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Program Report

Economic Fluctuations

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The research activities of the NBER's Program on Economic Fluctuations are arranged through a number of small working groups as well as in individual projects. This report surveys the activities of the working groups and highlights several studies presented at the program's major research meetings.

Another important responsibility of the program is the preparation of the Bureau's business cycle chronology, a function carried out by the seven-member Business Cycle Dating Committee.

The 1990 Business Cycle Peak

The Business Cycle Dating Committee conferred twice in the past year. In December 1990, the committee reviewed the evidence on the decline in real activity in the U.S. economy starting during the previous summer. At that time, the committee concluded that the economy probably had reached a peak at some point in the summer, but there was insufficient evidence of a deep enough contraction to enter the peak into the NBER's chronology. In other words, the committee's opinion was that the economy probably was in a recession, but the evidence was not strong enough to make a definitive pronouncement.

Traditionally, the NBER has not made an announcement on a business cycle peak or trough until there was almost no doubt that the date would not be revised in the light of subsequent availability of data. A number of previous episodes have challenged the Bureau's dating process. In 1967, the economy paused dramatically during a period of otherwise strong growth. Many economists considered the period a recession. But the Bureau concluded that the depth of the decline of the economy was considerably less than its standard for a recession.

In This Issue

Program Report: Economic Fluctuations	1
Research Summaries	
Economic Reform in Eastern Europe and the U.S.S.R.	4
Macroeconomics in Disarray	6
Labor Market Institutions in Developed Countries	11
NBER Profiles	12
Conferences	13
Conference Calendar	25
Bureau News	26
Bureau Books	31
Current Working Papers	32

This issue of the *Reporter* highlights the Bureau's Program on Economic Fluctuations. Next, Stanley Fischer, N. Gregory Mankiw, and Richard B. Freeman summarize their presentations at the NBER's Annual Research Conference. After 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.

In 1973 and 1974, the economy stopped growing and real activity remained almost constant. In late 1974, real activity plunged and the economy entered what was then the most severe contraction since the Great Depression. The Bureau placed the peak of the cycle in November 1973, following the principle that once an episode is identified as a recession, the peak is when real activity reached its peak, even if the sharp plunge characteristic of a recession occurs many months later.

The recession of 1980 presented a rather different challenge. Real activity rebounded strongly from the trough in July 1980, but began contracting again in mid-1981. Was 1980 a separate recession, or was it part of the beginning of the severe recession of 1981-2?

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The committee concluded that 1980 truly was a separate recession, because real activity reached a level at the next peak, July 1981, above its level of the previous peak, January 1980. The committee has reviewed all three of these decisions well after the fact, and has concluded that the original decisions were correct.

In April, the committee had additional data showing that real activity had contracted sharply at the end of 1990. Earlier doubts about the depth of the contraction were resolved. The monthly series considered most seriously by the committee were total employment, real manufacturing and trade sales, industrial production, and real personal income. All of these series turned down during the summer and showed sufficiently large contractions by early 1991 to meet the committee's criterion for depth. The indicators reached peaks in different months, with employment peaking first and industrial production last. The committee selected July 1990 as the overall peak in real activity.

As this report is being written, there are indications that the economy may have passed the trough of activity and may have entered the recovery phase of the business cycle. Consistent with its earlier practices, the committee will wait until the recovery is fully evident in the data before entering a date for the trough into the chronology.

Research Meetings

The program holds research meetings in February in Palo Alto, in July at the Bureau's Summer Institute in Cambridge, and in October in Cambridge. The papers discussed at research meetings are at an intermediate stage of development, roughly at the point of distribution as NBER Working Papers.

