricts imports of textile and apparel products. Ahearn and Reifman see no quick resolution of the contending viewpoints. A new round of trade negotiations has been the traditional means of building a domestic consensus for the current trading system and fending off new restrictions. It is their view, however, that even if Congress comes to support a new round, it will include provisions that prevent significant concessions in U.S. levels of protection. Thus, they predict that unilateral trade actions are likely to become increasingly popular and to become a major issue in domestic politics.

Among the conference participants were NBER Research Associates William H. Branson, Gene M. Grossman, Irving R. Kravis, Paul R. Krugman, Robert E. Lipsey, and Assaf Razin; NBER Faculty Research Fellows Susan Collins and Kala Krishna; and NBER Executive Director Geoffrey Carliner.

The five papers, along with summaries of the discussion that followed each paper, will be published as an NBER Conference Report entitled "Current Trade Policy Issues." Its availability will be announced in a subsequent issue of the *NBER Reporter*.

Research Conference Held in October

The following four articles summarize the presentations made at NBER's Annual Research Conference in New York on October 7.

Annual Research Conference—1: **The LDC Debt Crisis**

Jeffrey D. Sachs

For three years, the world economy has been threatened by the most severe financial crisis since the Great Depression. More than 40 developing countries, including almost all of the nations in Latin America, have been forced to postpone scheduled debt repayments. These countries have suffered extreme economic hardship as they have attempted to continue servicing their debt, even at a moderated pace. Commercial banks, the principal creditors of the developing countries, have seen a significant erosion in their market value, that could be multiplied severalfold if the prospects for the LDC debt worsen significantly. Although the dramatic crisis atmosphere of 1982-83 has abated, risks remain high.

The successful management of the debt crisis in the past three years represents a political and intellectual achievement of the first order. International capital markets have not collapsed, despite enormous strain; no country has unilaterally defaulted, and very few have refused to submit to conditionality in return for easier repayment conditions; and the serious collapse of creditor financial institutions has been largely avoided.

The success to date is not accidental. The coordinated actions of creditors, debtors, governments, and international organizations have reflected a deep institutional memory of the harrowing financial crises of the 1930s. That experience proved that financial crises do not simply take care of themselves, and that a hands-off public policy is insufficient. However, even after the round of reschedulings, the burden of servicing \$700 billion of LDC debt remains. And while there has been a sharp turnaround in the external positions of the major debtor countries, that improvement in the external balance has been accompanied by a sharp contraction in the economic activity and standards of living in the debtor countries. (If living standards do not begin to rise in the debtor countries, the continued willingness of debtor-country governments to service their debts must be regarded as highly doubtful.)

The onset of the debt crisis was the result of a combination of global economic shocks (such as the rise in world interest after 1980 and the deep world recession of 1981-82) and bad economic management in many of the borrowing countries. The importance of global shocks is evidenced by the nearly simultaneous onset of debt-servicing difficulties in more than 40 countries in the early 1980s. The significance of poor macroeconomic management is best illustrated by the fact that many borrowing countries (such as South Korea) were able to surmount the global shocks, while others (such as most countries in Latin America) succumbed to the deterioration in the global economic development. Much recent research by NBER research associates indeed suggests that "success" or "failure" has depended importantly on macroeconomic management, particularly with regard to exchange rate and trade policies.¹

It is now of paramount importance to sort out the twin roles of global shocks and domestic policies in bringing on the recent crisis. Identifying the domestic policies in the debtor countries that helped bring on the crisis will aid in the design of stabilization policies for these countries in the coming decade and will also help in advising other borrowing countries on how to

¹R. Dornbusch, "External Debt, Budget Deficits, and Disequilibrium Exchange Rates," *NBER Working Paper No. 1336, April 1984*, and in *International Debt and the Developing Countries*, G. Smith and J. Cuddington, eds. Washington, DC: World Bank, 1985; J. D. Sachs, "External Debt and Macroeconomic Performance in Latin America and Asia," *Brookings Papers on Economic Activity 2 (1985)*; S. Edwards, "The Behavior of Interest Rates and Real Exchange Rates during a Liberalization Episode: The Case of Chile, 1973-83," *NBER Working Paper No. 1702, September 1985*; also see *Economic Adjustment and Exchange Rates in Developing Countries*, S. Edwards and L. Ahamed, eds. Chicago: University of Chicago Press, forthcoming 1986.

avoid new debt crises. Similarly, analyzing the role of global shocks in the onset of the crisis will help in understanding the role of macroeconomic policies in the developed countries as fostering stable growth among the debtor countries.

A new NBER research project on developing country debt is now underway to meet these research needs. This project involves two types of analyses. The first are in-depth studies of individual debtor countries (both crisis cases and successful adjusters) designed to measure and document the policies that were pursued by the governments of these countries in the past decade. The goal of these studies is identification of the key macroeconomic variables and policy decisions that contributed to the onset of a foreign debt crisis, or the successful avoidance of a crisis in the country. The second type of study focuses on the global aspects of the debt crisis: macroeconomic management in the developed economies; the behavior of the world financial markets, both before and after the onset of the global crisis; the effects of trade policies in the developed countries on adjustment performance among debtor countries; and so on.

The country studies will provide crucial new information on the links between macroeconomic policies in the debtor countries and their economic performance. Why, for example, did oil exporters such as Argentina, Mexico, Peru, and Venezuela succumb to a debt crisis following the sharp rise in oil prices in 1979 and 1980, while oil importers such as South Korea did not? Preliminary analysis suggests that South Korea benefited from its pro-export orientation, which gave it the foreign exchange to service its debts and pay for imported oil, while the Latin American countries suffered from an anti-export bias in exchange rate and trade policies.

The country studies focus on at least six middle-income developing countries: Argentina, Brazil, Indonesia, Mexico, South Korea, and Turkey. All of these countries have large, diversified economies, with extensive financial linkages to world markets. All have borrowed heavily in world markets in the past decade. The

total debt of these six economies represents about one-half of the total foreign indebtedness of all developing countries.

These six countries have been sharply affected by the global economic disturbances of the early 1980s, but with vastly different outcomes in macroeconomic performance. As shown in Table 1, Argentina, Brazil, and Mexico (the "crisis" countries) had the sharpest deterioration in real economic growth and inflation after 1980. The other three economies (the "successful adjusters") have experienced a more modest slowdown in growth, and by 1983 had lower inflation than in the 1970s. While the three Latin American economies have had to undertake emergency debt reschedulings in the early 1980s and have been cut off from new international borrowing at normal market terms, the other three economies have maintained their international creditworthiness and have been able to continue to draw funds from syndicated loans at commercial terms.

The recent experience of Indonesia and Turkey should prove especially illuminating, since these countries have shown themselves to be susceptible in international debt crises at earlier dates. Indonesia experienced a hyperinflation and external debt crisis during the politically turbulent transition from Sukarno to Suharto in the mid-1960s and then again experienced foreign debt difficulties in the Pertamina crisis of the mid-1970s. Since then, Indonesia has carefully pursued a policy of exchange rate management designed to preserve the competitiveness of its nonoil exports. Turkey's debt crisis in the late 1970s required a rescue operation by an OECD consortium of official creditors. After a military coup in 1980, a new stabilization program was put in place (again, with a priority on international trade competitiveness) that has apparently been successful in allowing Turkey to overcome the external shocks of the early 1980s.

A major and novel goal of the NBER project is the identification of key political factors behind macroeconomic policymaking in the debtor countries. Policy "mistakes" in many of the debtor countries reflect the

Table 1. Debt and Macroeconomic Indicators for Six Countries

	<i>Total Debt</i> (\$US billion end 1983)	<i>Debt-GNP</i> <i>Ratios</i> (%)	<i>GNP Growth</i>			<i>Inflation</i>			<i>Per Capita</i> <i>GNP, 1982</i> (\$US)
			1975-79	1979-82	1983	1975-79	1979-82	1983	
Debt Crisis Countries									
Argentina	45.3	70.6	2.2	-3.4	3.0	215.9	121.5	343.8	1,819
Brazil	93.1	41.1	6.7	2.1	-3.2	44.1	95.2	142.0	2,119
Mexico	89.8	60.5	6.2	5.2	-4.6	20.0	37.0	101.9	2,163
Successful Adjusters									
Indonesia	29.5	37.3	7.4	6.6	4.2	14.8	13.4	11.8	557
South Korea	40.1	53.5	10.2	3.1	9.5	14.5	18.7	3.4	1,801
Turkey	23.9	44.4	3.5	2.5	3.4	36.2	55.4	29.1	1,159

SOURCE: International Financial Statistics, IMF, for all data except debt data. Morgan Guaranty Trust Co., Morgan International Data.

fact that entrenched political interests have blocked proposed economic reforms. Consider, for example, the issue of exchange rates. Many Latin American governments were loath to devalue their currencies in the late 1970s and early 1980s, even though a devaluation would have spurred exports. (That reluctance continues today in many countries.) A key effect of a devaluation, besides spurring exports, is that it usually raises the domestic price of food and lowers the real wages of urban workers. On the other hand, rural agricultural workers typically benefit, since their products sell at a higher price. Devaluation often leads to more egalitarian income distribution, since it transfers income from the urban sector to the poorer rural sector. But it is almost always resisted in Latin America, since urban workers have far more political muscle than rural peasants do. This urban bias seems to be less pronounced in many of the successful Asian economies.²

In the end, such political realities may dictate the extent of adjustment that will be undertaken by the debtor countries, as well as the political limits of debt servicing by these countries. The NBER country studies should go far toward a better understanding of these important, and underanalyzed, linkages between politics and macroeconomic performance.

²See J. D. Sachs, "External Debt and Macroeconomic Performance in Latin America and Asia," for evidence of this proposition.

Annual Research Conference—II: **Is the Strong Dollar Sustainable?**

Paul R. Krugman

The sustainability of the strong dollar has been an issue ever since the dollar began rising in 1980. Concerns about sustainability grew acute when the dollar soared to new heights in early 1985; this research was begun during that rise, and the preliminary conclusion that the dollar was *not* sustainable was reached in March. Since then the dollar has fallen 15–20 percent by most measures. Nonetheless, the dollar remains very strong by the standards of the 1970s, and the issue of sustainability therefore remains vibrant.

What do we mean when we ask whether the strong dollar is sustainable? A simple interpretation is: can the dollar remain indefinitely at its present level? The answer to this is clearly no. The current level of the dollar would imply continuing huge U.S. trade deficits, and ever-growing U.S. current account deficits as the United States becomes more of a net debtor to the rest

of the world. It is as certain as any prediction in economics can be that the U.S. real exchange rate must eventually return to a level that produces something like current account balance.

When we question the dollar's sustainability, however, we usually have a different issue in mind. Financial markets recognize that the dollar must eventually decline; but the concern of some analysts is that the market is not properly recognizing the constraints that will force the dollar down. According to this view, *the dollar must fall faster than the markets now expect*. If this is the case, the markets will eventually be forced to revise their expectations; when they do, the dollar will experience an abrupt decline.

To assess this view, we must ask what expectations underlie the dollar's value. Then we need to ask whether these expectations are reasonable, or whether in fact the dollar must decline more rapidly than the markets believe. If this is the case, the dollar is headed for a sudden fall even in the absence of any new information or change in policy.

The best available measure of market expectations about the future of the dollar is the difference in interest rates between the United States and other industrial countries. The fact that foreigners are willing to acquire an increasing amount of claims denominated in dollars with only a modest interest differential—1.6 percent against a trade-weighted average of other countries at the time of this conference [October 1985]—indicates that they do not expect the dollar to decline by more than 1.6 percent a year on average.

The next question is whether such a modest rate of decline is feasible. The principal constraint here is the accumulation of U.S. debt to the rest of the world. We know that the current exchange rate implies massive U.S. trade deficits. The market seems to expect a very slow decline in the dollar, which means that in order to confirm the market prediction these deficits would have to last for a long time. My estimates show that as of today the dollar would have had to decline 26 percent to restore current account balance and thus prevent U.S. foreign debt from growing. If the dollar were to decline by only 1.6 percent a year, it would take 16 years for the dollar to decline this far. Furthermore, during that time the United States would be going ever further into debt, and the dollar would have to decline even more, so as to generate a trade surplus with which the United States could pay its debt service.

Estimates using numbers from the last week in September indicate that if the dollar were to decline as slowly as the market seems to expect, U.S. foreign debt as a percentage of GNP would continue to rise for the next 30 years. By that time the U.S. debt/GNP ratio would be over 50 percent, comparable to Brazil or Mexico. Few believe that such an outcome is feasible for the world's largest economy. If this outcome is not feasible, however, the market is wrong and the dollar will come down sharply when the error becomes apparent. That is, the strong dollar is not sustainable.

Some may find it difficult to take seriously conclusions

based on projecting the implications of expectations so far into the future. There is, however, no natural stopping point when we ask whether market expectations are justified. If the objection is made that there is too much uncertainty to look that far ahead, the appropriate answer is a careful analysis of the implications of uncertainty.

There are two main types of uncertainty relative to the future of the dollar. The first is political risk. There is clear evidence that political risk is not a major factor in explaining the strength of the dollar vis-à-vis other industrial countries' currencies: the dollar liabilities of other nations, such as Eurodollar deposits, pay the same interest rates as similar assets in the United States.

The other source of uncertainty is the possibility that at some point governments will finally do something to bring the dollar down. This makes calculations that stretch 30 years into the future seem irrelevant; but if one thinks about it, the possibility of action on the dollar should make it weaker rather than stronger. Allowing for this kind of uncertainty reinforces the conclusion that financial markets are underestimating the required rate of decline in the dollar.

The final conclusion, then, is that the strong dollar is *not* sustainable, in either of the two senses in which we have defined the term.

Annual Research Conference—III:

The International Competitiveness of U.S. Firms

Robert E. Lipsey

Two concepts of competitiveness are often mixed together in public discussion. One is the competitiveness of the United States as a geographical entity (the usual concept); the other is the competitiveness of U.S. firms, which is the subject of the studies I report on in this presentation.

We all know the sad story of declining U.S. competitiveness in world trade. I refer not just to the events of the last few years but to the longer-term story. For example, the United States accounted for almost 20 percent of the world's exports in 1950, but for only 10 to 12 percent since the mid-1970s. If we compare the United States with what are called the developed market economies, our share was over one-fourth in 1955 and only 16–18 percent since the mid-1970s. I have said elsewhere that I think it is wrong to treat all of this decline in shares as a decline in the competitiveness of the U.S. economy. For one thing, the U.S. share of exports in 1950 reflected the incomplete recovery of Europe and Japan from World War II. For another, the U.S. share of the world's population and production has fallen substantially since 1950. Furthermore, the declines in trade shares seem to have stopped after the late 1970s. Still, the data suggest some fall in U.S. competitiveness.

Why has this happened? At least two families of explanations are offered. One, which we might refer to as the "traditional" explanation, involves factors that affect the whole U.S. economy, including such macroeconomic variables as U.S. fiscal and monetary policy, exchange rates and inflation, and rates of investment and productivity growth. The other involves more "intangible" factors that are internal to firms, such as their research and development effort, their production technology, their organization, and the way they are administered. One recent diagnosis suggested that "... American manufacturers have gotten into trouble not because of general economic conditions ... but because they lost the determination to manufacture well" (Abbernathy, Clark, and Kantrow, *Industrial Renaissance*, p. 5). These ills were described as being "... of a 'micro' sort [that is, having to do with issues relating to management of particular companies]" and within that category relating not to "hardware [equipment, plants, buildings, and machinery]," but to "software [people management, organizational systems, and corporate strategies]. . . ."

Irving Kravis and I have been interested in these same characteristics of individual firms and in others more related to R and D and technology, not in connection with issues of competitiveness but for a quite different reason. We have been trying to explain the causes and consequences of the overseas operations of firms based in the United States and other countries, and these kinds of firm-specific or internal characteristics have come to be considered the main explanation for the existence and growth of multinational firms.

Multinational firms and their activities have never fitted comfortably into standard trade theory. The theory has never tried to tell us who will produce something but only where it will be produced. To study multinational firms' operations, we need some explanation of why semiconductors are produced in Singapore by U.S. firms rather than by locally owned firms.

The literature on multinationals has pointed to the existence of internal, or firm-specific, assets, as the basic explanation. These assets could include techniques of management or marketing, technical knowledge gained from production experience or from the firms' R and D programs, and even specific patents or inventions. Their distinctive characteristic is that they are tied to the firm; they are more profitably exploited by being used for production within the firm than by their sale or rental. Thus, these assets are not mobile among firms within a country, as we expect other factors, such as labor, to be. They are mobile within the firm, however, and among countries. A firm can exploit these assets by producing at home for sale elsewhere (if circumstances permit), by producing in other countries for local sale, or by producing in other countries for exports to third countries or for sale in the firm's home country.

I will refer here to two characteristics of the United States and of U.S. firms. One is their *competitiveness*, which is shorthand for shares in world exports of man-

ufactured goods. The other is their *comparative advantage*, which is shorthand for the industry or commodity distribution of their exports, relative to those of other companies, or of the United States and other countries.

The firm's choices as to where to produce reflect the competitiveness and comparative advantages of different locations of production. Firm-specific assets give the individual firm some competitiveness and comparative advantages that are separate from those of its home country. That is not to say that the two are unrelated. The firm's comparative advantage may, and often does, reflect the present or past comparative advantages of the firm's home or base country. We can, however, think of U.S. firms, or of U.S. multinational firms, as having their own competitiveness and comparative advantage, separate from those of the United States. Two consequences follow from that way of thinking. One is that we have a way of looking for explanations of both production ownership and production location. Another is that we have a way of distinguishing between factors that affect U.S. firms wherever they operate, such as technological leadership and management skills, and those that affect the United States as a geographical entity, such as U.S. productivity, prices, and exchange rates.

Shares in World Exports

The decline in the U.S. share of exports of manufactured goods by all market economies, frequently cited as evidence of falling U.S. competitiveness, was more than 40 percent over the 20 years from 1957 to 1977, and was 25 percent or more in each half of that period. We can take those numbers as the background against which to compare the performance of American firms, counting their operations not only in the United States but also overseas. Presumably whatever firm-specific characteristics U.S. companies possess ought to operate in both the parent companies here and in their subsidiaries abroad. If American firms have lost their technological edge or their ability to manufacture well or to market well, they should have lost these abilities everywhere, not just in the United States.

What does the evidence show? If we take all American-based manufacturing companies, including those that operate only in the United States, the decline in their share of world and developed-country exports between 1957 and 1977 was about half as great as that of the United States as a country. If we take American multinationals as a group, their share in world exports of manufactured products actually increased from 1967-77, the only period for which we can make this comparison. That was not because more U.S. firms became multinational in these years; there was little change in that respect. The increased share of world exports reflected the competitiveness of those firms that were already multinational in 1966. Judging by this aggregate evidence, we can say that this group of companies, which includes most major U.S. manufacturing firms, showed

no evidence of declining competitiveness and even some indication of a gain in competitiveness.