At the research meeting in July 1989, organized by Andrei Shleifer and Lawrence H. Summers, Steven Davis and John C. Haltiwanger presented the first results of a major research project that has attracted a great deal of subsequent attention. Davis and Haltiwanger carry out their research within the Bureau of the Census, where they have access to data on employment by firm. Confidentiality requirements prohibit the distribution of the data to outside researchers. The authors have examined the ways that employment rises and falls at the plant level over the business cycle. They find that the sharp decline in employment that occurs during a recession is the result of large drops in employment at a minority of firms. Many firms continue to expand employment at normal rates during recessions. One implication of their findings is that many more workers move through the labor market during contractions than during booms.

At the same meeting, Lawrence Ausubel, an industrial organization economist, presented a challenging paper on the profitability of the credit card business. He found that competition has not depressed the profit on an incremental credit card customer at a bank; on the contrary, credit card accounts change hands among banks at a considerable premium over the amount owed

by the customer. His results are important for macroeconomists who need to choose between strictly competitive models of financial markets and those with information limitations and other departures from the competitive model.

At the research meeting in February 1990, Joseph G. Altonji, Fumio Hayashi, and Laurence J. Kotlikoff discussed the association between the consumption levels of related households. According to a famous hypothesis advanced by Robert J. Barro, related families may make transfers between themselves to offset misfortunes in one family or windfalls in another. If so, only the joint income of two related families should matter for the consumption of either family—the family's own income should have no influence beyond that of joint income. Altonji, Hayashi, and Kotlikoff test this implication and reject it strongly.

The program's research meeting in July 1990, organized by Russell Cooper and Steven N. Durlauf, featured papers on complementarities. Research in this area of macroeconomics pursues the idea that positive interactions among firms or other economic units can amplify the effects of external driving forces. Macroeconomists starting with Keynes have looked for amplification mechanisms, because the driving forces seem weak in comparison to the strength of the business cycle. A paper by Marianne Baxter and Robert G. King showed that within the type of business cycle model pioneered by Edward Prescott, the introduction of complementarities can resolve some of the failures of earlier models to reproduce the actual behavior of the U.S. economy.

At the research meeting in October 1990, Robert B. Barsky and Elizabeth Warner discussed research on retail pricing over the seasonal cycle. Their work pursues the idea developed by Jeffrey A. Miron and others, including Barsky, that there is a useful analogy between seasonal cycles and business cycles. Many of the same features of the movements of important variables over the business cycle also show in the seasonal cycle. One of these is the lack of cyclical movements in prices, in the presence of large changes in demand over both the seasonal cycle and the business cycle. Barsky and Warner examine the behavior of the prices of about two dozen products that are popular Christmas presents, from the beginning of the shopping season in mid-November until the conclusion of the post-Christmas season in January. They find little tendency for the prices of standardized products, such as consumer electronics, to rise during the period of high demand or to fall in January. The phenomenon of sales is important in their findings: sales are most common on the Friday after Thanksgiving, but remain important throughout the Christmas season. (Barsky and Warner were motivated to examine this issue by an interchange between two participants in the program's research meeting in July 1987.)

In February 1991, Jess Benhabib, Richard Rogerson, and Randall Wright presented an analysis of labor supply with a focus on changes in the level of employ-

ment over the business cycle. The traditional view of labor supply sees the worker dividing time between the labor market and nonwork activities, often called leisure. These authors look at the problem in a different way. They picture the individual as deciding between work in the market and work at home. The analysis leads to the conclusion that market work is more likely to be volatile when the alternative activity is work at home rather than leisure.

In the past decade, macroeconomists have given little attention to the important topic of the effect of monetary policy on real economic activity. Many of the models considered at research meetings of the Program on Economic Fluctuations imply that monetary policy has little or no influence on output or employment, while at the same time most of the participants believe that monetary policy in the actual U.S. economy is a major influence on these variables. Two of the papers scheduled for the program's July 1991 meeting, one by King and one by Lawrence J. Christiano and Martin S. Eichenbaum, make up for this neglect.

Research Groups

Much of the activity of the economic fluctuations program occurs in its research groups. A typical group has about 10 members and meets twice a year, once at the Summer Institute and once during the academic year, sometimes in conjunction with a research meeting. A group is created and convened by an organizer or a pair of coorganizers. Groups tend to be focused on relatively narrow research topics of current interest and usually last about two or three years. Some group members are affiliated with the NBER but many others are not. Groups often include advanced graduate students and new faculty members.

Cooper is the organizer of the oldest active group in the program, dating from 1986 and dealing with issues of macroeconomic complementarities. The current research topics in his group include overhead costs and economic fluctuations (Mohamad Hammour), growth and unemployment (Peter Howitt), international currency (Nobuhiro Kiyotaki), and business cycles in a model with multiple steady states (Peter Klenow).

This year Ricardo J. Caballero and Andrew Caplin have created a new group on nonconvexities in macroeconomics. The common idea in this research is that fixed costs and increasing returns can help explain certain macroeconomic phenomena not explained by the standard neoclassical model with constant returns. Caballero, and also Janice Eberly, are studying consumer purchases of durables. The nonconvexity in durables arises because of their "lumpiness." A family cannot buy a fraction of a car when it needs more transportation. Caballero's model, which carefully aggregates individual decisions about the purchase of lumpy durables, shows us why modern models of aggregate consumption fail to account for the time-series properties of durables purchases. Eberly has developed methods for dealing with nonconvexities in studying micro-

data on durables purchases from individual families. Boyan Jovanovic is studying the Great Depression with the framework of models with nonconvexities in which a low-level equilibrium is possible. Roland Benabou is developing models of urban development—where transportation costs create a nonconvexity—and thus pursuing the analogy between the agglomeration of economic activity in space and its agglomeration in time (the business cycle).

Since 1989, Christiano and Eichenbaum have been in charge of a research group on impulses and propagation mechanisms. As part of his role in the group, Eichenbaum has been working on labor hoarding over the business cycle. John Donaldson has been considering whether aggregate fluctuations can be caused by random shocks hitting individual sectors of the economy. Anton Braun and Charles Evans have been investigating the relationship between seasonal and cyclical activity within real business cycle or equilibrium macro models. Also within this group, King has developed his work on money and the business cycle.

Davis has organized a group on labor market dynamics and aggregate fluctuations. Within the group, Jeremy Greenwood, Rogerson, and Wright are studying housing and durables in a real business cycle model. Harry J. Holzer is analyzing data on job vacancies at the firm level. Tito Boeri, pursuing ideas developed by Davis and Haltiwanger, is using data on employment changes for firms in Germany. Ana Aizcorbe is studying cyclical labor issues, including productivity and labor hoarding, in the U.S. auto business.

Frank Diebold and Durlauf lead a group on common elements of growth and fluctuations. Research in this group pursues the idea that growth and fluctuations involve similar mechanisms. A recession is, in effect, a time when the economy becomes a little less developed. Much of the work in the group focuses on measurement and econometric issues. Danny Quah and Thomas J. Sargent are working on time-series models that study many countries simultaneously. Paul Johnson is studying the time-series implications of the basic Solow growth model. Andrew Bernard and Durlauf have created a statistical framework for testing the idea of convergence—that differences in income per capita among countries tend to disappear over time. Kenneth D. West is studying Japanese monetary policy within a growth-and-cycles framework. Jordi Gali and Hamour are considering the long-run effects of business cycles.

Louis Maccini and Valerie Ramey have just organized a group on inventories. The swing in inventory investment is well known to be the dominant change in the components of GNP during a recession—typically, the decline in GNP from peak to trough is of about the same magnitude as the reduction in inventory investment. Timothy F. Bresnahan and Ramey are looking at plant-level data in the auto industry in order to understand this process better. Durlauf and Maccini are looking at the large amount of unexplained movement in inventories; this noise in inventory investment appears

to be an important driving force in the business cycle. West is continuing his research on inventories by looking at the Japanese case. James A. Kahn is using inventory behavior to make inferences about cost conditions. Barsky, Miron, Stephen G. Cecchetti, Anil Kashyap, David Wilcox, Cooper, and Haltiwanger are all studying the various aspects of seasonal movements of the economy as they influence inventory accumulation.