To see more precisely what happened, we can distinguish between exports from the United States (parent exports) and exports from foreign production locations. The shares of parent company exports from the United States in world and developed-country exports of manufactures declined between 1966 and 1977, but by much less than U.S. exports in general. That is clear from the increase in parent companies' share of U.S. exports (from 63 to 72 percent). Exports of U.S. firms other than multinationals dropped from 6.1 percent of world exports in 1966 to 3.5 percent in 1977. The cause of the gains in U.S. multinationals' shares in world and developed-country exports was the substantial increase in the shares of U.S.-owned overseas affiliates in exports of countries other than the United States. This increase in the share of U.S. multinationals took place in a period when the exports of these countries were growing much faster than U.S. exports. The shares of all U.S.-owned affiliates in world exports rose from 9 percent in 1966 to 11 percent in 1977 (really 13.5 percent). It increased in both developed- and developing-countries' exports, and the latter gain was particularly large, from less than 1 percent in 1957 to over 5 percent in 1977.

Another way of putting this is that there was a large shift in the geographical origins of exports by U.S. firms. For U.S. companies in general, the share of total exports supplied by the overseas affiliates of multinationals increased from 17.5 percent in 1957 to over 40 percent (over 45 percent including minority-owned affiliates) in 1977. For the multinationals, we know what happened only in the period after 1966. The share of their exports supplied from majority-owned affiliates outside the United States rose from less than 40 percent in 1966 to almost 50 percent in 1977; the share supplied by all affiliates reached over 50 percent. Thus, U.S. multinational firms overcame some of the relative decline in the competitiveness of the United States as a production location by shifting production to other countries from which they exploited their firm-specific competitive advantages.

Another confirmation of the the competitiveness of U.S. firms can be seen in comparisons of the rates of growth of their exports with those of rival manufacturing firms operating in the same areas of the world. In Canada, Europe, Latin America, and Asia (other than Japan), exports by U.S.-owned firms grew faster than exports by other firms between 1966 and 1977, and they did so by fairly wide margins. The reason why we do not see such a wide margin in the aggregate is that exports were growing most rapidly in areas such as Asia other than Japan (where U.S. firms accounted for a small share of exports in 1966) and in Japan, where there were virtually no majority-owned U.S. firms (and therefore no data on exports by U.S.-owned firms).

If we compare U.S. affiliates to other firms in individual countries, we find the same story repeated. In nearly every European country, exports by U.S. affiliates

increased more rapidly than exports of other firms. It was not that U.S. firms' exports were growing fast in countries with generally slow export growth. U.S.-owned firms were leading the way in the countries with the most rapid export growth around the world as a whole.

We hope, in extending this study to the 1980s, to examine the share of U.S. firms not only in exports but also in production around the world. Over a very long period extending back to the early 1800s, there has been an increasing internationalization of the world's economy, in the sense of a rise in the share of output that is traded. That pattern was visible from the early 1800s to just before World War I, was interrupted by the two world wars and the Great Depression, and resumed after World War II. Part of the growth of U.S. firms' exports reflects this internationalization, which characterized all the major developed countries from World War II until the severe recession of the early 1980s. The United States led this shift in the 1970s, but since 1982 there has been a dichotomy between the export ratio and the import ratio in the United States, the former continuing to fall, while the latter rose. What happened, of course, is that the price levels of the major exporting countries, which had all been above that of the United States in 1980, fell to levels of one-fourth to one-third below that of the United States by March 1985.

The growth in importance of trade to national economies was paralleled by a shift to exports by U.S. multinationals. The share of affiliates' sales exported almost doubled between 1957 and 1977, from a little over 15 percent to over 30 percent. The share of exports more than tripled among affiliates in developing countries, which had existed to serve host-country markets almost exclusively in 1957.

The Comparative Advantages of U.S. Multinationals

A way to view the comparative advantage of U.S. multinational firms, putting aside their choices of location, is to look at their exports from all locations, including those from the parents in the United States and those from their affiliates overseas.

Over the 11-year period from 1966-77, there was remarkably little change in the industry distribution of exports from all locations by U.S. multinationals: slight declines in foods and metals, and small increases in chemicals and transport equipment. These changes were much smaller than those for the parent companies alone, for affiliates alone, and particularly for affiliates in developing countries. One interpretation of these events is that the comparative advantages of U.S. multinationals remained virtually constant; the shifts in exports for parents in the United States and for their affiliates abroad must have represented changes in the comparative advantages of production locations. The shifts in industry distribution were very large for affiliates in developing countries: declines in foods (from 44 percent of the total to 13 percent), chemicals (from 17 percent to 8 percent), and metals (from 13 percent

to 8 percent), and enormous increases in machinery (from 8 percent to 51 percent) and transport equipment (from 1 percent to 7 percent).

Between 1966 and 1977, the comparative advantage of foreign firms shifted toward the comparative advantage of U.S. multinationals. That was particularly the case for foreign firms in developing countries. In all cases but one, in which the share of foreign firms' exports in an industry was substantially above that of the U.S. multinationals in 1977, foreign firms in developing countries decreased their share of exports in the previous 11 years; in the case in which their share was below that of U.S. multinationals, they increased it. (The exception was "other manufacturing," a mixture containing a wide range of industry types.)

Shifts in the Geographical Origin of Exports by U.S. Multinationals

Since the industry distribution of exports by U.S. multinationals remained virtually constant between 1966 and 1977 while those of the parent firms in the United States and of their overseas affiliates each changed, there must have been shifts in the advantages of production in different geographical locations.

For manufacturing industries as a group, there was a substantial shift away from the United States in the sources of exports by U.S.-based multinationals. The share of the U.S. parents fell from 59 to 48 percent. That shift took place not only in the aggregate but in every broad industry group. It was largest for metals (72 percent to 42 percent), next for chemicals (65 percent to 46 percent), and least for transport equipment and machinery. By 1977, only in the transport equipment industry did U.S. multinationals supply as much as half of their exports from the United States. We might infer that the sharpest decline in comparative advantage for the United States as a geographical entity was in metals, not surprising given the problems of both the iron and steel and the nonferrous metals industries. The lack of change in transportation equipment is more surprising, but it probably reflects the retention of U.S. comparative advantage in the aircraft industry and the very large trade with Canada in motor vehicles and components.

Policy Implications

If, as we have hypothesized, the competitiveness and comparative advantage of U.S. firms reflect their managerial and technological abilities, there is little indication here of any serious erosion of these advantages or even of shifts in their industry distribution. I think this fact casts doubt upon explanations of U.S. trade problems that attribute the U.S. trade deficit or losses of markets to unfavorable aspects of U.S. management, such as undue focus on short-term profits or a lack of measures that enlist the support of workers, or to declines in the technological capabilities of U.S.

firms. It suggests that the causes for deterioration in the American position may be the factors that determine relative U.S. prices as costs, such as monetary and fiscal policy and wage and productivity behavior.

Another implication of these results is that if we wish to affect the competitiveness of the United States, we should distinguish between policies that mainly affect the competitiveness of U.S. firms and policies that affect the competitiveness of the United States as a geographical area. For example, subsidies to the R and D efforts of U.S. firms, or to their technological progress, might produce gains in U.S. multinationals' shares of world markets without necessarily affecting the extent of production in the United States. To influence domestic production, we might look at why U.S. price levels reached more than 30–50 percent above those of our main competitors early this year.

Annual Research Conference—IV: **Revenue Response to the 1982 Personal Tax Cuts**

Lawrence B. Lindsey

The possibility that tax rates and tax revenues may be inversely related has received an increasing amount of attention in recent years. The so-called "Laffer Curve," allegedly first drawn on the back of a napkin at a business lunch, suggests that, above a certain point, higher marginal tax rates will produce lower revenue. It is, perhaps, these inauspicious beginnings that caused the Laffer Curve to be greeted with so much derision in much of the economics profession.

However, the idea behind the Laffer Curve is at least as old as the *Wealth of Nations*. Adam Smith argued, "High taxes, sometimes by diminishing the consumption of the taxed commodities, and sometimes by encouraging smuggling, frequently afford a smaller revenue to government than what might be drawn from more modest taxes."

Some of the resistance to the Laffer Curve was caused by the misplaced mystique that surrounded it. For example, Jude Wanniski claimed that the top point of the Laffer Curve represented "the point at which the electorate wishes to be taxed." He added, "It is the task of the statesman to determine its location and follow its variations as closely as possible."

But, at the maximum point of the Laffer Curve, the excess burden associated with collecting an additional dollar of revenue is infinite. Far from being a preferred rate of taxation, the Laffer Curve's maximum point is something statesmen should be aware of only as a level of taxation to be avoided.

In addition, much of the adverse reaction to the Laffer Curve was the result of the political claim associated with it: that taken as a whole, American tax rates were above their revenue-maximizing level. The political claim can be refuted easily economically. Don Fullerton, using a general equilibrium model developed with King, Shoven, and Whalley, showed that with any plausible assumption about labor supply elasticities, the present economywide marginal rate of 32 percent is below the revenue-maximizing level.

However, not only will labor supply respond to tax rates, as in the Fullerton model, but so will portfolio decisions, interest and charitable deductions, and business and entertainment expenses. For example, Feldstein and Slemrod demonstrated that capital gains realizations are highly sensitive to the capital gains rate. Feldstein, Clotfelter, Taylor, Boskin, and others have demonstrated a high elasticity of charitable giving to its aftertax price. Clotfelter also showed a significant responsiveness to tax rates of the business and entertainment deductions of partnerships.

The exaggerated claims about the Laffer Curve obscure a key observation about tax rates and tax revenues. Even if revenues do not decline when tax rates are raised, they will not increase as dramatically as tax rates. Stated simply, a 10 percent income tax surcharge will produce less than 10 percent more revenue, and a 10 percent tax cut will cut revenues by less than 10 percent.

It is the magnitude, not the existence, of behavioral response to tax rates on the part of taxpayers that is in dispute. Given the near unanimity of our profession about the existence of these microeconomic feedback effects, it is surprising that we do not include them in our models. For example, both the Department of Treasury Tax Calculator and the similar models used by the Joint Committee on Taxation and the Congressional Budget Office assume no microeconomic response by taxpayers to changes in tax rates. However, all do model macroeconomic, demand-side feedbacks. Either in spite of or because of the exaggerated claims of supply-siders, the bulk of tax modeling is currently based on the equally implausible assumption that taxpayers do not respond to tax rates.

The 1981 Economic Recovery Tax Act (ERTA) provided an outstanding opportunity for measuring the microeconomic response of taxpayers to a rate reduction. In the first year of the tax cut, all tax rates were reduced 10 percent and the top marginal tax rate was cut from 70 percent to 50 percent. These rate reductions were the most dramatic since the Kennedy tax cut of 1964.

Methodologically, the objective of my work is to isolate the microeconomic response of taxpayers of changing their behavior as a result of the rate change from the macroeconomic, demand-side feedbacks that have already been estimated. To measure the micro response, I hold the macroeconomic conditions of 1982 constant and take the historic relationship between macroeconomic measures of economic activity from the National

Income and Product Accounts (NIPA) and tax return data on income. The historic relationship between NIPA and tax data occurred in the environment that existed prior to the tax cut. Therefore, a combination of these historical relationships and 1982 economic conditions provides the level and distribution of tax revenue we would have expected if there had been no tax cut. A comparison of this no-tax-cut value and the actual amount of taxes paid shows how much added revenue can be attributed to changed taxpayer behavior.

I compute this no-tax-cut value, or baseline, using the NBER TAXSIM model. This computerized model, like the Tax Calculator at the Department of Treasury, relies on a large database of actual tax returns. I also use NIPA data on the various components of personal income to create baseline income distributions for 1977, 1979, 1981, and 1982. These income profiles accurately predicted the level of tax revenue in 1977, 1979, and 1981, all years in which there was roughly the same set of tax rates in place. This indicated that the modeling was well calibrated to taxpayer behavior under the pre-1982 rate structure.

I applied the same modeling process to 1982, but the predicted level of revenues proved to be well below the actual level. The baseline predicted income tax revenue of \$263 billion, while actual collections were \$278.5 billion, higher by \$15.5 billion or nearly 6 percent. By contrast, the average discrepancy for the other years studied was less than 1 percent. This suggested a fertile ground for closer investigation.

The degree of revenue discrepancy varied significantly across the income distribution. In order to control for as many factors as possible, I ranked taxpayers in my baseline distribution by income and then compared them with equally ranked taxpayers in the actual data. For example, I compared the top 8408 taxpayers in my database with the top 8408 taxpayers in the actual data. This top group of people corresponded to taxpayers reporting incomes over \$1 million. The remaining taxpayers were grouped in a similar fashion.

The best summary measure of the behavioral response of taxpayers is taxable income. As noted earlier, taxpayers may alter their behavior by changing portfolio composition, changing their level of itemized deductions, and by working harder or saving more. All of these behavioral changes are reflected in the taxpayer's taxable income. Table 1 presents the actual and baseline taxable income for the various income groups in the population.

The data show that taxable income was 33.5 percent higher for the top taxpayer group, or top 8408 taxpayers. Among the top 180,000 taxpayers, taxable income was \$9.6 billion, or 17 percent more than the level predicted by the baseline. As a group, these upper-bracket taxpayers accounted for one-third of the total difference between the level of taxable income reported by the baseline and the actual level of taxable income.

The next three taxpayer groups, comprising about 4.5 percent of the population, reported taxable income \$7.2 billion higher than predicted by the baseline. This

Table 1
Actual and Baseline Taxable Income for 1982
(billions of dollars)

<i>Percentile of Taxpayers Reported AGI (in thousands)</i>	(A)	(B)	<i>Ratio of (A) to (B)</i>
	<i>Actual Taxable Income</i>	<i>Baseline Taxable Income</i>	
TOP 0.01% (over \$1000)	14.89	11.15	1.335
NEXT 0.02% (500-1000)	11.04	8.61	1.282
NEXT 0.15% (200-500)	31.96	28.53	1.120
NEXT 0.60% (100-200)	58.94	57.55	1.024
NEXT 0.74% (75-100)	46.72	45.47	1.027
NEXT 3.21% (50-75)	141.38	136.80	1.033
NEXT 4.95% (40-50)	166.02	161.30	1.029
NEXT 10.34% (30-40)	273.30	262.20	1.042
NEXT 7.99% (25-30)	169.73	164.20	1.034
NEXT 9.23% (20-25)	160.09	159.50	1.004
NEXT 11.05% (15-20)	147.46	146.00	1.010
NEXT 15.01% (10-15)	137.66	141.80	0.971
NEXT 17.87% (5-10)	90.13	95.80	0.941
BOTTOM 18.83% (under 5)	23.92	25.18	0.950

represents about a 3 percent increase. The next set of taxpayer groups, representing 23 percent of the taxpayer population, reported about 3.5 percent more taxable income. It should be noted that for these taxpayers the percentage of decline in their marginal tax rates was greater than for the somewhat richer group because of the maximum tax on earned income. These taxpayers also cluster around the ceiling for Social Security earnings and therefore may have received a larger percentage of increase in their take-home pay than did more affluent taxpayers. For both reasons, we might expect their behavioral response to the rate reduction to be higher.

The lowest taxpayer groups actually reported substantially less taxable income than the baseline predicted. Consider, however, what the baseline represents. The economic environment of 1982 was taken as a given. But, to some extent, this macroeconomic environment reflected the response of taxpayers to the rate reductions. This behavioral response was great-

Table 2
Revenue Response to Tax Cut

<i>Taxpayer Group</i>	<i>Actual Revenue</i>	<i>Baseline Revenue</i>	<i>Revenue Response</i>
Top 0.18% (over \$200,000)	\$ 26.9	\$ 22.9	\$ 4.0
Next 0.60% (\$100,000-\$200,000)	\$ 22.0	\$ 21.2	\$ 0.8
Next 3.95% (\$50,000-\$100,000)	\$ 50.7	\$ 47.4	\$ 3.1
Next 15.29% (\$30,000-\$50,000)	\$ 84.7	\$ 79.8	\$ 4.9
Next 17.22% (\$20,000-\$30,000)	\$ 52.1	\$ 49.7	\$ 2.4
Next 62.76% (under \$20,000)	\$ 42.1	\$ 41.7	\$ 0.4
TOTAL	\$278.5	\$263.0	\$15.5

Revenue Cost of Tax Cut

<i>Taxpayer Group</i>	<i>Actual Revenue</i>	<i>Old Law Revenue</i>	<i>Revenue Cost</i>
Top 0.18% (over \$200,000)	\$ 26.9	\$ 26.3	\$ 0.6
Next 0.60% (\$100,000-\$200,000)	\$ 22.0	\$ 23.9	-\$ 1.7
Next 3.95% (\$50,000-\$100,000)	\$ 50.7	\$ 56.5	-\$ 5.8
Next 15.29% (\$30,000-\$50,000)	\$ 84.7	\$ 95.2	-\$10.5
Next 17.22% (\$20,000-\$30,000)	\$ 52.1	\$ 58.5	-\$ 6.4
Next 62.76% (under \$20,000)	\$ 42.1	\$ 49.3	-\$ 7.2
TOTAL	\$278.5	\$309.7	-\$31.2

est at the top end of the income distribution but was apportioned evenly across all income groups in making up the baseline. Thus, lower-income groups, with a smaller degree of behavioral response, had too much income imputed to them. Indeed, if one includes the effect on macroeconomic values resulting from the rate reductions, then all taxpayer groups had too high a baseline level of income imputed. In constructing the model as I did, I was deliberately cautious in my estimates of behavioral response. In all likelihood, the response of taxpayers to lower tax rates is greater than reported here.

This higher level of taxable income of course translated directly into a higher level of tax revenue. Table 2 shows the effect of the rate reduction. The top part of the table compares the actual level of tax revenue with that predicted by the baseline. The top taxpayer group, those with incomes over \$200,000, paid \$4.0 billion, or 17 percent more than the baseline predicted. There were smaller percentage differences for the other tax-

payer groups. In sum, the behavioral response of taxpayers netted the government about \$15 billion more than if taxpayers had taken the lower rates and not changed their behavior.

However, this does not mean that the lower rates led to more revenue. The second part of the table compares actual revenue with what the baseline predicted, using the old, higher set of rates. On net, the rate reduction cost \$17.8 billion, or about 6 percent of anticipated revenue.

However, the rate reduction was only a portion of the 1981 tax bill. In that year, IRAs were liberalized and the two-earner deduction was created. These caused lower taxes without affecting tax rates. Fully \$13.4 billion of revenue was lost this way. When one takes this into account, the rate reductions cost the Treasury only \$33.3 billion, of which \$15.5 billion was recouped by a behavioral response. In short, about 47 percent of the prospective revenue loss from the rate reductions was recouped from the behavioral response of taxpayers.

As noted earlier, the response of tax revenue was not evenly distributed across the income distribution. Only about 6 percent of the revenue cost of the rate reductions was recouped from the lower-income group. This figure rises to 37 percent for taxpayers earning between \$20,000 and \$30,000, and 51 percent for taxpayers earning between \$30,000 and \$50,000. In addition, roughly half of the revenue loss was recouped in the next two groups.

Among taxpayers with incomes over \$200,000, more revenue was collected under the lower tax rates of the new law than the baseline predicted would be received with higher rates under the old law. In short, the revenue-maximizing point of the Laffer Curve is below the 70 percent level that applied prior to 1982.

Table 2 shows two other important points about the 1982 rate reductions. First, from a distributional standpoint, labeling the tax cut as oriented toward the rich is inaccurate. Even ignoring the behavioral response to the rate reductions, ERTA provided a larger proportional rate reduction to the middle class than to upper-income groups. The nonbehavioral tax cut in the top two groups averaged a bit over 11 percent, while the other four groups in the table got tax cuts of between 15 and 16 percent. When one considers that further rate reductions for tax brackets below the 50 percent level were scheduled for 1983 and 1984, it becomes clear that ERTA was very much oriented to middle-income taxpayers.

When the behavioral response of taxpayers is included, the overall effect of the 1982 rate cuts was to raise taxes on upper-income groups while lowering them on all other groups. Taxes on those at the top of the income distribution actually rose 2.3 percent, while taxes for the other groups declined from 7.9 percent to 14.6 percent.

The second observation from Table 2 is that the behavioral response to rate reductions is of significant magnitude over the whole range of incomes. The 1982 reductions in tax rates cost only one-half of what the nonbehavioral simulation predicted. The corollary to

this is that a 10 percent income tax surcharge will raise only about one-half of the money expected. This is an error of serious magnitude that makes solution of our current fiscal policy dilemma more difficult, if a solution is sought on the revenue side of the ledger.

Where did this behavioral response come from? Among the top income groups, the largest dollar change in taxable income came from wages and salaries. The top 180,000 or so taxpayers reported wage and salary income \$5 billion—20 percent—higher than predicted by the baseline. The tax data are insufficient to determine whether this increase reflected a real increase in labor supply or other factors. The level of wage compensation may be relatively discretionary for these taxpayers. The behavioral choice for them may be between higher cash compensation and business expenses with consumption value such as automobiles, travel, and entertainment. Although some labor supply response may be expected, the bulk of the explanation is probably a rearrangement of compensation to reflect the new tax regime. The many studies of labor supply elasticities of prime-age males—comprising most of this group—do not support a response sufficient to explain the observed increase in wage and salary income.

This dramatic elevation of wages and salaries was paralleled by a dramatic elevation of reported business income by the same group. This income, reported on Schedule C, was 88 percent or \$1.2 billion higher than predicted by the baseline. This reported rise in business income occurred in spite of the liberalized depreciation rules that came into effect with ERTA. It also came in spite of lousy business conditions that caused taxpayers earning under \$100,000 to report about \$1.0 billion less in business income than predicted by the baseline.

A third area of significant behavioral response was capital gains realizations. Top-bracket taxpayers saw a decline in their capital gains tax rate from 28 to 20 percent and reported 27 percent, or \$3.1 billion, more in capital gains than predicted by the baseline.

The debate about the responsiveness of capital gains realizations to tax rates has been raging ever since the 1978 reductions in capital gains tax rates produced a dramatic increase in realizations a year later. Many have argued that factors other than taxes were at work, such as a booming stock market. The baseline attempted to predict the level of capital gains realizations if higher rates prevailed. The rate reductions were dramatically concentrated on upper-income groups, so if it were rates at work, we would see gains concentrated there; if other factors contributed, higher capital gains realizations would occur throughout the population.

As it turns out, the data overwhelmingly support the tax rate hypothesis. Each of the top five income groups had capital gains higher than anticipated, while all but one of the nine lower-income groups reported capital gains that were lower than anticipated. While taxpayers over \$200,000 reported \$3.1 billion more gains than expected, taxpayers earning under \$100,000 reported \$1.2 billion lower capital gains than predicted. Thus, the rise in capital gains realizations by the wealthy

occurred in spite of a deteriorating capital gains environment for most taxpayers. We are forced to conclude that either rich people's stocks went up while everyone else's went down, or that capital gains realizations are highly sensitive to capital gains tax rates.

Surprisingly, interest and dividend income showed very little responsiveness to the tax rate change. It may be that the effects of the act that made payment of dividends relatively more attractive than previously will take time to manifest themselves in corporate financial policy.

In sum, the behavioral response to the tax rate reductions was concentrated in business and professional income and salaries, as well as in capital gains. It remains to be seen whether the long-run effect of the rate reductions proves to be greater than or less than the effects of the 1982 rate cuts.

As I noted previously, the data suggest that the revenue-maximizing top marginal tax rate is below the 70 percent level in place prior to the enactment of ERTA. The top income group, comprising taxpayers with incomes of \$200,000 or higher, actually paid more taxes with a top rate of 50 percent, than the baseline predicted they would pay with a top rate of 70 percent.

Fortunately, the tax cut provided economists with some leverage to determine what the revenue-maximizing top marginal rate actually is. The benefit to the taxpayer of reporting an additional dollar of taxable income is how much he pockets aftertax. For example, a taxpayer in the 40 percent bracket pockets 60 cents if he earns another dollar, or say, contributes one less dollar to a charity. In either case, his taxable income rises by one dollar.

I calculated the marginal aftertax shares of the taxpayers in each of the income classes described above, using the NBER TAXSIM model. The model was carefully crafted to take into account such provisions as the maximum tax on earned income, the minimum tax, and the alternative tax computation. Then, I regressed the percentage change in the reporting of taxable income with the percentage change in the marginal aftertax share that the taxpayer pockets. The result suggests that a 1 percent change in the taxpayer's marginal aftertax share of his income will increase his income by about 0.75 percent.

This 0.75 figure represents the price elasticity of reporting taxable income. The model suggests that high-bracket taxpayers will show a bigger behavioral response to an across-the-board rate reduction. For example, a 10 percent tax cut from 50 to 45 percent increases the taxpayer's price of taxable income from 50 cents to 55 cents, or about 10 percent. We would expect this taxpayer to report about 7.5 percent more taxable income. On the other hand, a taxpayer in the 20 percent bracket sees a rate cut to 18 percent, raising his price from 80 cents to 82 cents, or about 2.5 percent. He would increase his taxable income by about 0.75 times 2.5 percent, or a bit under 2 percent. This closely parallels what we actually observed.

Let's then put the government in the role of tax revenue-maximizing monopolist, ready to set rates to soak

us for as much as it can get. The government faces a trade-off between higher rates on a smaller base or lower rates on a larger base. To maximize revenue, the government should set a flat tax rate of 57 percent on all taxable income.

However, this tax scheme exhibits no progressivity. The government would take 57 percent from poor and rich alike. Lower brackets on lower incomes provide the solution to the progressivity problem. But, if you allow for lower brackets on some income, it turns out that the revenue-maximizing top tax rate falls as well. Consider why this is the case. The advantage of a higher rate is that the government gets it on all of the taxpayer's income. In turn, the higher rate costs taxable income at the margin. If you put in lower rates on inframarginal income, the higher rate is applied to less income, but you still have the same reduction in taxable income at the margin.

It also turns out that the more progressive a tax scheme you desire, the lower is the revenue-maximizing top marginal rate. Under our current tax schedule, a progressive tax schedule, income elasticity is about 1.32. To preserve a tax schedule with that elasticity, the revenue-maximizing top marginal tax rate should be 43 percent, with a top bracket starting at its current location of about \$170,000. These simulations suggest that if such a cut were not accompanied by rate reductions on inframarginal income, it could be accomplished at no revenue cost to the government.

In sum, both the derision with which the Laffer Curve has been treated in much of the profession and the exaggerated claims of its supporters appear misplaced. Taken as a whole, the U.S. tax system is operating below its revenue-maximizing level. However, there is a significant behavioral response to lower tax rates that is not currently being taken into account by policymakers. In the case of the 1982 rate reductions, roughly half of the potential foregone revenue was recouped. Even under tax rates currently faced by middle-income taxpayers, about one-third of prospective revenue changes will be negated by behavioral responses. This is likely to be true with both tax rate increases intended to raise revenue and with tax rate cuts designed to reduce revenue.

The behavioral response by high-income individuals to the rate reductions clearly showed that the old tax rate schedule was operating at a tax rate above its revenue-maximizing point. A tax system with a degree of progressivity such as our current system would maximize revenue with a top rate of 43 percent.

Saying that, I must return to a caution with which I began: that this rate bears no particular significance except that rates above this level are counterproductive from a revenue point of view. Considerations of economic efficiency require that rates be below this level. The revenue-maximizing rate of the Laffer Curve is not, as Jude Wanniski claims, the rate at which the electorate wishes to be taxed. It is a rate to be avoided by decision makers, not sought.

Current Policy Issues in the United States and Japan

NBER and the Japanese Ministry of Finance (MOF) held a joint conference in Tokyo on October 21 and 22. The conference began with an overview of Japanese economic issues by Yasuo Matsushita. Matsushita suggested that high Japanese saving rates may lead to large capital outflows and trade surpluses in the near term. However, in the future the aging of Japan's population may lead to substantially less saving.

The agenda for the balance of the conference was:

SESSION I: MACROECONOMICS OF GOVERNMENT BUDGET DEFICITS

Chairman: Ryuichiro Tachi, President, Institute of Fiscal and Monetary Policy, MOF

Toshihiro Ihori, Osaka University, "Budget Deficits, Government Spending, and Aggregate Demand"

Discussants: Kazuyoshi Kurokawa, Hohsei University, and Makoto Fujii, Director, Research Division, Budget Bureau, MOF

SESSION II: EFFECTS OF TAXATION ON SAVING AND INVESTMENT

Chairman: Keimei Kaizuka, Tokyo University

John B. Shoven, NBER and Stanford University, "The Taxation of Income from Capital in Japan"

Discussant: Heizo Takenaka, Institute of Fiscal and Monetary Policy, MOF

Fumio Hayashi, NBER and Osaka University, "Taxes and Corporate Investment in Japanese Manufacturing"

Discussant: Yukio Noguchi, Hitotsubashi University

SESSION III: MICRO- AND MACROECONOMIC ASPECTS OF TRADE CONFLICTS

Chairman: Ken-ichi Imai, Hitotsubashi University

Geoffrey Carliner, Executive Director of NBER, "Patterns in Japanese and American Trade"

Discussants: Motoshige Itoh, Tokyo University, and Michihiro Yoshida, Director, Planning Division, Customs Bureau, MOF

SESSION IV: INTERNATIONAL CAPITAL FLOWS

Chairman: Ryuichiro Tachi

Jeffrey D. Sachs, NBER and Harvard University, "Macroeconomic Interdependence of Japan and the United States: Some Simulation Results" (NBER Working Paper No. 1637)

Discussant: Hiroshi Yoshikawa, Osaka University

Kazuo Ueda, Osaka University and Institute of Fiscal and Monetary Policy, MOF, "Fiscal Policy and the Current Account"

Discussants: Toshihisa Toyoda, Kobe University; Shigeru Hatakeyama, Director, Research and Planning Division, Minister's Secretariat, MOF; and Hiroshi Tomizawa, Director, Research Division, International Finance Bureau, MOF

In the first paper I hori tests the hypothesis that households increase their saving in order to offset government budget deficits and thus to leave the same net wealth to their descendants. He finds that Japanese consumers, especially since the late 1960s, did in fact increase their saving to offset Japanese budget deficits. He also develops a theoretical model that shows that government spending is typically above optimal levels.

Next, Shoven presented the results of his joint paper with Toshiaki Tachibanaki of the Kyoto Institute of Economic Research. They used cost-of-capital techniques to compute the marginal rate of taxation on capital income. They find that the effective marginal tax rate in Japan is relatively low by international standards and is very low when the rate of inflation is high. This low rate stems mainly from the fact that interest income and dividend income are taxed relatively lightly.

Hayashi examines the effect on manufacturing investment of the Japanese corporate income tax, and especially of its provisions for tax-free reserves and the deductibility of prior year taxes. He finds that investment is determined primarily by stock market prices and investment opportunities, and that the effects of changes in tax incentives on investment are small.

Carliner's paper analyzes the determinants of differences in intraindustry trade between countries. Most of these differences can be explained by differences in per capita income, total income, proximity to potential trading partners, and the manufacturing trade balance as a share of GNP. Carliner finds that the actual value of intraindustry trade for the United States was significantly greater than its predicted value, while the actual value for Japan was smaller than the predicted value, but not significantly so.

The papers by Sachs and Ueda both present models to explain U.S. and Japanese current account balances. In Ueda's model, the Japanese current account balance depends on Japanese saving rates, Japanese government budget deficits, OPEC savings, real interest rates, cyclical factors, U.S. saving, and the U.S. government budget deficit. Ueda finds that the most important factor in explaining the rise in Japan's current account surplus since 1981 has been the U.S. government budget deficit, although other factors also have contributed.

Sachs's paper, written with Naoko Ishii of the Japanese Ministry of Finance and Warwick McKibbin of Harvard University, analyzes the effects of monetary and fiscal policies in Japan and the United States on the current account balances of the two countries. The unusual feature of this model is that it allows relatively free capital flows across international borders. This implies that the effect of a fiscal expansion on trade balances is bigger than when international capital flows are small. Sachs agrees with Ueda that the U.S. government budget deficit has been the main contributor to large trade deficits by the United States and to large surpluses by Japan since 1981. However, Sachs and his coauthors also find that decreases in Japanese government budget deficits have contributed to the growing trade imbalances.

Conference Calendar

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

Organizations wishing to have meetings listed in the Conference Calendar should send information, comparable to that given below, to Conference Calendar, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please also provide a short (fewer than fifty words) description of the meetings for use in determining whether listings are appropriate for inclusion. The deadline for receipt of material to be included in the Spring 1986 issue of the *Reporter* is February 15. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss at (617) 868-3900.

February 13-16, 1986

Conference on Capital Formation, NBER

February 21, 1986

Program Meeting: Financial Markets and Monetary Economics, NBER

March 7-8, 1986

Conference on Macroeconomics, NBER

March 20-21, 1986

U.S.-Japanese Economic Relations, NBER

March 20-22, 1986

Annual Meeting, Midwest Economics Association*

March 22, 1986

Program Meeting: Economic Fluctuations, NBER

April 1986

International Conference, International Health Economics and Management Institute

April 3-4, 1986

Program Meeting: Taxation, NBER

April 3-4, 1986

Empirical Methods for International Trade, NBER/Columbia

April 3-4, 1986

Brookings Panel on Economic Activity, Brookings Institution

April 4-5, 1986

4th Annual Workshop: "Free Trade Options for the United States and Canada," Institute of Public Policy Studies

April 11-12, 1986

Public Policy Conference, Carnegie-Mellon/University of Rochester

April 15-20, 1986

21st International Conference, Atlantic Economic Society*

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

April 24-25, 1986

Economic Policy Panel Meeting, Center for Economic Policy Research

May 1986

Conference: Research Project on Europe-U.S. Trade Relations, NBER

May 1-2, 1986

Annual Meeting, Association of Private Pension and Welfare Plans

May 2-3, 1986

Universities Research Conference: Economic Fluctuations, NBER

May 2-3, 1986

Political Economy Conference, Carnegie-Mellon University

May 16-18, 1986

CEME Decentralization Conference, NBER

May 19-20, 1986

Spring Symposium, National Tax Association-Tax Institute of America*

June 5-7, 1986

International Conference, International Association of Energy Economists*

June 24-26, 1986

International Seminar on Macroeconomics, NBER

June 25-28, 1986

Summer Meeting, Econometric Society

July 1-5, 1986

Annual Conference, Western Economic Association

July 27-31, 1986

Annual Meeting, American Agricultural Economics Association*

August 14-15, 1986

Public Sector Unionism, NBER

August 18-21, 1986

Annual Meeting, American Statistical Association*

August 24-26, 1986

13th Annual Conference, European Association for Research in Industrial Economics*

August 28-31, 1986

22nd International Conference, Atlantic Economic Society*

September 1-2, 1986

Conference: Economics of Technology Policy, Center for Economic Policy Research

September 11-12, 1986

Brookings Panel on Economic Activity, Brookings Institution

September 13-17, 1986

Annual Meeting, National Association of Business Economists*

September 25-26, 1986

Anglo/French Colloquium, Center for Economic Policy Research

October 16-17, 1986

Economic Policy Panel Meeting, Center for Economic Policy Research

November 6-8, 1986

North American Conference, International Association of Energy Economists*

November 9-12, 1986

79th Annual Conference, National Tax Association-Tax Institute of America*

November 23-25, 1986

Annual Meeting, Southern Economic Association*

December 28-30, 1986

Annual Conference, American Economic Association*

Winter 1986/7

United States in the World Economy, NBER

March 26-28, 1987

Annual Meeting, Midwest Economic Association*

April 1987

Conference, Atlantic Economic Society*

August 2-5, 1987

Annual Meeting, American Agricultural Economics Association*

August 17-20, 1987

Annual Meeting, American Statistical Association*

September 9-12, 1987

18th Annual Conference, Center for International Research on Economic Tendency*

September 27-October 1, 1987

Annual Meeting, National Association of Business Economists*

November 8-11, 1987

80th Annual Conference, National Tax Association-Tax Institute of America*

November 22-24, 1987

Annual Meeting, Southern Economic Association*

August 8-11, 1988

Annual Meeting, American Statistical Association*

September 25-28, 1988

81st Annual Conference, National Tax Association-Tax Institute of America*

September 25-28, 1988

Annual Meeting, National Association of Business Economists*

November 20-22, 1988

Annual Meeting, Southern Economic Association*

August 14-17, 1989

Joint Statistical Meetings, American Statistical Association*

September 17-20, 1989

Annual Meeting, National Association of Business Economists*

October 8-11, 1989

82nd Annual Conference, National Tax Association-Tax Institute of America*

November 19-21, 1989

Annual Meeting, Southern Economic Association*

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

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

New Directors Named

NBER's Board of Directors elected four new members at its fall meeting in New York. *Edgar Fiedler*, vice president and economic counselor of The Conference Board, will represent the National Association of Business Economists on NBER's Board. Fiedler, who has been with The Conference Board since 1975, previously served as assistant secretary of the U.S. Department of the Treasury (1972-75), and as deputy director of the Cost of Living Council (1971).

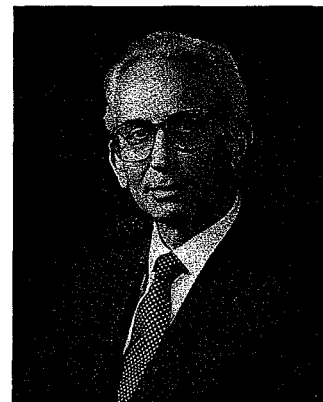
George Hatsopoulos, director at large, is the founder and president of Thermo Electron Corporation (Waltham, MA). In addition to his corporate duties Hatsopoulos, who holds a doctorate from MIT, served on the MIT faculty from 1956 to 1962 and is currently a senior lecturer there.

James Houck, professor of agricultural economics at the University of Minnesota at St. Paul, represents the American Agricultural Economics Association on the Board. Houck has taught at the University of Minnesota since 1965 and was a visiting associate professor at the Harvard Business School in 1964-65.

Robert T. Parry, executive vice president and chief economist of Security Pacific National Bank (Los Angeles), was also elected a director at large. Prior to joining Security Pacific in 1970, Parry was an econo-



Edgar Fiedler



George Hatsopoulos

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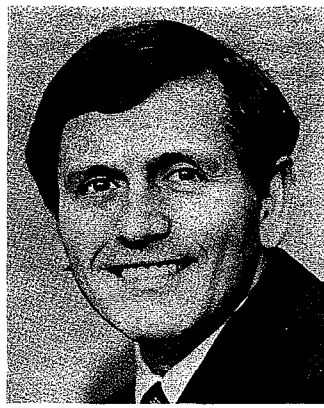
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Victor Zarnowitz
Richard Zeckhauser



James Houck



Robert T. Parry

mist at the Federal Reserve Board in Washington (1965-70). He is also a past president of the National Association of Business Economists.