For the past year, Rogerson and Wright have been responsible for a research group on micro and macro perspectives on the aggregate labor market. The group brings together labor economists and macroeconomists. John Kennan is carrying out research on wage setting when there is private information. Kenneth Burdett, Wright, and Eric Smith are considering various aspects of job search models. Davis and Haltiwanger are doing research on the determinants of the cyclical job flows revealed in their earlier research. Gary Hansen and Sargent are studying variations over time in straight time and overtime employment.

Related Activities

The NBER's overall research includes several activities related to the Program on Economic Fluctuations. These include the International Seminar on Macroeconomics, arranged by Robert J. Gordon and Georges de Mènil, the Macroeconomics Annual Conference organized by Stanley Fischer and Olivier J. Blanchard, and the Macroeconomic History Workshop under the direction of N. Gregory Mankiw and Christina D. Romer. Separate reports on these activities appear in this and other issues of the *NBER Reporter*.

Research Summaries

The following articles summarize the three presentations made at the NBER's Annual Research Conference in New York on May 13.

Annual Research Conference—I: **Economic Reform in Eastern Europe and the U.S.S.R.**

Stanley Fischer

The NBER's research on economic reform in Eastern Europe and the U.S.S.R. is part of its overall project

on "The Economics of National Security." Research Associate Olivier J. Blanchard of MIT directs the work on the macroeconomics of stabilization, while Research Associates Kenneth A. Froot of MIT and Jeffrey D. Sachs of Harvard oversee the research on the structural elements of economic reform.

There are no historical examples of economic reform as broad and rapid as what is now envisaged in Eastern Europe. In analyzing the reform processes there and in the Soviet Union, we have had to draw on both theory and the partial reform experiences of other economies. The extent to which simple theory—for example, supply and demand analysis, and intermediate macroeconomics—can illuminate the experiences of the formerly socialist East European economies is impressive. The precedents come from reform attempts in the developing countries, from the reform programs in China, Hungary, and Yugoslavia, and from the industrialized economies, including Britain with its privatization program. However, there is always the question of whether different methods are needed for systemwide reform—such as the privatization of all industry—than for more modest reforms that have been attempted within a market economy.

Now, roughly two years after serious systemwide reforms became a realistic prospect, the early and tentative lessons are beginning to come in.

The Problem

The problem in all the reforming countries is how to transform into a modern western market economy an economy with massive, and sometimes near total, state ownership, which relies to a considerable extent on central planning and pursues international trade on a quasi-barter basis at prices that differ grossly from those in the rest of the world. The social cost must be as low as possible. While there has been much discussion of which is the best western model, the formerly socialist economies have a way to go before having to choose the West German, or the U.S., or some other model.

The reforming economies started from different points. Some, such as Hungary and Yugoslavia, were significantly decentralized; the extent of public ownership differed; and some, such as Poland and the Soviet Union, had developed massive macroeconomic imbalances, visible in large budget deficits and inflation. These differences affect their reform strategies.

The Challenge

Two years ago, the reform process posed several key policy and intellectual challenges: 1) How to shift from a severely distorted price system to a reasonably rational one. 2) How to create functioning markets to replace the planning system. 3) How to privatize. 4) Would it be possible to use the usual macroeconomic methods to stabilize socialist economies? 5) Does re-

form have to await the creation of a viable banking system? 6) How rapidly can reforms take place?

Tentative Answers

Price Reform

The rational price system for a country that wants to integrate into the world economy is world (relative) prices. World prices can be imported through a convertible currency, with low and uniform tariffs. With current account convertibility, imports are available at world prices, and exporters can earn world prices for their products. Then, given the exchange rate, international competition forces domestic producers to sell at world prices and, by allowing domestic producers to sell abroad, ensures that goods will not be sold in the domestic market below world prices.