Eighth Summer Institute Held

Over 200 economists from universities and organizations worldwide, about half of whom are affiliated with NBER, traveled to Cambridge this summer to attend the Bureau's eighth Summer Institute. During July, the Bureau's Programs in Economic Fluctuations and Financial Markets and Monetary Economics held their workshops and conferences. Three other major research programs—international studies, labor studies, and taxation—met in August. The Bureau's Program in Productivity convened in workshops throughout the summer. Finally, participants in two newer NBER projects had an opportunity to begin or continue their work this summer: "Mergers and Acquisitions" met in July and "State and Local Public Finance" in August.

NBER's Program in Economic Fluctuations, directed by Robert E. Hall of Stanford University, focused on four broad topics this summer. Richard Rogerson of the University of Rochester organized a series of workshops on "Aggregate Models of the Labor Market." Kenneth West and John Y. Campbell of Princeton University, and Richard H. Clarida of Yale University co-chaired the sessions on financial markets and real activity; the Program in Financial Markets jointly participated in those sessions. The third group of meetings, organized by Gary Fethke and John Kennan of the University of Iowa, dealt with "Empirical Applications of Labor Market Theory." Finally, Jo Anna Gray and David Spencer of Washington State University put together a series of discussions on "The Monetary Transmission Mechanism under Modern Financial Institutions." The culmination of the macroeconomic

program's summer meeting was a three-day conference on August 26-28.

The Program in Financial Markets and Monetary Economics, directed by Benjamin M. Friedman of Harvard University, focused on three areas in its summer workshops. NBER Research Associate Anna J. Schwartz organized a series of discussions on "Modeling the Money Supply Process and Interdependence." R. Glenn Hubbard of Northwestern University set up the workshops on "Contracting and Price Flexibility." Finally, John Campbell, Richard Clarida, and Kenneth West organized joint sessions with the economic fluctuations program on financial markets and real activity. During the first two weeks in July, the financial markets programs met daily. To conclude their portion of the Summer Institute, the financial economists held a conference on July 18 and 19. The topics covered included: investment decisions; rational price "bubbles"; the term structure of interest rates, both domestically and in the Euromarket; and the Keynesian effects of fiscal policy.

NBER's Program in International Studies, led by William H. Branson of Princeton University, held two weeks of seminars and a conference during the summer. The first week, on international monetary economics, was organized by Richard C. Marston of the University of Pennsylvania. Topics included the relationship between exchange rates and domestic prices, the high value of the dollar, exchange rate expectations, foreign currency futures, developing country debt, and the international effects of monetary and fiscal policies. The second week, on international trade and structural change, was organized by J. David Richardson of the University of Wisconsin. Topics included theoretical and empirical analyses of trade under imperfect competition, industrial policies, the optimal timing of liberalization, and the political economy of most-favored-nation clauses. In addition, there was a conference on "Current Trade Policy Issues," organized by Richardson and Robert E. Baldwin of the University of Wisconsin. It is described in detail in the "Conferences" section of the *NBER Reporter*.

The labor studies program, directed by Richard B. Freeman of Harvard University, met for one week in August. The labor group met each day and discussed three papers on a related topic. Unemployment, labor supply, micro analysis of labor issues, and unions were included in the range of topics. The group also planned a new Bureau project on immigration and exchanged information on newly available data sets.

Three topics formed the basis for the tax portion of Summer Institute, directed by David F. Bradford of Princeton University. Don Fullerton, then of the University of Virginia, led the workshops on "Simulation of Tax and Government Policy." Mervyn A. King, London School of Economics, chaired the meetings on "Taxes and Financial Behavior." Finally, Alan J. Auerbach, University of Pennsylvania, organized discussions on the "Tax Aspects of Corporate Mergers and Acquisitions." Auerbach is directing a Bureau project on mergers and acquisitions that met for the first time this sum-

mer. Participants reviewed the current state of research and made plans for future NBER studies on this subject.

The Program in Productivity, directed by Zvi Griliches of Harvard University, met in informal sessions throughout the summer. The focus was primarily on the analysis of productivity at the firm level and on comparative studies of the impact of R and D on productivity growth in different countries. Several joint sessions were held with the mergers and acquisitions group. In addition, M. Ishaq Nadiri of New York University organized a broader four-day workshop on the general topic of "R and D Spillovers and Productivity Growth."

Finally, NBER's Project on State and Local Public Finance met in Cambridge for two days. Its director is Harvey S. Rosen of Princeton University. Participants discussed a variety of topics, including competition among jurisdictions and the limits to income redistribution at the state level, effects of excise tax reform, tax structure and public sector growth, and provision of services by state and local governments. The group also discussed plans for future work.

Summer Institute provides a valuable opportunity, particularly for young scholars doing empirical research, to come together, exchange ideas, and collaborate over a longer period than is possible at a typical conference. Much of the work discussed at the NBER Summer Institute is in a preliminary stage; authors are thus able to incorporate aspects of the discussions into their final papers. In general, those papers will become part of the Bureau's Working Paper series; their availability will be announced in future issues of the *NBER Reporter*.

NBER Macroeconomists Hold Fall Meeting

Members and guests of NBER's Program in Economic Fluctuations, which is directed by Robert E. Hall of Stanford University, met in Cambridge on October 4. The agenda for the group's fall program meeting was:

Robert J. Shiller, NBER and Yale University, "Conventional Valuation and the Term Structure of Interest Rates" (NBER Working Paper No. 1610)

Discussant: Robert C. Merton, NBER and MIT

Andrew Caplin, NBER and Harvard University, and Daniel Spulber, University of Southern California, "Inflation, Menu Costs, and Endogenous Price Variability"

Discussant: Olivier J. Blanchard, NBER and MIT

Jo Anna Gray and David Spencer, Washington State University, "The Role of Price Prediction Errors in a Natural Rate Model: Some Evidence"

Discussant: Frederic S. Mishkin, NBER and Columbia University

Rudiger Dornbusch, NBER and MIT, "Exchange Rates and Prices"

Discussant: Paul R. Krugman, NBER and MIT

Jeremy I. Bulow, NBER and Stanford University, and Lawrence H. Summers, NBER and Harvard University, "A Theory of Dual Labor Markets with Application to Industrial Policy, Discrimination, and Keynesian Unemployment" (NBER Working Paper No. 1666)

Discussant: Joseph E. Stiglitz, NBER and Princeton University

In the first session of the day, Shiller described the relationship between short-term and long-term interest rates and reached three main conclusions. First, individuals estimate future short-term rates by using a weighted sum of recent short-term rates and declining but positive weights. In settings such as prewar Britain, where short-term interest rates typically reverted quickly toward their mean, this "conventional valuation" would place *more* weight on the most recent interest rates than is consistent with the rational expectations theory of the term structure. In the postwar United States, however, where interest rates are reverting to their mean slowly if at all, this rule puts *less* weight on the most recent interest rates than is consistent with the rational expectations hypothesis.

Second, Shiller finds that fads affect long-term rates. That is, there are transitory movements in long-term interest rates that are unrelated to movements in short-term rates. Finally, Shiller concludes that although the rational expectations theory does not provide a complete account of the term structure, it is of some relevance. In particular, the relationship between short-term and long-term interest rates is not constant across regimes, as a pure "conventional valuation" theory would predict. Rather, the differences in the relationship between short-term and long-term rates are in the general direction predicted by the rational expectations hypothesis.

The second paper of the day, by Caplin and Spulber, focused on price stickiness. They model an economy of monopolistically competitive firms in which each firm must bear a small cost to adjust its price. In an inflationary environment, each firm will keep its posted price constant until inflation has caused the overall price level to drift somewhat above the firm's price. At that point, the firm raises its price to an amount above the average price level.

Caplin and Spulber's model produces two major results. First, despite the assumption that changes in price are costly, aggregate prices are not inflexible in this model. A nominal disturbance, such as a change in the money supply, simply leads to an increase in the average price level and not to a change in real economic activity. This is so because most firms do not change their prices at all in response to the disturbance, but the firms that do adjust their prices make large changes. The authors conclude that the presence of costs that firms incur in changing their nominal prices is not enough

to account for the stickiness of the overall price level. Second, their model predicts that increases in either the level or the variability of inflation raise the variability of relative prices.

In macroeconomics, several theories predict that positive disturbances to aggregate demand will lead both to higher prices than expected and to unemployment below its "natural" level. However, previous empirical work has not uncovered a negative correlation between price surprises and departures of unemployment from the natural rate. In their paper, Gray and Spencer make two modifications to conventional procedures and successfully detect the predicted relationship.

First, they model the natural rate of unemployment more elaborately than usual by not assuming that it follows a simple trend. In particular, they attempt to account for the fact that a higher dispersion of rates of employment growth across sectors is likely to raise the unemployment rate as workers move among sectors.

Second, they note that not all price disturbances reflect aggregate demand disturbances. For example, changes in the price of energy may affect overall prices. Gray and Spencer then find a significant negative association between departures of (nonenergy) prices from their expected level and departures of unemployment from the natural rate. They are not able to determine, though, whether this association is caused by wage stickiness, as predicted by Keynesian models, or by misperceptions, as predicted by new classical models. Finally, Gray and Spencer find that price surprises at lags of more than a year have no effect on unemployment, suggesting that the duration of wage stickiness or misperceptions is fairly short.

Dornbusch's paper bridges international macroeconomics and industrial organization. He begins his analysis with the vast real appreciation of the dollar in the early 1980s, asking how this appreciation has affected the prices of materials and of manufactured goods. In the case of materials, he argues that markets are sufficiently competitive that there is a prevailing "world" price of materials. He then develops a simple model that predicts that real appreciation of the dollar leads to a decline in the world price of materials relative to U.S. prices and a rise relative to foreign prices. Testing the model empirically, Dornbusch finds that real dollar appreciation has been associated with a fall in materials prices not only relative to the prices of U.S. goods but also relative to foreign goods. He concludes that the strong negative association between the real exchange rate and commodity prices is "a puzzle."

Dornbusch further argues that studying manufactured goods requires models based on imperfect competition. He observes that real dollar appreciation, in the face of wage stickiness, represents a downward cost shock for foreign producers relative to American producers. He then draws on models in industrial organization to predict that dollar appreciation leads to declines in the real prices of manufactured goods in the United States. The extent of the decline is greater as the foreign share of the market is larger and the industry is more competitive. Symmetric predictions

may be made about the prices of manufactured goods abroad. Dornbusch concludes that even the limited data available suggest that this approach shows some promise.

In the final presentation, Bulow and Summers explore a model of the labor market that can account for many important microeconomic and macroeconomic phenomena. They begin by noting that it is often difficult for firms to monitor workers' efforts. Firms may respond to this difficulty by offering high wages, thereby causing workers who wish to keep their lucrative jobs to expend high effort even if the chance of their efforts being observed is fairly low.

Bulow and Summers extend such "efficiency wage" models to two sectors. In one sector, effort can be measured costlessly; in the other, it can be monitored only imperfectly so firms offer high wages. This theory has a variety of implications. First, it leads to a dual labor market: one sector (the primary sector) of the economy is characterized by high wages and low turnover, while the other (secondary) sector has the opposite characteristics. Secondary workers would prefer primary sector jobs but are unable to bid down primary sector wages. Instead, primary sector jobs are rationed.

Second, the theory is consistent with the claims of advocates of industrial policy that subsidizing high-wage, high-value-added sectors and protecting them from foreign competition may be desirable. Third, the theory provides an account of labor market discrimination. For example, if women generally have a lower level of job attachment than men, then high wages provide less of an incentive for them to expend effort. Primary sector firms, recognizing this, will prefer to hire men.

Finally, the model can provide a theory of unemployment. If primary sector firms hire new workers from the unemployed rather than from employed secondary workers—an assumption that the authors defend both empirically and theoretically—then some workers will remain unemployed in the hope of obtaining primary sector employment. In this model, unemployment is not a purely macroeconomic phenomenon but is instead one symptom of an imperfection in the labor market that has pervasive effects.

In addition to the authors and discussants, the following NBER associates attended the day-long meeting: Andrew B. Abel, Martin Feldstein, Benjamin M. Friedman, and N. Gregory Mankiw, Harvard University; Fischer Black, Goldman Sachs & Company; Zvi Bodie and Yannis Ioannides, Boston University; Stanley Fischer, Oliver D. Hart, James M. Poterba, Julio J. Rotemberg, and Eytan Sheshinski, MIT; Robert J. Gordon, Northwestern University; Herschel I. Grossman and William Poole, Brown University; William D. Nordhaus, Yale University; and Anna J. Schwartz. David Romer of Princeton University also attended and assisted in the preparation of this report. Guests of the program included: Stephen Cecchetti, New York University; Daniel V. Dantas, F.G.V. (Rio de Janeiro, Brazil); Steven Durlauf and Matthew D. Shapiro, Yale University; Gary Fethke, University of Iowa; Koichi Hamada,

University of Tokyo; Franco Modigliani and Martin Weitzman, MIT; Knut Mork, Vanderbilt University; Barry Nalebuff and Christina Romer, Princeton University; and James Stock, Mark W. Watson, and Philippe Weil, Harvard University.

Tax Program Meets in Cambridge

Members and guests of NBER's Program in Taxation met in Cambridge on October 31 and November 1 to discuss the following agenda:

James M. Poterba and Julio J. Rotemberg, NBER and MIT, and Lawrence H. Summers, NBER and Harvard University, "A Tax-Based Test of Nominal Rigidities" (NBER Working Paper No. 1627)

Discussant: N. Gregory Mankiw, NBER and Harvard University

Lawrence H. Summers, "Tax Policy and International Competitiveness"

Discussant: Charles Stuart, Council of Economic Advisers

Martin Feldstein, NBER and Harvard University, and Gilbert Metcalf, Harvard University, "The Effect of Federal Tax Deductibility on State and Local Spending"

Discussant: Robert P. Inman, NBER and University of Pennsylvania

Don Fullerton, Department of the Treasury, and Yolanda K. Henderson, American Enterprise Institute, "A Disaggregated Equilibrium Model of the Tax Distortion among Assets, Sectors, and Industries"

Discussant: John Whalley, NBER and University of Western Ontario

Roger H. Gordon, NBER and University of Michigan, "Taxation of Investment Savings in a World Economy: The Certainty Case" (NBER Working Paper No. 1723)

Discussant: Lawrence H. Summers

Louis Kaplow, NBER and Harvard University, "Horizontal Equity: Measures in Search of a Principle" (NBER Working Paper No. 1679)

Discussant: Harvey S. Rosen, NBER and Princeton University

Jerry A. Hausman, NBER and MIT, joint work with Lynn Paquette, "Involuntary Early Retirement and Consumption"

Discussant: B. Douglas Bernheim, NBER and Stanford University

The first paper, by Poterba, Rotemberg, and Summers, examines the effects on price and output of shifts between direct and indirect taxation that are revenue neutral. In classical microeconomic models with flexible wages and prices, whether a tax is levied on producers or consumers does not affect its incidence.

However, if wages or prices are rigid in the short run, as they are in Keynesian macroeconomic models, then shifting a tax from one side of the market to the other may have real effects. Tax changes therefore provide potential tests for the presence of nominal rigidities. The results in this paper, based on postwar data from both Great Britain and the United States, provide evidence against the view that wages and prices are completely flexible in the short run.

The paper by Summers theoretically and empirically examines the linkages between tax policy and international competitiveness. It begins by analyzing the implications of alternative tax policies for competitiveness in both the short and long run, assuming that capital is fully mobile internationally. If capital is highly mobile, saving incentives will increase international competitiveness, and investment incentives decrease it, in the short run. The long-run effects tend to be in the opposite direction. If capital is not mobile internationally, the distinction between incentives for saving and investment disappears, and neither has a very predictable effect on competitiveness. Summers confirms previous findings that over the long term, domestic saving and investment rates are very highly correlated within the OECD, and he examines the implications of this finding for effective capital mobility.

Feldstein and Metcalf reported on their work on the effects of federal tax deductibility on taxes and spending by state and local governments. Their empirical study finds that the composition of taxes is much more sensitive to federal deductibility than is the overall level of state and local taxes and spending. They note that one implication of this finding is that eliminating deductibility would produce much less revenue for the federal government than is generally assumed and might even cause a loss of revenue.

Fullerton and Henderson construct a general equilibrium model to investigate the importance of tax distortions in the allocation of real capital among assets, sectors, and industries. They find that distortions between the corporate and the noncorporate sectors and among industries are smaller than previous models have indicated. However, distortion among assets dominate these misallocations. Even in combination, all of these distortions in the allocation of real capital generally add up to less than 0.5 percent of national income.

Gordon's paper explores the characteristics of individual portfolio holdings in a world economy with a unified securities market where there are many countries, each with its own tax rates and inflation rate. When nominal interest is taxable but income to equity owners is tax exempt in all countries, investors in the highest tax bracket specialize in equity; among the remaining investors, those with lower tax rates buy bonds of countries with higher inflation rates. Gordon also explores a model with a unified world market in bonds but no international trade in equity. Here he finds a strong tax incentive for firms owned by investors in countries with

high personal tax rates to become multinationals and invest abroad.

Kaplow's paper questions whether the normative foundations for horizontal equity—the command that equals be treated equally—justify the indexes and approaches that generally have been adopted. He suggests that past attempts to implement horizontal equity in the tax system are inconsistent with its proposed foundations and raises serious doubts as to whether any alternative interpretation of horizontal equity reasonably consistent with common understanding of the concept can be justified.

Finally, Hausman and Paquette attempt to measure whether the potential economic distress from losing a job actually occurs. They use the Retirement History Survey to estimate the change in consumption of individuals who suffer “involuntary retirement”—being laid off, fired, or leaving a job because of health problems. They find that food consumption declines about 20 percent for such individuals.

In addition to the authors and discussants, the following members of the tax program attended the meeting: Alan J. Auerbach, University of Pennsylvania; Michael J. Boskin, Stanford University; David F. Bradford and Joseph E. Stiglitz, Princeton University; Charles T. Clotfelter, Duke University; Daniel Feenberg, NBER; Lawrence H. Goulder and Jerry R. Green, Harvard University; David G. Hartman, Data Resources, Inc.; Patric H. Hendershott, Ohio State University; John H. Makin, American Enterprise Institute; Stewart C. Myers, MIT; Michael Rothschild, University of California at San Diego; Jonathan S. Skinner, University of Virginia; and Joel Slemrod, University of Minnesota. Guests included William Andrews, Oliver Oldman, and Bernard Wolfman, all of Harvard Law School; and Harvey Galper, Brookings Institution.

Program Meeting of Financial Economists

NBER's Program in Financial Markets and Monetary Economics, under the direction of Benjamin M. Friedman of Harvard University, held its fall meeting in Cambridge on November 8. Five papers were discussed:

John Huizinga, NBER and University of Chicago, and Frederic S. Mishkin, NBER and Columbia University, “Monetary Policy Regime Shifts and the Unusual Behavior of Real Interest Rates” (NBER Working Paper No. 1678)

Discussant: Carl E. Walsh, NBER and Princeton University

V. Vance Roley, NBER and University of Washington, “The Response of Interest Rates to Money Announcements under Alternative Operating Procedures and Reserve Requirement Systems”

Discussant: Robert Rasche, NBER and Michigan State University

Robert S. Pindyck, NBER and MIT, “Risk Aversion and the Determinants of Stock Market Performance”
Discussant: Robert J. Shiller, NBER and Yale University

Bruce N. Lehmann, NBER and Columbia University, joint work with David M. Modest, “The Empirical Foundations of the Arbitrage Pricing Theory I: The Empirical Tests” (NBER Working Paper No. 1725)

Discussant: Stephen Brown, Yale University

Robert B. Barsky, University of Michigan, and Lawrence H. Summers, NBER and Harvard University, “Gibson's Paradox and the Gold Standard” (NBER Working Paper No. 1680)

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

The paper by Huizinga and Mishkin investigates the nature and timing of shifts in the real rate process to determine whether the unusual behavior of real interest rates in the early 1980s is associated with changes in monetary policy regimes. They find that not only were there significant shifts in the behavior of real interest rates in October 1979 and October 1982—when the Federal Reserve altered its operating policies—but also that these dates are the most likely breakpoints in the real rate process. On the basis of another monetary policy regime change quite similar to that of October 1979—the sharp rises in the discount rate in 1920—the authors conclude that there is a striking correspondence between monetary policy regime changes and shifts in the real rate process.

Roley's paper examines the response of interest rates to money announcements. In Roley's models, changes both in operating procedures and in reserve requirement systems potentially affect the response. Roley's empirical results generally confirm his theoretical predictions. In particular, he finds that the response of the Treasury bill yields to money announcement surprises changed significantly following changes in either operating procedures or reserve requirement systems in October 1979, October 1982, and February 1984.

The paper by Lehmann and Modest examines the validity of the arbitrage pricing theory (APT) based on an analysis of the returns on large cross sections of securities. Their empirical results cannot explain the expected returns on portfolios of securities with different market capitalizations. However, they adequately account for the expected returns on portfolios formed on the basis of dividend yield and own variance. In addition, they sharply reject the zero beta version of the APT in favor of the riskless rate model. They also find little basis for discriminating among five- and ten-factor versions of the theory.

The paper by Barsky and Summers provides a new explanation for Gibson's Paradox—the positive correlation between the price level and the nominal interest rate over long periods of economic history—in terms of the fundamental workings of a gold standard. Under

a gold standard, the price level is the reciprocal of the real price of gold. Because gold is a durable asset, its relative price is systematically affected by fluctuations in the real productivity of capital, which also determine real interest rates. Empirical evidence using contemporary data on gold prices and real interest rates supports this theory.

In addition to the authors and discussants, the following members of the financial markets and monetary economics program attended the meeting: Andrew B. Abel, Andrew Caplin, and N. Gregory Mankiw, Harvard University; Olivier J. Blanchard, MIT; Zvi Bodie, Alex Kane, and Alan J. Marcus, Boston University; Michael D. Bordo, University of South Carolina; Willem H. Buiter and Richard H. Clarida, Yale University; Jeremy I. Bulow and Terry Marsh, Stanford University; John Y. Campbell, Princeton University; R. Glenn Hubbard, Northwestern University; Takatoshi Ito, University of Minnesota; Angelo Melino, University of Toronto; William Poole, Brown University; Anna J. Schwartz, NBER; and James A. Wilcox, University of California at Berkeley.

Labor Program Meets in Cambridge

NBER's Program in Labor Studies, directed by Richard B. Freeman of Harvard University, met in Cambridge on November 15. The agenda was:

John Abowd, NBER and MIT, "Collective Bargaining and the Division of the Value of the Enterprise"

Gary Solon, NBER and University of Michigan, "Bias in Longitudinal Estimation of Compensating Wage Differences"

Joseph Tracy, Yale University, "Contracts, Negotiations, and Strikes"

Boyan Jovanovic, NBER and New York University, joint work with Clive Bull, "The Role of Matching and Relative Demand Shocks in Generating Turnover"

In his paper, Abowd models the firm (enterprise) as a collection of formal and informal contracts that provide various factors of production with claims on the income stream in exchange for assets or services supplied to the firm. This efficient bargaining model implies that the division of the quasi-rents will result in dollar-for-dollar exchanges of wealth between union members and shareholders. The implications of the leading inefficient bargaining model, in contrast, do not suggest such trade-offs in general.

Abowd tests his model by considering contract settlements during 1976-82. Financial and security price data for the firms are merged with the bargaining data. The tests provide substantial confirmation of the dollar-for-dollar wealth trade-off between union members and shareholders.

At least since the time of Adam Smith, Solon noted in his presentation, economic analysts of the labor market have predicted that, other things equal, jobs with characteristics universally regarded as disagreeable must offer wage premiums to attract workers. Because risk of injury on the job seems a particularly clear-cut case of a disagreeable job characteristic, numerous studies have estimated the "compensating wage differences" associated with risk of injury. Most of these studies have used cross-sectional data on individual workers to estimate the extent to which workers in more dangerous jobs are paid more. However, because these studies may be biased by a failure to control for unobserved worker characteristics, some recent studies have used longitudinal data to see whether the *same* worker tends to be paid more after changing to a more dangerous job. Solon's paper shows that this approach may also be biased because of the self-selection of job changers.

In Tracy's paper, bargaining is viewed as a method used by the union to infer private information held by the firm. A strike takes place if this learning process continues beyond the expiration of the current contract. Tracy tests his model on a micro data set of contract negotiations. He uses measures of investor uncertainty as proxies for the union's uncertainty over the firm's future profitability. The data confirm that increased uncertainty raises the probability of a strike as well as its expected duration. Strikes are also found to be countercyclical with respect to shocks to the industry but procyclical with respect to shocks to the local labor market.

The work by Jovanovic and Bull merges two distinct theories of labor turnover: matching between jobs and workers, and relative shifts in demand or technology. Studies of panel data seem to indicate that job matching exists, while analysis of aggregate data on both unemployment and turnover points to the latter theory. Both theories may be important, however.

Jovanovic and Bull attempt to determine the extent to which the two theories explain turnover and wage variability. They find that the interaction of the two theories helps to explain the observed growth of wages as a function of seniority. Finally, they show that after correcting for selection bias, wages should be a decreasing function of job seniority.

In addition to the authors, the following members of the labor program attended the day-long meeting: Steven G. Allen, North Carolina State University; Joseph Altonji, Casey Ichniowski, and Andrew Weiss, Columbia University; Orley Ashenfelter, Princeton University; David E. Bloom and Zvi Griliches, Harvard University; Charles C. Brown and George Johnson, University of Michigan; William T. Dickens, Lawrence F. Katz, and Jonathan S. Leonard, University of California at Berkeley; Ronald G. Ehrenberg and Olivia S. Mitchell, Cornell University; Alan L. Gustman, Dartmouth College; Daniel S. Hamermesh, Michigan State University; Mark Killingsworth, Rutgers University; Morris Kleiner, University of Kansas; Edward P. Lazear, University of Chicago; Ann Dryden Witte, Welles-

ley College; and Jeffrey S. Zax, Queens College. Guests of the program included: Katharine G. Abraham, Brookings Institution; Geoffrey Carliner, NBER; John Hamm, Princeton University; and Robert LaLonde, University of Chicago.

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647. "International Policy Coordination in Historical Perspective: A View from the Interwar Years," by Barry J. Eichengreen, 1985 (NBER Working Paper No. 1440)
648. "Domestic and Foreign Disturbances in an Optimizing Model of Exchange Rate Determination," by Stephen J. Turnovsky, 1985 (NBER Working Paper No. 1407)
649. "Imported Materials Prices, Wage Policy, and Macroeconomic Stabilization," by Richard C. Marston and Stephen J. Turnovsky, 1985 (NBER Working Paper No. 1254)
650. "Simulating Alternative Social Security Responses to the Demographic Transition," by Alan J. Auerbach and Laurence J. Kotlikoff, 1985 (NBER Working Paper No. 1308)
651. "Understanding Inflation in the 1980s." by Robert J. Gordon, 1985
652. "Adjustment to Monetary Policy and Devaluation under Two-Tier and Fixed Exchange Rate Regimes," by Joshua Aizenman, 1985 (NBER Working Paper No. 1107)
653. "Household Saving: an Econometric Investigation," by Patric H. Hendershott and Joe Peek, 1985 (NBER Working Paper No. 1383)
654. "Pricing Adjustable-Rate Mortgages," by Patric H. Hendershott, 1985 (NBER Working Paper No. 1548)
655. "Tax Reform and Housing," by Patric H. Hendershott and David C. Ling, 1985 (NBER Working Paper No. 1524)
656. "Pricing Default-Free, Fixed-Rate Mortgages," by Stephen A. Buser and Patric H. Hendershott, 1985 (NBER Working Paper No. 1408)
657. "A Vintage Model of Supply Applied to French Manufacturing," by Pentti J. K. Kouri, Jorge Braga de Macedo, and Albert J. Viscio, 1985 (NBER Working Paper No. 1639)
658. "International Comparison of the Sources of Productivity Slowdown, 1973-82," by John F. Helliwell, Peter H. Sturm, and Gerard Salou, 1985 (NBER Working Paper No. 1465)
659. "The Competitive Position of U.S. Manufacturing Firms," by Robert E. Lipsey and Irving B. Kravis, 1985 (NBER Working Paper No. 1557)
660. "Empirical Studies of Macroeconomic Interdependence," by John F. Helliwell and Tim Padmore, 1985 (NBER Working Paper No. 1021)
661. "Household Formations," by Patric H. Hendershott and Marc Smith, 1985 (NBER Working Paper No. 1390)
662. "International Coordination in the Design of Macroeconomic Policy Rules." by John B. Taylor, 1985 (NBER Working Paper No. 1506)
663. "Military Enlistments: What Can We Learn from Geographic Variation?" by Charles C. Brown, 1985 (NBER Working Paper No. 1261)
664. "The Capital Inflows Problem Revisited: A Stylized Model of Southern Cone Disinflation," by Maurice Obstfeld, 1985 (NBER Working Paper No. 1456)
665. "Effects of Inflation on the Pattern of International Trade," by Alan C. Stockman, 1985 (NBER Working Paper No. 713)
666. "Consumer Durables and the Real Interest Rate," by N. Gregory Mankiw, 1985 (NBER Working Paper No. 1148)

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52. "A Fiscal Theory of Hyperdeflations? Some Surprising Monetarist Arithmetic," by Willem H. Buiter, November 1985 (JEL No. 300)
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Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the Working Paper. Abstracts of all Working Papers issued since October 1985 are presented below. For previous Working Papers, see past issues of the *NBER Reporter*. The 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. Working Papers are not reviewed by the Board of Directors of NBER.

Assistance to the Poor in a Federal System

Charles C. Brown and Wallace E. Oates
Working Paper No. 1715
October 1985
JEL No. 911

This paper explores the role of different levels of government in assisting the poor. Using a model with interdependence of utility, we present some theoretical results on how levels of relief vary with the mobility of the poor under both centralized and decentralized systems of support. After surveying the relevant empirical work and the experience under the English Poor Laws, the paper argues for a basic role for central government in this function.

Short-Term and Long-Term Interest Rates in a Monetary Model of a Small Open Economy

Stephen J. Turnovsky
Working Paper No. 1716
October 1985
JEL No. 431

This paper analyzes the effects of both anticipated and unanticipated monetary and fiscal disturbances on the dynamic behavior of a small open economy in the context of a monetary model. It focuses on the adjustment of the short-term and long-term interest rates and the divergence of their transitional paths, particularly in anticipation of these disturbances. The analysis demonstrates how anticipation of a future change in policy can generate perverse behavior in the short run. The essential reason for the divergence between the short and long rates is that the latter are dominated by long-term expectations, while the former are primarily determined by current influences.

Standard-Rate Wage Setting, Labor Quality, and Unions

Charles C. Brown
Working Paper No. 1717
October 1985
JEL No. 830

Standard-rate wage policies, under which all workers in a particular job receive the same wage, are common for blue-collar workers, especially those covered by collective bargaining agreements and those who work for large employers. This paper analyzes the impact of standard-rate wage setting.

There are two important conclusions. First, a standard-rate rule that leaves the employer free to set the rate can either increase or reduce the quality of labor hired. Given empirically likely distributions of alternative wages for workers, it pushes employers toward the middle of the quality distribution. Second, union standard-rate policies allow union-nonunion differences in wages for workers of a given quality to exist even when union employers are free to alter the quality of their work forces.

The Comparative Advantage of Educated Workers in Implementing New Technology: Some Empirical Evidence

Ann P. Bartel and Frank R. Lichtenberg
Working Paper No. 1718
October 1985
JEL Nos. 621, 824, 851

In this paper, we estimate the variants of an equation for labor demand derived from a (restricted variable)

cost function in which experience on a technology (proxied by the mean age of the capital stock) enters nonneutrally. Our specification of the underlying cost function is based on the hypothesis that highly educated workers have a comparative advantage with respect to the adjustment to and implementation of new technologies. Our empirical results are consistent with the implication of this hypothesis, that the demand for educated workers declines as the capital stock (and presumably the technology embodied therein) ages. According to our estimates, the education distribution of employment depends more strongly on the age of equipment than on the age of plant, and the effect on labor demand of changes in the age of equipment is magnified in R and D-intensive industries.

Defined-Benefit versus Defined-Contribution Pension Plans: What Are the Real Trade-Offs?

Zvi Bodie, Alan J. Marcus, and Robert C. Merton

Working Paper No. 1719

October 1985

JEL No. 520

Defined-benefit (DB) and defined-contribution (DC) pension plans are very different in terms of their respective characteristics: risks faced by employers and employees; sensitivity of benefits to inflation; flexibility of funding; and importance of governmental supervision. In this paper, we examine some of the main trade-offs in the choice between DB and DC plans. Our most general conclusion is that neither type of plan wholly dominates the other from the perspective of employee welfare.

The major advantage of DB plans is their potential for providing a stable rate of replacement of final income for workers. If the replacement rate is the relevant variable for workers' retirement utility, then DB plans offer some degree of insurance against real wage risk. Of course, protection offered to workers is risk borne by the firm. As real wages change, funding rates must adjust correspondingly. However, to the extent that real wage risk is largely diversifiable to employers and not to employees, the stability of the replacement rate should be viewed as an advantage of DB plans.

The advantages of DC plans are most apparent during periods of uncertain inflation. These are: the predictability of the value of pension wealth; the ability to invest in inflation-hedged portfolios rather than nominal DB annuities; and the fully funded nature of the DC plan. Finally, the DC plan has the advantage that workers can more easily determine the true present value of the pension benefit they earn in any year, although they may have more uncertainty about future pension benefit flows at retirement. Measuring the present value of accruing defined benefits is difficult at best and imposes severe informational requirements on workers. Such difficulties could lead workers to misvalue their total compensation, thus resulting in misinformed behavior.

Tests for Liquidity Restraints: A Critical Survey

Fumio Hayashi

Working Paper No. 1720

October 1985

JEL No. 020

This paper surveys recent empirical work on tests for liquidity constraints. It focuses on tests based on the Euler equation. After examining the technical aspects of recent tests on aggregate time-series data and on micro data, the paper concludes that for a significant fraction of the population, the behavior of consumption over time may be predicted by credit rationing and by differential borrowing and lending rates. However, the available evidence does not provide the information needed to calculate the response of consumption to changes in the time profile of income. This is because the literature has not paid much attention to the cause of liquidity constraints.

Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons

Bruce Lehmann and David M. Modest

Working Paper No. 1721

October 1985

JEL No. 520

This paper asks whether the absolute and relative rankings of managed mutual funds are sensitive to the benchmark chosen to measure normal performance. We use the standard capital asset pricing model benchmarks and a variety of arbitrage pricing theory (APT) benchmarks to investigate this question. We find that there is little similarity between the absolute and the relative rankings of mutual funds obtained from alternative benchmarks. This suggests the importance of knowing the appropriate model for risk and expected return.

In addition, the rankings are quite sensitive to the method used to construct the APT benchmark. We might have reached very different conclusions about the funds' performance had we used smaller numbers of securities in the analysis or less efficient methods for estimating the necessary factor models than with 750 securities and maximum-likelihood procedures. However, we find that the rankings are not very sensitive to the exact number of common sources of systematic risk that are assumed to impinge on security returns. Finally, we find statistically significant measured abnormal performance when we use all the benchmarks. The economic explanation of this phenomenon appears to be an open question.

Monetary Rules and Commodity Schemes under Uncertainty

Stanley Fischer

Working Paper No. 1722
October 1985

This paper presents a simple monetary model and uses it to compare alternative monetary systems. Money may be either fiat or gold. Both gold supply and velocity are uncertain. Asset demands are derived from expected utility maximization.

I demonstrate the basic argument against a commodity money—that it wastes resources—and show why the optimal growth rate of money may be zero. I also compare the behavior of the economy under constant money stock, constant price level, and constant gold price rules. I find that expected utility is typically highest under the constant price level rule.

Taxation of Investment and Savings in a World Economy: The Certainty Case

Roger H. Gordon

Working Paper No. 1723
October 1985
JEL Nos. 441, 323, 325

This paper explores the characteristics of individuals' portfolios in a world economy with a unified securities market and many countries, each with its own tax rates and inflation rate. When nominal interest is taxable but income to equity owners is tax exempt in all countries, investors in the highest tax bracket specialize in equity. Among the remaining investors, those with lower tax rates buy bonds of countries with higher inflation rates.

Because of the tax system, countries with a higher inflation rate must pay a higher *real* interest rate on their debt. This is necessary in equilibrium to compensate those who purchase the debt for their higher taxable income. The diversity of real rates of return in the world securities market has a variety of effects on the optimal tax policy of a small open economy.

I also explore a model in which there is a unified world market in bonds but no international trade in equity. Here I find a strong tax incentive for firms owned by investors in countries with high personal tax rates to become multinationals and invest abroad. If domestic investors do end up purchasing both bonds and domestic equity, then the optimal corporate tax rate on *real* corporate income in a small open economy would be quite high relative to the personal tax rate on *nominal* interest income, in order not to distort the portfolio composition of domestic investors.

The Welfare Analysis of Product Innovations with an Application to CT Scanners

Manuel Trajtenberg

Working Paper No. 1724
October 1985

This paper presents a methodology for measuring *product* innovations using a value metric, that is, by equating the magnitude of innovations with the welfare gains that they generate. I apply this research design to the case of computed tomography (CT) scanners, a revolutionary innovation in medical technology. The econometric procedure centers on the estimation of a discrete-choice model (the nested multinomial logit) that yields the parameters of a utility function defined over the dimensions of the product. The estimated flow of social gains from innovation is used primarily to compute a social rate of return to R and D, to explore the interrelation between innovation and diffusion, and to trace the time profile of benefits and costs. The latter suggests the possible occurrence of "technological cycles."

The Empirical Foundations of the Arbitrage Pricing Theory I: The Empirical Tests

Bruce Lehmann and David M. Modest

Working Paper No. 1725
October 1985
JEL No. 520

This paper examines the validity of the arbitrage pricing theory (APT) based on an analysis of large cross sections of securities. Our empirical implementation of the APT could not explain the expected returns on portfolios composed of securities with different market capitalizations. It did explain the expected returns on portfolios formed on the basis of dividend yield and own variance; in these cases, risk adjustment with the capital asset pricing model employing the usual market proxies had failed. In addition, we sharply reject the zero beta version of the APT in favor of the riskless rate model. There is little basis for discriminating among five- and ten-factor versions of the theory.

The Empirical Foundations of the Arbitrage Pricing Theory II: The Optimal Construction of Basis Portfolios

Bruce Lehmann and David M. Modest

Working Paper No. 1726
October 1985
JEL No. 520

The arbitrage pricing theory (APT) of Ross (1976) presumes that a factor model describes security re-

turns. In this paper, we examine the merits of various strategies for constructing basis portfolios that are, in principle, highly correlated with the common factors affecting security returns. Three main conclusions emerge from our study. First, increasing the number of securities included in the analysis dramatically improves the performance of the basis portfolio. Our results indicate that factor models involving 750 securities provide markedly superior performance to those involving 30 or 250 securities. Second, comparatively efficient estimation procedures, such as maximum-likelihood and restricted maximum-likelihood factor analysis (which imposes the APT mean restriction), significantly outperform the less efficient procedures with instrumental variables and principal components that have been proposed in the literature. Third, a variant of the usual Fama-MacBeth portfolio formation procedure, which we call the minimum idiosyncratic risk portfolio formation procedure, outperformed the Fama-MacBeth procedure and proved as good as or better than more expensive quadratic programming procedures.

The Funding Status of Teacher Pensions: An Econometric Approach

Robert P. Inman
Working Paper No. 1727
October 1985

The financing of pensions for public employees has become an issue of growing public concern. This paper examines the funding status of teacher pension plans for the fifty states and for selected localities for the decade, 1971-80. I specify and estimate a pension underfunding equation, based upon actuarial principles, using a sample of pension plans for which sound measures of underfundings are available. I then use the pension equation to "predict" underfundings for each state and local pension plan in each year for which full pension plan data are available. The results reveal that the real dollar value of plan underfundings has risen by over 50 percent in the average state from 1971-80. There is a lack of strategies for funding these growing pension deficits.

Municipal Employment, Municipal Unions, and Demand for Municipal Services

Jeffrey S. Zax
Working Paper No. 1728
October 1985

Municipal unions may use their votes and those of sympathetic fellow citizens to promote increases in the demand for municipal services. If successful, this strategy can increase employment levels of members without sacrificing compensation. The unionization of municipal employees significantly increases levels of

annual man-hours and employment per capita and reduces annual hours of work per employee. The net effect of average levels of unionization is to increase employees per capita by at least 4.7 percent, and man-hours per capita by at least 3.3 percent, over levels that would prevail in the absence of municipal unions. These effects occur almost entirely in functions with recognized bargaining units. In these functions, employment levels are at least 9.9 percent higher than they would be in the absence of unionization.

Birth Outcome Production Functions in the United States

**Hope Corman, Theodore J. Joyce,
and Michael Grossman**
Working Paper No. 1729
October 1985
JEL No. 913

This paper describes the first production functions for infant health that simultaneously consider the effects of a number of inputs on (race-specific) neonatal mortality rates. These inputs include the use of prenatal care, neonatal intensive care, abortion, federally subsidized family planning clinics, maternal and infant care projects, community health centers, and the Women, Infants, and Children (WIC) program. Our empirical analysis is based on a cross section of U.S. counties in 1977; the incidence of low birth weight (2500 grams or less) is used as an intermediate outcome. This allows us to examine the extent to which prenatal influences operate directly on neonatal mortality. It also allows us to examine their indirect effects on mortality rates through low birth weight. Our results underscore the qualitative and quantitative importance of abortion, prenatal care, neonatal intensive care, and the WIC program in black and white birth outcomes.

Intergenerational Risk Sharing

Roger H. Gordon and Hal R. Varian
Working Paper No. 1730
October 1985

In this paper, we argue that in designing government policies on debt and tax transfer, it is important to consider their implications for the allocation of risk between generations. There is no reason to presume that the market or the family can allocate risk efficiently to future generations, implying that random government policies have the potential for creating improvements in welfare. This model provides a non-Keynesian justification for debt financing of wars and recessions, as well as a rationale for tax-transfer schemes (of the Social Security type) that aid unlucky generations, for example, the Depression generation, at the expense of luckier generations.

The Determinants of IRA Contributions and the Effect of Limit Changes

Steven F. Venti and David A. Wise

Working Paper No. 1731

October 1985

JEL Nos. 323, 212, 220

Tax-deferred savings are a potentially important component of savings for retirement and could represent a very substantial increase in tax-free savings for many employees. Individual retirement accounts (IRAs) may also have a substantial effect on national savings. Total IRA contributions in 1982 were over \$29 billion. Despite the size and potential significance of IRA contributions, little is known about their determinants. This paper presents: (1) an analysis of the effect of individual attributes on whether a person contributes and how much is contributed; and (2) simulations of the effect of potential changes in contribution limits on the amount that is contributed to IRAs. We compare results of a similar analysis based on Canadian data with results for the United States. Persons with low incomes are unlikely to have IRAs. In addition, after controlling for income, age, and other variables, persons without private pension plans are no more likely to contribute to an IRA than are those with such plans. The analysis of Canadian data yields similar findings; indeed, specific parameter estimates for the two countries are very similar. Simulations based on the estimates suggest that the current Treasury Department proposal would lead to about a 30 percent increase in IRA contributions.

Was It Real? The Exchange Rate-Interest Differential Relation, 1973-84

Richard Meese and Kenneth Rogoff

Working Paper No. 1732

October 1985

JEL No. 431

In Meese and Rogoff (1983 a, b), the main result is that small, structural exchange rate models do not forecast major dollar exchange rates better than naive random walk models. This result holds even when the forecasts of the models are based on actual *realized* values of the explanatory variables. In this paper, we improve our methodology by implementing a new test of out-of-sample fit. The test is valid even for overlapping forecasts with long horizons. We find that the dollar exchange rate models perform somewhat better over the recent Reagan regime than over the episodes studied previously. We also apply the methodology to the mark/yen and mark/pound exchange rates, and to real exchange rates. Finally, we test to see whether real exchange rates and real interest differentials can be represented as a cointegrated process. The evidence suggests that there is no single, common influence inducing nonstationarity in both real exchange rates and real interest differentials.

Union Work Rules and Efficiency in the Building Trade

Steven G. Allen

Working Paper No. 1733

October 1985

This paper estimates the effect of union work rules on employment and costs in the building trades. It compares factor demand elasticities for union and nonunion contractors and subcontractors using micro data from two different types of construction. The results show that the elasticities of substitution between labor and other inputs and the own-price elasticities for nonlabor inputs are about the same for union and nonunion contractors. In contrast, the elasticities of substitution among different skill categories of labor and the own-price elasticities for each category are much lower under unionism. Based on a typical office building subcontract, these lower factor demand elasticities result in excess staffing of 3.2 percent, excess labor costs of 5.0 percent, and excess total costs of 2.0 percent.

This study also directly examines the effect of union work rules on the use of prefabricated components. I find that union contractors are just as likely to use them as are nonunion contractors.

Some Thoughts on Weitzman's *The Share Economy*

Russell Cooper

Working Paper No. 1734

October 1985

This paper explores the positive and normative aspects of share contracts. In particular, I consider the properties of a share system as advanced by Martin Weitzman in *The Share Economy*. My model highlights a "macroeconomic externality" created in a multisector economy with imperfect competition. The introduction of share contracts influences the comparative static properties of the model's economy and in some cases leads to Pareto superior outcomes.

Productivity Growth in the Automobile Industry, 1970-80: A Comparison of Canada, Japan, and the United States

Melvin A. Fuss and Leonard Waverman

Working Paper No. 1735

October 1985

In this paper we calculate and analyze the cost and productivity experience of the automobile industries

during the 1970s in Canada, the United States, and Japan. Using an econometric cost function methodology, we are able to isolate the major source of short-run disequilibrium in this industry—variations in capacity utilization—and to analyze its effects on cost and gross total factor productivity (TFP). Applying the Viner-Wong envelope theorem, we track short-run behavior using what is essentially a long-run cost function.

Two striking empirical results emerge. First, TFP grew much faster in the Japanese automobile industry (4.3 percent per annum) than in the Canadian (1.4 percent) and U.S. (1.6 percent) industries. Second, ignoring variations in capacity utilization, a source of productivity change, would have led to a 31 percent underestimate of long-run TFP growth in Canada and a 37 percent underestimate for the United States.

Social Security and Individual Welfare: Precautionary Saving, Liquidity Constraints, and the Payroll Tax

R. Glenn Hubbard and Kenneth L. Judd

Working Paper No. 1736

October 1985

Recently simulation models have been used to isolate intragenerational and/or intergenerational effects in the examination of efficiency gains from dynamic tax reforms. Important considerations of uncertainty or imperfections in capital markets are frequently missing from such a framework, though. In this paper, we focus on the welfare gains from introducing Social Security retirement annuities, given that lifetimes are uncertain and that there are restrictions on borrowing.

The paper has four principal findings: First, given the considerations mentioned above, "precautionary saving" exceeds life-cycle saving (which would have taken place in the absence of lifetime uncertainty), lending further support to the notion that the perfect-certainty version of the life-cycle model provides an inadequate explanation of observed saving behavior.

Second, the introduction of an actuarially fair Social Security system leads to a significant partial equilibrium increase in lifetime consumption and welfare, accompanied by a reduction in the capital stock. However, the increase in lifetime welfare is reduced, and in many cases eliminated, when borrowing restrictions are imposed.

Third, extending the model to general equilibrium, we find that the partial equilibrium gains in lifetime welfare from participation in Social Security are offset by the interaction of higher steady-state interest rates and binding liquidity constraints.

Finally, replacing the proportional payroll tax with a progressive tax (essentially a linear tax with an exemption), we show that age-specific tax schemes can restore much of the potential gain from introducing Social Security.

Life Insurance of the Elderly: Adequacy and Determinants

Alan J. Auerbach and Laurence J. Kotlikoff

Working Paper No. 1737

October 1985

JEL No. 921

Despite less poverty in general among the aged, about one-third of elderly nonmarried women, many of whom are widows, are "officially" poor. The fact that poverty rates are significantly higher for widows than for married women suggests that many households may fail to buy sufficient life insurance. This paper considers the adequacy and determinants of life insurance among the elderly. Its principal conclusions are:

(1) Combined private and public life insurance is inadequate for a significant minority of elderly households.

(2) Of those elderly households in which the husband's future income represents a significant fraction of total household resources, roughly one-half are inadequately insured.

(3) Households do not significantly offset Social Security's provision of survivor insurance by reducing their private purchase of life insurance.

(4) The actual determinants of the purchase of life insurance appear to differ greatly from those predicted by economic theory.

Nominal Contracting and Price Flexibility in Product Markets

R. Glenn Hubbard and Robert J. Weiner

Working Paper No. 1738

October 1985

This paper emphasizes the role of contracts for market equilibrium—for many raw materials and basic industrial commodities—in which long-term contractual arrangements and spot markets coexist. Our principal goals are to explain the existence of contracts and the equilibrium fraction of trades carried out under contract and to consider the impact of demand and supply shocks on spot prices when market trades also take place through long-term contracts.

We find that the relative importance of contracting depends inter alia on the variance of the spot price and the sources of underlying fluctuations. Consistent with the findings of previous macroeconomic studies, we find that contracting and price rigidity are more likely as demand shocks are more important relative to supply shocks. We adapt our static model of contract price and quantity determination to discuss the adjustment of contract prices. Finally, we discuss three important applications of our multiple-price modeling

structure: to analyses of the effects of changes in vertical market structure on market equilibrium in commodity markets (with specific reference to petroleum and copper); to models of the optimal degree of contract indexation; and to aggregate studies of "sticky prices" in macroeconomics.

Inflation, Exchange Rates, and Stabilization

Rudiger Dornbusch

Working Paper No. 1739

October 1985

This paper discusses the interaction of inflation and exchange rate policy in a variety of contexts. Four different settings highlight that role: the experiments with exchange rate overvaluation in the Southern Cone; the place of exchange depreciation in the transition from high to even higher inflation, discussed in the context of Brazil; fixing of exchange rates and real appreciation during stabilization in the 1920s; and, the U.S. real appreciation of 1980-85. The common thread of argument is that exchange rate policy can make an important contribution to stabilization but that it can also lead to persistent deviations from purchasing power parity (PPP), with devastatingly adverse effects. This paper also investigates through what channels these PPP deviations arise and how they influence inflation, trade, and capital flight.

The Administration Tax Reform Proposal and Housing

Patric H. Hendershott and David C. Ling

Working Paper No. 1740

November 1985

JEL Nos. 323, 932

This paper estimates the likely impact of the administration's tax reform plan on housing. Our analysis incorporates two impacts of general equilibrium—a one percentage point decline in the level of interest rates and a decrease in the property tax rate on principal residences. We also correct errors in discount rates and refinancing found in the basic rental model.

We project a 7 percent increase in market rates (11 percent without the decline in interest rates). Considering the individual components of the administration plan, the only significant negative provision is the cut in the personal tax rate from 0.53 percent (including a 6 percent state and local rate deductible at the federal level) to 0.41 percent. Without this cut (and the decline in interest rates largely attributable to the cut), market

rents would *fall* by 6 percent. Rents rise only because rental housing is a negatively taxed asset in the sense that a tax cut lowers the supply of the asset.

The general equilibrium effects will offset the negative direct effects—the cut in marginal tax rates and loss of deductibility of property taxes—on owner-occupied housing in the aggregate. However, this housing will generally be cheaper for households with incomes below \$40,000—especially below \$25,000—but will be more expensive for those with incomes above \$60,000. This constitutes an improvement in both efficiency and equity; under current law the price of owner housing services is far lower for high-income households than for low-income households. Homeownership rates should increase by two to three percentage points for households with incomes below \$40,000 and one to two percentage points in the aggregate.

Commodity Export Boom and the Real Exchange Rate: The Money-Inflation Link

Sebastian Edwards

Working Paper No. 1741

November 1985

JEL Nos. 400, 430

This paper analyzes the relationship between exogenous changes in commodity export prices and the real exchange rate in a monetary economy. I extend the traditional Dutch Disease case and explore the monetary consequences of an export boom. I show that in the short run commodity export booms can generate either an excess demand for or an excess supply of money. In a monetary setting, the short-run behavior of the real exchange rate can differ significantly from the more traditional Dutch Disease case without money. I then test the model using data for Colombia.

Employment While in College, Academic Achievement, and Post-College Outcomes: A Summary of Results

Ronald G. Ehrenberg and Daniel R. Sherman

Working Paper No. 1742

November 1985

JEL No. 800

This paper uses 1972-79 panel data from the National Longitudinal Survey of the High School Class of 1972 to study how male college students' employment while in college influences their academic performance, persistence in school, decisions to enroll in graduate school, and post-college success in the labor market. The analytic framework treats in-school employment as endogenous and determines persistence by a comparison of expected utilities.

Foreign Currency Futures

Robert J. Hodrick and Sanjay Srivastava

Working Paper No. 1743

November 1985

JEL No. 431

We derive and empirically analyze the theoretical nature of risk premiums in foreign currency futures markets and discuss the estimation problems encountered in using data on futures. Since forward rates and futures prices are demonstrated to be approximately equal, and because risk premiums in forward markets are highly variable, consistency of the data requires time variation in daily risk premiums in the futures market. We reject unbiasedness of daily futures prices as predictors of the following day's futures price for all currencies. Reconciliation of daily and monthly data requires positive serial correlation in daily risk premiums.

Labor Supply Incentives and Disincentives for the Disabled

Jonathan S. Leonard

Working Paper No. 1744

November 1985

JEL Nos. 813, 910

The past three decades have witnessed a large and puzzling decline in labor force participation by prime-age males and a correspondingly large increase in Social Security disability beneficiary roles. This paper reviews the analytical studies that have attempted to determine the causal links between disability, beneficiary status, and labor force nonparticipation.

Although disability is often thought of as a purely medically determined condition with no labor supply responsiveness to economic factors, models of Social Security disability beneficiary status as an economic decision have had some success in explaining both the growth of the program and the decline in labor force participation. However, these studies have produced a wide range of estimates of labor supply elasticity, in part because of the difficulty of the underlying econometric problem of estimating the response to two (or more) potential income streams, only one of which is usually observed for any individual.

The Effectiveness of Equal Employment Law and Affirmative Action Regulation

Jonathan S. Leonard

Working Paper No. 1745

November 1985

JEL Nos. 820, 917

This paper reviews some recent empirical analyses of the impact of Affirmative Action and antidiscrimina-

tion law on employment and productivity. The major findings are that: (1) Affirmative Action has some success in improving employment opportunities for minorities and females, particularly for blacks. The results for white females are mixed, though. (2) Increases in black employment under Affirmative Action have taken place in both high-skilled and low-skilled occupations.

(3) Compliance reviews have not been targeted against establishments with the lowest relative proportions of minority or female employment. Targeting seems more compatible with an earnings redistribution rather than an antidiscrimination program. (4) While many of the detailed enforcement steps and sanctions of the contract compliance process seem to have little effect individually, the compliance review process as a whole has been effective.

(5) The system of goals and timetables has not been adhered to as rigidly as one might expect of quotas. The goals that firms agree to are greatly inflated relative to their subsequent achievements, but they are not hollow promises.

(6) Litigation under Title VII of the Civil Rights Act of 1964 has played a significant role in increasing black employment. In addition, as minority and female employment shares have increased, their relative productivity, while poorly measured, has not declined significantly.

Macroeconomic Policy Design in an Interdependent World Economy: An Analysis of Three Contingencies

Willem H. Buiter

Working Paper No. 1746

November 1985

JEL Nos. 430, 131

This paper uses a small analytical model with two regions (the United States and the rest of the industrial world) to analyze three issues of international economic interdependence and macroeconomic policy coordination.

First, what should be the monetary and/or fiscal response in the rest of the industrial world to a tightening of U.S. fiscal policy, and what should be the U.S. monetary response?

Second, what should be the monetary and/or fiscal response in the United States and in the rest of the industrial world to a "collapse of the U.S. dollar"? The paper highlights the importance of determining the causes of such a "hard landing" for the U.S. dollar, as the appropriate policy responses are very sensitive to this.

Third, what should be the macroeconomic policy response in the industrial world to disappointing real growth? Again, the correct identification of the reason(s) for the unhealthy growth is crucial.

Finally, I discuss and qualify the activist policy conclusions derived from the formal analysis.

The Covariance Structure of Earnings and Income, Compensatory Behavior, and On-the-Job Investments

James R. Kearl

Working Paper No. 1747

November 1985

JEL Nos. 850, 042, 229

Individuals who appear to be alike but make different choices about on-the-job investments should have earnings profiles that differ systematically. In particular, investments in nonspecific human capital should result in lower initial earnings but higher growth rates of earnings. Human capital models of this sort admit testing by examining the covariance between the level of earnings and the growth rate of earnings.

This paper reports estimates of this covariance using the sample covariance among income observations across time for the same individuals. The sample covariances are drawn from the Utah Panel Data, a panel of some 16,000 households with income and wealth observations at various intervals from 1850-1900. The parameter of interest is negative. This estimate is robust to various specifications of the model.

I also reexamine earlier work by Lillard and Weiss, and Hause that uses data on earnings. Using data from three quite different sources covering different economies and different time periods, I conclude that there is strong support for the on-the-job investment hypothesis.

The Effect of the Union Wage Differential on Management Opposition and Union Organizing Success

Richard B. Freeman

Working Paper No. 1748

November 1985

This paper argues that under current institutional arrangements in the United States, the magnitude of the union wage premium actually reduces organization rather than increasing it. It reduces organizing success by lowering profits, thus giving management a greater incentive to oppose unions. In the traditional monopoly model, any given premium can cause management to donate more resources to opposing a union than workers will donate to organizing. Empirical evidence from NLRB elections supports the model in which larger premiums induce greater opposition and thus reduce union organizing success.

The Covariation of Risk Premiums and Expected Future Spot Exchange Rates

Robert J. Hodrick and Sanjay Srivastava

Working Paper No. 1749

November 1985

JEL No. 431

In 1984, Fama analyzed the variability and the covariation of risk premiums and expected rates of depreciation. We use three statistical techniques that do not suffer from a potential bias in Fama's analysis; nevertheless we confirm his findings. In contrast to his interpretation, our results are not necessarily at variance with the predictions of a theoretical model of the risk premium. Increases in expected rates of depreciation of the dollar relative to five foreign currencies are positively correlated with increases in the expected profitability of purchasing these currencies in the forward market. Moreover, risk premiums have larger variances than expected rates of depreciation do.

A Latent Variable Model of Quality Determination

Paul J. Gertler

Working Paper No. 1750

November 1985

JEL No. 913

Despite substantial interest in the determination of quality, there has been little empirical work in the area. The problem, of course, is the general lack of data on quality. This paper overcomes the data problem by constructing a Multiple Indicator Multiple Cause (MIMIC) model of quality determination. I present a one-factor MIMIC model of quality that derives natural indicators from the relationship between input demand and output determination. The indicators turn out to be input demands that have been filtered to remove variation caused by all factors except quality and random disturbances. These indicators are measures of input investment in each unit of output or the volume (intensity) of service. I identify the model by defining input demand to be a function of quantity and "total effective output" (quantity multiplied by average quality), instead of quantity and average quality. I apply the model to the determination of nursing home quality and it appears to perform quite well: the results generally conform with economic theory, and restrictions implied by the MIMIC structure are accepted in hypothesis tests.

A Decomposition of the Elasticity of Medicaid Nursing Home Expenditures into Price, Quality, and Quantity Effects

Paul J. Gertler

Working Paper No. 1751

November 1985

JEL No. 913

Nursing home expenditures have become a public policy concern primarily because the Medicaid program pays for approximately 50 percent of them. Medicaid makes health care available to individuals who otherwise could not afford it, by directly reimbursing nursing homes for Medicaid patient care. Typically, Medicaid reimbursement rates are set by a cost-plus method, where the reimbursement per patient is equal to average cost plus some return referred to as the Medicaid "plus" factor. This paper estimates the elasticity of Medicaid expenditures with respect to a change in the Medicaid plus factor and decomposes that elasticity into price, quality, and quantity components. I derive the decomposition from a model of nursing home behavior, which shows that an increase in the Medicaid plus factor causes nursing homes to admit more Medicaid patients and reduce quality.

Total expenditures are the Medicaid reimbursement rate times the number of Medicaid patients receiving care. An increase in the Medicaid plus factor affects the Medicaid reimbursement directly by raising the Medicaid plus factor, and indirectly by decreasing average cost through a reduction in quality. These are the price and quality effects, respectively. The quantity effect is the change in the number of Medicaid patients. I estimate the elasticities separately for proprietary and "not-for-profit" nursing homes using a 1980 sample of New York State nursing homes. Uniformly, the proprietary elasticities are approximately twice as large as the not-for-profit elasticities. As expected, the price and quantity effects are positive, and the quality effects are negative. In the decomposition, the quality effect is quite important. In fact, ignoring it would lead to a 53 percent overestimate of the Medicaid expenditure elasticity.

Increasing Returns and the Theory of International Trade

Paul R. Krugman

Working Paper No. 1752

November 1985

JEL No. 411

Increasing returns are as fundamental a cause of international trade as comparative advantage, but their

role has been neglected until recently because of the problem of modeling market structure. Recently, substantial theoretical progress has been made using three different approaches: the Marshallian approach, by which economies of scale are assumed external to firms; the Chamberlinian approach, in which imperfect competition takes the relatively tractable form of monopolistic competition; and the Cournot approach of noncooperative quality-setting firms. This paper surveys the basic concepts and results of each approach. It shows that some basic insights are not too sensitive to the particular model of market structure. Although much remains to be done, I have made progress toward a general analysis of increasing returns and trade.

Taxes and Corporate Investment in Japanese Marketing

Fumio Hayashi

Working Paper No. 1753

November 1985

This paper examines the impact of taxes on the incentive to invest for the Japanese manufacturing sector in the postwar period. The idiosyncratic feature of the Japanese corporate tax system as compared to that of the United States is the prevalence of tax-free reserves and the tax deductibility of a part of the taxes paid by corporations in the previous year. Our formula for the tax-adjusted q and the cost of capital incorporates this idiosyncrasy.

The main conclusions are: While the postulated negative relation with the cost of capital cannot be found, investment in Japanese manufacturing until 1974 shows a strong association with the tax-adjusted q . Since the change in stock prices, not taxes, is the primary source of changes in q , the profitability of capital is the major determinant of investment.

Workers' Rights: Rethinking Protective Labor Legislation

Ronald G. Ehrenberg

Working Paper No. 1754

November 1985

JEL No. 800

This paper examines four possible areas for expanding protective labor legislation in the United States over the next decade and their implications for labor markets. The four areas are hours of work, unjust dismissal, comparable worth, and plant closings. In each case, the question of how private markets have failed must be asked explicitly. There must also be empirical evidence on such claims of market failure, economic analysis of the potential unintended side effects of policy changes, and empirical estimates of the likely magnitudes of these effects.

Exchange Controls, Capital Controls, and International Financial Markets

Alejandro Hernandez D. and Alan C. Stockman

Working Paper No. 1755

November 1985

JEL No. 400

This paper examines the effects of restrictions on international financial markets. We analyze a general equilibrium, rational expectations model of a two-country world in which well-functioning international financial markets permit trade in all state-contingent securities except insofar as governments restrict these markets. The restrictions we examine take the form of taxes or quantitative controls on purchases of foreign currency and on the income from foreign assets. State-contingent financial markets allow households to allocate wealth optimally across states so that the imposition of exchange and capital controls, roughly speaking, has only substitution effects, not wealth effects. These restrictions reduce international trade in goods and lower ex post welfare in the country where they are imposed. Nominal prices and exchange rates are non-monotonic functions of these restrictions.

The Return to Tax Simplification: An Econometric Analysis

Joel Slemrod

Working Paper No. 1756

November 1985

JEL No. 323

This paper estimates the probable saving in the resource costs of complying with the tax law that would result from simplifying the individual income tax. The estimates are based on an econometric analysis of the tax filing behavior of a 1982 sample of Minnesota taxpayers.

First I present a simple model of tax compliance based on utility maximization in order to suggest the determinants of compliance behavior. The model treats the discrete choices of whether to itemize deductions and whether to obtain professional tax advice, and of how much time and money to spend, conditional on the discrete choices made.

Simulations based on the econometric results suggest that a significant saving in resources could be expected if the system of itemized deductions were eliminated. I cannot confidently predict any significant saving from changing to a single-rate tax structure.

The Impact of Induced Abortion on Birth Outcomes in the United States

Theodore J. Joyce

Working Paper No. 1757

November 1985

This paper examines the impact of induced abortion on birth outcomes. I treat abortion as an endogenous input in the production of infant health. To gauge the direct and indirect effects of abortion, I consider three measures of infant health simultaneously: the neonatal mortality rate; the percentage of births at low birth weight; and the percentage of preterm births. All three are race-specific and all pertain to large counties in the United States in 1977. Because the utilization of health inputs may depend upon the expected birth outcome, I emphasize estimates obtained by two-stage least squares.

The results make clear that abortion is an important determinant of infant health. This suggests that, by reducing the number of unwanted births, abortion enhances the healthiness of newborns of a given weight and gestational age and improves the distribution of births among high-risk groups. Moreover, these direct and indirect effects differ by race.

The Antebellum "Surge" in Skill Differentials One More Time: New Evidence

Robert A. Margo and Georgia C. Villaflor

Working Paper No. 1758

November 1985

JEL No. 042

Economic historians often use changes in the skill differential as a proxy for changes in income inequality. According to Jeffrey Williamson and Peter Lindert, American skill differentials rose sharply between 1820 and 1860; they interpret this as increasing income inequality.

Using a large, new sample of wage rates drawn from military records, we find no evidence of an aggregate "surge" in antebellum skill differentials. However, we do find that skill differentials on the frontier rose relative to levels in settled areas. We show how a reduction in the costs of migrating from old to new regions can explain this finding.

The Optimal Size of a Tax Collection Agency

Joel Slemrod and Shlomo Yitzhaki

Working Paper No. 1759

November 1985

JEL No. 323

This paper addresses the optimal degree of law enforcement for tax evasion. It derives the conditions

that characterize the optimal size of a tax collection agency and then provides a simple interpretation of the conditions in terms of excess burden. We clarify earlier findings that suggest that the optimal size should be larger than a simple cost-benefit calculation would indicate. We conclude with a numerical example that illustrates the optimality condition and demonstrates that a policy based on a naive cost-benefit analysis of the tax collection agency could result in a substantial overcommitment of resources.

Taxpayer Behavior and the Distribution of the 1982 Tax Cut

Lawrence B. Lindsey

Working Paper No. 1760
November 1985

The Economic Recovery Tax Act of 1981 mandated the most substantial reduction in personal income tax rates since the tax cuts of 1964. The rate reductions stimulated debates about the responsiveness of taxpayers to tax rates and incentives, the magnitude of the foregone revenue, and the distribution of the tax burden. This paper provides estimates of these three parameters.

I create a baseline income distribution that takes as given the macroeconomic environment of 1982. I then contrast this distribution with the actual income reported in 1982 to measure the added income reported as a result of the rate cuts. I also use the NBER TAXSIM model to estimate the effects of taxpayer behavior on tax liabilities.

Estimating the Revenue-Maximizing Top Personal Tax Rate

Lawrence B. Lindsey

Working Paper No. 1761
November 1985

The idea that marginal tax rates and tax revenue may be inversely related is at least as old as Adam Smith's *Wealth of Nations*. The emergence of the "Laffer Curve" in the modern public debate on the subject has rekindled interest in this idea. This paper uses data from the 1982 tax rate reductions to estimate the revenue-maximizing top personal tax rate.

This paper also examines the components of taxable income to consider the sources of taxpayer response to changes in marginal tax rates. I used the NBER TAXSIM model extensively in this study to estimate the magnitude of taxpayer response to tax rate changes.

The Corporate Cost of Capital in Japan and the United States: A Comparison

Albert Ando and Alan J. Auerbach

Working Paper No. 1762
November 1985
JEL No. 323

This paper presents evidence about the costs of corporate capital for a sample of large companies in Japan and the United States and evaluates a variety of hypotheses about why the cost might be lower in Japan.

We find that the before-tax return to capital in Japan appears slightly lower than in the United States when we use corrected book measures of earnings. This result would be reversed if market returns to Japanese equity were used in place of corrected earnings to measure the cost of equity.

To whatever extent the cost of capital may actually be lower in Japan, this is unlikely to be either because of a lower overall corporate tax burden or because of the particular tax advantages of corporate borrowing.

The Impact of Pollution Abatement Investment on Productivity Change: An Empirical Comparison of the United States, Germany, and Canada

Klaus Conrad and Catherine J. Morrison

Working Paper No. 1763
November 1985

It has been asserted often that imposition of environmental regulations in the 1970s may partially explain the slowdowns in productivity growth experienced by most industrialized countries during that decade. The contention is that the expenses of satisfying these regulations, including capital investment in pollution abatement, is unproductive in terms of measured output. Thus, conventional productivity measures will be biased downward when such regulations are imposed.

In this paper we construct a model that explicitly recognizes the difference between pollution abatement capital and "productive" capital. We then use this framework to develop an adjustment to nonparametric measures of productivity growth, purging them of the bias resulting from regulation. We measure the bias for the manufacturing sectors of three countries: the United States, Canada, and Germany. We can then assess the impact on productivity growth of increased regulation regarding pollution: Our principal finding is that the bias, which depends on relative rates of growth of output and capital investment in pollution abatement, is modest.

Testing Long-Run Productivity Models for the Canadian and U.S. Agricultural Sectors

Susan Capalbo and Michael Denny

Working Paper No. 1764

November 1985

Linking data from the agricultural sectors in the United States and Canada, this work explores the evolution of gains in agricultural productivity in the two countries during the post-World War II period. We have developed comparable data for each country and have applied it to a series of tests about the nature of the long-run production sector. These tests are designed to evaluate the alternate structures of long-run shifts in technology over time.

There is considerable evidence in both countries that the long-run shifts have been Hicks Neutral in models that use gross output measures. The reverse is true for the net output models. Our results strongly reject the use of conventional net output measures. However, the results do not reject separability of a type that is similar to, but weaker than, real value added in both countries.

The Impact of Tax Reform on Households

Joel Slemrod

Working Paper No. 1765

November 1985

JEL No. 323

This paper analyzes the Reagan administration's tax reform proposal in terms of its three stated objectives: fairness, simplicity, and economic growth. It also considers the likely effect of the proposal on labor supply, saving and investment, and housing. Finally, the paper attempts to place the tax reform debate in the context of modern public finance theory, in order to provide some rigorous framework for discussion of the important issues.

Changes in the Age Distribution of Income in the United States, 1968-84

**Michael J. Boskin, Laurence J. Kotlikoff,
and Michael Knetter**

Working Paper No. 1766

November 1985

JEL No. 220

Among the interesting changes in the U.S. economy in recent years have been the substantial shifts in the

age distribution of income and its components. These changes are not only interesting but are also an important background against which to interpret aggregate economic statistics.

In this paper we present detailed data on both the shares of income and the relative income per household headed by persons of different ages. These are supplemented by analogous data for the various components of income: earnings, property income, Social Security, unemployment insurance, welfare, and pensions. The data are tabulated from 17 years of the annual Current Population Surveys.

Among the most interesting trends are: the dramatic increase in the share of income and the relative incomes received by households over the age of 65; the enormous growth in the absolute and relative contribution of Social Security to the incomes of households 55-64, and 65 and over; the sharp decrease in the share of total and relative earnings of these two most elderly cohorts; and swings in the shares of total income of the other age cohorts, which in part reflect changes in the numbers of persons in households of different ages, for example, resulting from the aging of the baby-boom generation.

Price Flexibility, Credit Rationing, and Economic Fluctuations: Evidence from the United States, 1879-1914

Charles W. Calomiris and R. Glenn Hubbard

Working Paper No. 1767

November 1985

The reawakening of interest in links between price flexibility and fluctuations in economic activity calls for a reconsideration of models of price and quantity adjustment. We examine relationships between credit disturbances and real activity under flexible prices, using monthly data on real and financial variables from 1879-1914.

Recent theoretical and empirical work has focused on models and institutions of the post-World War II period. However, historical episodes of pronounced business cycles challenge our present formulations of the causes of fluctuations in output and employment. In this paper, we pursue two goals: (1) to demonstrate that substantial price flexibility existed during the period, pointing out that models of economic fluctuations relying on sticky prices are not appropriate for analyzing the period; and (2) to consider the effects of deflationary shocks on real variables in such a world.

We have two principal findings: First, evidence from several empirical tests corroborates the stylized fact of price flexibility during our period of study (relative to patterns of flexibility observed in postwar data). Contrary to others whose models applied to postwar data, we find that shocks to inflation rates produce positive and persistent effects on output. Second, ex-

tending earlier examinations of credit rationing as an outcome under imperfect information, we motivate this link by considering the impact of deflation on credit availability. The addition of measures of credit rationing accompanying deflation contributes substantially to our empirical explanation of output fluctuations during the period.

The Deductibility of State and Local Taxes: Impact Effects by State and Income Class

Daniel R. Feenberg and Harvey S. Rosen

Working Paper No. 1768

November 1985

JEL Nos. 323, 324

This paper estimates the impact on states and different income classes of removing the deductibility of state and local taxes. We show how deductibility affects marginal and average tax rates for both state and federal tax systems. One striking result is that the combined federal income tax and state tax burdens would generally fall under the president's tax reform proposal, even for high-income people in states with high tax rates.

Exchange Rates and Prices

Rudiger Dornbusch

Working Paper No. 1769

December 1985

The appreciation of the U.S. dollar over the past five years opens important areas of research. The fact of a large and persistent real appreciation poses a challenge for equilibrium theorists to uncover the change in fundamentals. It also seems to support the role of long-term wage contracts in macroeconomic adjustment. This paper assumes that wages are given and in a partial equilibrium setting investigates the determinants of relative price changes of different groups of goods. Specifically, it advances hypotheses about those sectors in which a change in exchange rates should lead to large changes in relative prices and others in which the relative price effects should be negligible.

The general idea is to draw on models of industrial organization to explain price adjustments in terms of the degree of market concentration, the extent of product homogeneity and substitutability, and the relative market shares of domestic and foreign firms. The movement in exchange rates and the money wage being less than fully flexible interact to produce a cost shock for some firms in an industry—foreign firms in the home market and home firms abroad—and thus bring about the need for an industrywide adjustment in prices.

Monopolistic Competition, Aggregate Demand Externalities, and Real Effects of Nominal Money

Olivier J. Blanchard and Nobuhiro Kiyotaki

Working Paper No. 1770

December 1985

JEL Nos. 023, 130

The relationship between imperfect competition and fluctuations in output is a long-standing issue in macroeconomics. In this paper, we examine the relationship between monopolistic competition and aggregate demand in the determination of output. First we show that monopolistically competitive economies exhibit an aggregate demand externality. Then we show that because of this externality, small menu costs—that is, small costs of changing prices—may lead to aggregate demand having large effects on output and welfare.

The Wage-Price Spiral

Olivier J. Blanchard

Working Paper No. 1771

December 1985

JEL No. 130

This paper discusses the wage-price spiral. It shows that, after an increase in aggregate demand, nominal prices and nominal wages adjust because of attempts by workers to maintain or increase their real wage and attempts by firms to maintain or increase their markups of prices over wages. Under continuous price and wage setting, the process of adjustment is instantaneous; under staggering of price and wage decisions, the adjustment takes time. The more inflexible real wages and markups are to shifts in demand, the higher is the degree of price level inertia and the longer lasting are the effects of aggregate demand on output.

Debt and Default in the 1930s: Causes and Consequences

Barry J. Eichengreen and Richard Portes

Working Paper No. 1772

December 1985

JEL No. 430

This paper analyzes the "debt crisis" of the 1930s to see if this historical experience sheds any light on re-

cent difficulties in international capital markets. We first consider patterns of overseas lending and borrowing in the 1920s and 1930s, comparing the performance of standard models of foreign borrowing in this period to the 1970s and 1980s. Next, we analyze the incidence and extent of default on sovereign debt, adapting models of debt capacity to the circumstances of the interwar years. We consider the choices available to investors in those foreign loans that lapsed into default in the 1930s, emphasizing the distinction between creditor banks and bondholders. Finally, we provide the first estimates of the realized rate of return on foreign loans floated between the wars, based on a sample of dollar and sterling bonds issued in the 1920s.

International Capital Mobility and Crowding Out in the U.S. Economy: Imperfect Integration of Financial Markets or of Goods Markets?

Jeffrey A. Frankel
Working Paper No. 1773
December 1985
JEL Nos. 440, 441

Conventional wisdom in the field of international finance holds that the U.S. economy has become so open financially that it may be characterized by perfect capital mobility: a highly elastic supply of foreign capital prevents the domestic rate of return from rising significantly above the world rate of return. This view has been challenged recently by the observation that investment rates are highly correlated with national saving rates, and also by the claim by Feldstein and Horioka that this correlation is evidence of relatively low capital mobility.

The premise of this paper is that the Feldstein-Horioka finding regarding crowding out in an open economy is strong enough to survive the econometric critiques that have been leveled against it, but that it need have nothing to do with the degree of capital mobility in the sense of the openness of financial markets and the equalization of international interest rates expressed in a common currency. It is *real* interest rates that matter for questions of crowding out, and real interest parity requires not just that nominal interest rates be equalized expressed in a common currency, but also that purchasing power parity hold. It is well known that purchasing power parity does not hold in fact. Currently, for example, the dollar is expected to depreciate in real terms. Thus real interest rate parity fails and crowding out takes place *because of imperfect integration of goods markets, not imperfect integration of financial markets.*

New Estimates of Federal Government Tangible Capital and Net Investment

Michael J. Boskin, Marc S. Robinson, and John M. Roberts
Working Paper No. 1774
December 1985
JEL No. 320

Government capital formation involves a number of important issues for our national well-being but the United States, unlike most advanced countries, does not account for capital in its formal budget documents. In this paper, we estimate depreciation of government capital using a methodology developed by Hulten and Wykoff that is based on price data for used assets. We estimate a net nonresidential capital stock of the federal government of over \$800 billion in 1984, more than 20 percent higher than the estimate of the Bureau of Economic Analysis (BEA). We also find much larger net federal investment since World War II than the BEA did. Further, we examine the behavior of military and civilian structures and equipment. Finally, we analyze the potential importance of these results for measuring the net national savings rate, national wealth, the trend in government capital formation relative to private capital formation, and the relationship between net investment and deficits.

Should Social Security Be Means Tested?

Martin Feldstein
Working Paper No. 1775
December 1985
JEL Nos. 320, 915

Providing Social Security benefits to retirees distorts the saving decisions of workers who are rational enough to save for their future. Since the implicit rate of return in an unfunded Social Security program is less than the marginal product of capital, the resulting decline in saving causes a welfare loss. It has been suggested that this welfare loss could be reduced, while leaving protected those who lack the foresight to save adequately for their retirement ("myopes" and "partial myopes"), by replacing the current universal Social Security program with a means-tested program that pays benefits only to those "myopic" individuals who have little or no other retirement income or assets.

This paper evaluates that suggestion using an explicit steady-state welfare comparison of the optimal universal and (optimal) means-tested programs. Relative welfare levels depend on characteristics of the economy (the growth rates of population and real wages, and the productivity of capital) and of the population (the frequency and degree of "myopia" with respect to saving for retirement).

The analysis shows that, although a means-tested program is generally superior, it is not always better than the optimal universal program. A universal program may be preferable if the optimal means-tested program would induce rational savers to stop saving. The analysis also implies that overall welfare can be increased by using different Social Security programs for different groups of workers; the working population as a whole would have to be divided into two or more subgroups with different mixes of "myopes," "partial myopes," and rational life-cycle savers.

Has Cost Containment Gone Too Far?

Victor R. Fuchs

Working Paper No. 1776

December 1985

JEL No. 913

Current strategies for cost containment in health care undoubtedly will result in fewer health services for patients. This paper shows how the effects of reduced service on health and on social welfare depend both upon the amount and distribution of services (relative to potential benefit) that existed prior to cost containment and on the size and selectivity of the reductions. Disagreement over whether cost containment has already gone too far arises from disagreements about the criteria for health services (health or social welfare), their prior distribution, and how selective reductions in services will be. In the long run, selectivity will be the key to successful cost containment.

Causes of Appreciation and Volatility of the Dollar

William H. Branson and Jacob A. Frenkel

Working Paper No. 1777

December 1985

JEL No. 430

In 1981, real interest rates in the United States increased spectacularly and the dollar appreciated in real terms by about 20 percent. Since the end of 1981, long-term real interest rates have remained in the range of 5-10 percent, with nominal long-term rates above short-term rates. The dollar appreciated further, but more gradually, until early 1985. This paper argues that these movements in real interest rates and the real exchange rate were caused by the shift in the high-employment deficit of some \$200 billion that was announced in the 1981 budget program. This deficit required an increase in real interest rates and a real appreciation to generate enough excess domestic saving

and foreign borrowing to finance it. The argument is a straightforward extension to an open economy of the idea of "crowding out" at full employment.

The current situation is not sustainable, however. Eventually, international investors will begin to resist further absorption of dollars into their portfolios, so U.S. interest rates will have to rise further, as the markets seem to expect, and the dollar will have to depreciate. This will continue until the current account is back in approximate balance, and the entire load of deficit financing is shifted to excess U.S. saving.

In his comments on Branson's paper, Jacob A. Frenkel discusses additional factors that have contributed to the evolution of the dollar since 1980. He concludes that, in addition to U.S. fiscal policies, monetary policy in the United States and the fiscal position of the United Kingdom, West Germany, and Japan have also contributed to the dollar's strength.

R and D and Productivity Growth: Comparing Japanese and U.S. Manufacturing Firms

Zvi Griliches and Jacques Mairesse

Working Paper No. 1778

December 1985

JEL Nos. 226, 621, 631, 123

We compute rates of growth in labor productivity during 1973-80 for samples of individual manufacturing firms in Japan and the United States. We relate these growth rates to differences in the rates of growth in their capital-labor ratios and in their intensities of R and D effort. We find that Japanese firms spent about as much of their own money on R and D, relative to sales, as did similar U.S. firms. Based on econometric analysis of firms that perform R and D, we accept the hypothesis that the contribution of such expenditures to productivity growth was about the same in both countries. Hence the rather large differences between the observed rates of productivity growth in the two countries cannot be explained by differences in either the intensity or the fecundity of such expenditures. We do find two important differences between the two countries that help to explain a significant fraction of the observed differences in productivity but these require an explanation of their own: (1) Japanese firms reduced their employment levels significantly during this period while U.S. firms were increasing theirs. This, by itself, accounts for the doubly fast growth in capital-labor ratio in Japanese manufacturing. (2) The established effect of the growth in the capital-labor ratio on firm productivity is approximately twice as large in Japan as in the United States. The two factors together can account for about half of the observed differences in the average rates of productivity growth between the two countries.

Rational Bubbles in Stock Prices?

Behzad Diba and Herschel I. Grossman

Working Paper No. 1779

December 1985

JEL No. 310

This paper reports empirical tests for the existence of rational bubbles in stock prices. The analysis focuses on a familiar model that defines market fundamentals to be the expected present value of dividends, discounted at a constant rate. It defines rational bubbles as a self-confirming divergence of stock prices from market fundamentals in response to extraneous variables. The tests are based on the theoretical result that, if rational bubbles exist, time series obtained by differencing real stock prices do not have stationary means. Analysis of the data in both the time domain and the frequency domain suggests that the time series of aggregate real stock prices is nonstationary in levels but stationary in first differences. Applications of the time-domain tests to simulated nonstationary time series that would be implied by rational bubbles indicates that the tests have power to detect relevant nonstationarity when it is present. Furthermore, application of the time-domain and frequency-domain tests to the time series of aggregate real dividends also indicates nonstationarity in levels but stationarity in first differences—suggesting that market fundamentals can account for the stationarity properties of real stock prices. These findings imply that rational bubbles do not exist in stock prices. Accordingly, any evidence that stock price fluctuations do not accord with market fundamentals (as specified above) is attributable to misspecification of market fundamentals.

The Dynamic Interaction of Exchange Rates and Trade Flows

William H. Branson

Working Paper No. 1780

December 1985

JEL No. 430

During the fifteen years since 1970, the theory of exchange rate determination has been completely transformed. In the late 1960s, the standard model of the foreign exchange market had supply and demand as stable functions of exports and imports, with the expectation that a floating rate would move gradually with relative price changes. However, the period of floating rates that began in the early 1970s has revealed that exchange rates exhibit the volatility of financial

market prices. This experience, coupled with development of theory, led first to the "monetary" approach to exchange rate determination and then to the "asset market" approach.

The monetary approach to exchange rate determination had essentially one-way causation from money to exchange rates, sometimes via purchasing power parity. The broader asset market approach assumes two-way causation. The exchange rate, in the asset market view, is proximately determined by financial market equilibrium conditions. It, in turn, influences the trade balance and the current account. The latter, in its turn, is the rate of accumulation of national claims on foreigners, and this feeds back into financial market equilibrium. Thus the asset market approach contains a dynamic feedback mechanism in foreign assets and exchange rates. I call this approach a "fundamentals" model of exchange rate dynamics. Recent work on rational expectations adds a layer of expectations to the model. I assume that, following an unexpected disturbance, the market can anticipate where the fundamentals will move the system, and move the exchange rate in anticipation of that fundamentals path.

This paper integrates the traditional elasticities and absorption approaches into the general equilibrium fundamentals model and then adds the expectations layer. I use the model to interpret recent shifts in U.S. fiscal policy and portfolio preferences for the dollar.

The Second Best Theory of Capital Taxation

Martin Feldstein

Working Paper No. 1781

December 1985

JEL No. 323

An important proposition in the theory of efficient taxation is that, if capital income is taxed, all types of capital income should be taxed at the same rate. This conclusion has motivated extensive empirical analysis of the tax rates on different types of capital income. It has also been the basis for a variety of proposals to revise actual tax rules.

This paper emphasizes that the conventional view must be modified in the very common situation in which some capital tax rate is politically constrained to something other than its optimal value: for example, the zero rates on the imputed income on owner-occupied housing. The formal analysis of the paper examines the case in which there are three types of capital income and one of the tax rates is arbitrarily constrained to be zero.

Three general "rule-of-thumb" results emerge from the specific analysis: First, if the several types of capital can be regarded as independent in production, the optimal tax rates on the taxable types of capital income should depart from equality in the direction of an inverse elasticity rule. Second, in comparison to these rates, capital that is a complement to the untaxed capital should generally be taxed more heavily, while capital that is a substitute for the untaxed capital should be taxed less heavily. Third, variations in the degree of complementarity or substitutability between the two types of capital should alter the two tax rates in a way that maintains a constant difference in the total taxes on each type of capital.

Although these rule-of-thumb results help to modify the conventional equal-tax-rates rule in an appropriate way, the most important implication of my analysis is that any departure from optimal taxation makes it very difficult to set other capital tax rates optimally.

The Crime Rate and the Condition of the Labor Market: A Vector Autoregressive Model

Tadashi Yamada

Working Paper No. 1782

December 1985

JEL No. 916

Few empirical studies of the economics of crime have doubted the deterrent effects of legal sanctions on crime. Those studies, however, have not established a definitive understanding of the effects of labor market conditions on crime. In this paper, I examine the impact of labor market conditions, represented by either male civilian unemployment or labor force participation rates, on seven major categories of crime, using the quarterly crime rate data for the United States.

Based on an analysis of the reported rates for murder, forcible rape, robbery, aggravated assault, burglary, larceny-robbery, and motor vehicle theft from the first quarter of 1970 through the fourth quarter of 1983, I reject the hypothesis that labor market conditions have no effect on the crime rate. Rather, I find that male civilian unemployment rates, especially for those age 25 and over, are strongly and positively associated with most of the crime rates studied. I also find the male civilian labor force participation rates to be related to the crime rates considered here. Youth labor force participation rates for both whites and nonwhites, age 16 to 19, are more strongly associated with the examined crime rates than are the labor force participation rates for males, age 20 and over.

A Multinomial Logistic Approach to the Labor Force Behavior of Japanese Married Women

**Tadashi Yamada, Tetsuji Yamada,
and Frank Chaloupka**

Working Paper No. 1783

December 1985

JEL No. 810

Using a multinomial logistic approach, we analyze the interdependencies among the labor force participation decisions of married women in Japan. These decisions are: working part time, working full time, being unemployed (in the labor market but unable to find work), and not participating. Our focus is on the interdependency between the decision to work part time and the decision to work full time. Our results indicate that married women who work full time view part-time work as a good substitute, but we did not observe the reverse. We also obtain estimates of the own-wage elasticity for both forms of participation and find that part-time labor force participation of Japanese married women is substantially more elastic than that of their full-time counterparts. These findings reinforce the view that married women in Japan who have loose ties to the labor market are quite responsive to changes in the returns to work.

Expected Fiscal Policy and the Recession of 1982

**William H. Branson, Arminio Fraga,
and Robert A. Johnson**

Working Paper No. 1784

December 1985

JEL Nos. 430, 431

The Economic Recovery Tax Act of 1981 had one aspect that is unusually useful for economic analysis. It provided an example of a clear-cut announcement of future policy actions at specified dates. This provides an opportunity to apply recent advances in the analysis of expectations dynamics to data that have been generated in an environment that includes such announced and anticipated policy action.

A three-stage future tax cut was announced in the tax bill in March 1981. In a Keynesian model with liquidity-constrained consumers or investors, or with uncertainty, this would normally be expected to provide a stimulus to the economy when the tax cuts actually appear. But the financial markets could look ahead to

the stimulus and the shift in the high-employment deficit brought about by the tax cuts, and their implications for bond prices and interest rates. In this paper we argue that this happened during the first half of 1981. As market participants came to understand that the tax and budget actions of March 1981 implied a *future* shift of the high-employment—now “structural”—deficit by some 5 percent of GNP, they revised their expectations of future real interest rates upward. This caused a jump in real long-term rates then, in 1981. It also caused a sudden and unanticipated real appreciation of the dollar at the same time. The jump in real long-term interest rates and the dollar appreciation in the first half of 1981 were essential features of the recession that began in July 1981.

This paper points out the *possibility* of a purely anticipatory recession. If the only policy action had been the fiscal announcement, and if goods markets are “Keynesian” but financial markets are forward looking, the announcement can cause a recession, which will end when the actual fiscal action begins to stimulate the economy. In the actual context of 1981, a shift toward monetary tightness also contributed to the recession.

The Relation between Price and Marginal Cost in U.S. Industry

Robert E. Hall

Working Paper No. 1785

January 1986

JEL Nos. 227, 611, 825, 226

An examination of data on labor input and the quantity of output reveals that most U.S. industries have marginal costs far below their prices. The conclusion rests on the empirical finding that cyclical variations in labor input are small compared to variations in output. In booms, firms produce substantially more output and sell it for a price that exceeds the costs of the added inputs. This paper documents the disparity between price and marginal cost, where marginal cost is estimated from variations in cost from one year to the next. It considers a wide variety of explanations of the findings that are consistent with competition, but none is found to be plausible.

The Allocation of Credit and Financial Collapse

N. Gregory Mankiw

Working Paper No. 1786

January 1986

JEL Nos. 130, 310

This paper examines the allocation of credit in a market in which borrowers have greater information concerning their own riskiness than do lenders. It illustrates that: (1) the allocation of credit is inefficient and at times can be improved by government intervention; and (2) small changes in the exogenous risk-free interest rate can cause large (discontinuous) changes in the allocation of credit and the efficiency of the market equilibrium. These conclusions suggest a role for government as the lender of last resort.

Monopolistic Competition, Relative Prices, and Output Adjustment in the Open Economy

Joshua Aizenman

Working Paper No. 1787

January 1986

The purpose of this paper is to explain price and output dynamics in an open economy characterized by a monopolistic competitive market structure in which pricing decisions incur costs. That leads producers to preset the price path for several periods. The paper derives an optimal pricing rule, including the optimal pre-setting horizon. It does so for a rational expectations equilibrium, characterized by staggered, unsynchronized price setting, for which the degree of staggering is endogenously determined. The discussion focuses on the critical role of the degree of substitutability between domestic and foreign goods in explaining price and output effects of monetary and real shocks.

The Equity Premium and the Concentration of Aggregate Shocks

N. Gregory Mankiw

Working Paper No. 1788

January 1986

JEL Nos. 130, 310

This paper examines an economy in which aggregate shocks are not dispersed equally throughout the population. Instead, while these shocks affect all individuals *ex ante*, they are concentrated *ex post* among a few. The equity premium in general depends on the concentration of these aggregate shocks; it follows that one cannot estimate the degree of risk aversion from aggregate data alone. These findings suggest that the empirical usefulness of aggregation theorems for capital asset pricing models is limited.

Long-Term Behavior of Yield Curves

Charles R. Nelson and Andrew F. Siegel

Working Paper No. 1789

January 1986

JEL No. 313

The flattening of yield curves at long-term maturities under general conditions is approximately proportional to the reciprocal of the time to maturity. This is because earlier forward rates persist in the averaging process that produces yields from forward rates. Therefore, a "reciprocal maturity yield curve" would significantly facilitate the interpretation of the behavior of long-term yields by making them linear for display over a shorter interval. We illustrate this using a yield curve for U.S. Treasury bills.

U.S. Budget Deficits and the European Economies: Resolving the Political Economy Puzzle

Martin Feldstein

Working Paper No. 1790

January 1986

JEL No. 300

This paper discusses how increases in U.S. budget deficits since 1980 have affected the economies of West-

ern Europe. The analysis emphasizes that U.S. deficits have not only affected these economies directly but have also induced them to adopt more restrictive monetary and fiscal policies that they would have chosen otherwise. This induced shift in domestic policies is the primary reason why European governments have pressed for a reduction in U.S. budget deficits despite the favorable impact of those deficits on European trade surpluses.

The Effect of Federal Deductibility on State and Local Taxes and Spending

Martin Feldstein and Gilbert Metcalf

Working Paper No. 1791

January 1986

JEL No. 324

This paper examines the effect of federal deductibility of state and local taxes on the fiscal behavior of state and local governments. The primary finding is that deductibility affects the way that state-local governments finance their spending as well as the overall level of spending. More specifically, in states where federal deductibility implies a relatively low cost of using deductible personal taxes (including income, sales, and property taxes), there is greater reliance on those taxes and less reliance on business taxes and other revenue sources.

The effect of deductibility on the state-local financial mix implies that deductibility has a much lower cost to the federal government than has previously been assumed. Indeed, if deductibility causes a large enough shift of financing from business taxes to personal taxes, deductibility may actually raise federal tax receipts. The analysis also implies that deductibility is likely to be a more cost-effective way than direct grants for raising the general level of state-local government spending.

This study uses the individual tax return data in the NBER TAXSIM model to calculate federal tax prices for itemizers and other taxpayers in each state. The econometric analysis recognizes that the federal tax price is endogenous (because it reflects the state-local spending decisions) and therefore uses a consistent instrumental variable procedure. This use of instrumental variable estimation exacerbates the difficulty of making precise estimates from the data. The relatively large standard errors indicate the need for caution in interpreting the point estimates.

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