Thus, price reform does not require an elaborate process of decontrol in which economic policymakers try to guide prices to the proper levels—the process can be left to the international markets. The early evidence also suggests that price reform can take place rapidly. Convertibility can be put in place at the start of the reform process, as it was in Poland, at an exchange rate that is consistent with balance-of-payments equilibrium. And, most domestic prices also can be freed up at the start of the reform program.

Of course, there are some qualifications. Not all goods are traded internationally. In those cases, domestic prices can be expected to reach rational levels through competition. Public utilities and other quasi-natural monopolies usually have regulated prices, even in market economies. Finally, for certain basic inputs whose prices are far from world levels, such as energy in most of the reforming economies, a very rapid transition to world prices could produce widespread bankruptcies, thereby complicating the reform process. Moving the prices of such goods to world levels gradually, over a sufficiently short period (say two to three years) that there is no question that the shift will take place, might soften the shock.

The Creation of Markets

Markets are not created independently of price reform. They emerge as prices that are freed to move and guide the allocation of resources. Privatization of transportation (for example, by selling state-owned trucks) and retail trade is likely to contribute to the efficiency of the markets through which food and other commodities are sold.

Ownership Transformation

Privatization is at the heart of the transformation process. A similar basic strategy is being followed in all countries: to privatize the smallest firms, such as restaurants and small retail shops, very rapidly, typically through sale or lease to employees, but to proceed more slowly with larger firms. In most countries, small- and medium-scale enterprises are being privatized on a pragmatic and eclectic basis, with current employees

proposing schemes that are approved by a state property agency. These may involve sales to foreigners, or to the employees, or to any other purchaser.

There are two approaches to the privatization of the largest industrial firms, which account for over half of industrial output. There are 500 such firms in Poland, and 5000 in the Soviet Union. Voucher schemes, which will make it possible for citizens to buy shares in firms or in mutual funds, are being implemented in Poland and Czechoslovakia. The vouchers are distributed to citizens, who then can use them to buy shares. An alternative approach is being followed in Hungary, where the view is that property should not be given away. Accordingly, all firms will be sold for money, rather than vouchers. This has the advantage of raising revenue, either for firms or the state; the voucher schemes, when implemented, will result in large-scale and rapid change of ownership.

Macroeconomic Stabilization

Before the stabilization programs in Eastern Europe, it was sometimes argued that the labor-managed firms would not react in the usual way to tightening fiscal and monetary policy. However, balanced budgets and tight credit *do* reduce demand and can slow inflation. Because money markets are absent, though, direct credit targets for individual banks are needed to control the overall growth of credit.

Macroeconomic stabilization generally has involved three additional elements. First, a fixed exchange rate provides a nominal anchor for the price level. Second, because unemployment was unknown in the socialist economies, an emergency social safety net has been put in place to deal with workers who become unemployed during the reform process. Third, because worker-owners may permit excessive wage increases, countries have imposed taxes on wage increases above some norm. There is a trade-off between the needs of stabilization and those of the efficient allocation of labor, which has to await privatization anyway.

The Role of Banks

Most banks in the reforming economies are bankrupt. Bankrupt and near-bankrupt banks tend to take excessive risks, so balance sheets will need restructuring before banks will be able to finance industry successfully. Restructuring is a time-consuming process, particularly where the economy is in a state of flux. Therefore, the question of how firms are to be financed in the interim arises. New, well-capitalized banks, including foreign banks, could contribute to the financing of industry; so could separate, private sector departments within existing banks. The implementation of reform does not have to await the development of a viable banking system, but the absence of banks and financing will make the process more difficult.

The reforming countries all are fascinated by the development of stock exchanges and other more sophisticated financial markets. While stock exchanges will have a role in privatization schemes, they cannot be expected to play a big part in allocating resources

until more information about emerging firms becomes available.

The Speed of Reform

In Eastern Europe, especially in Poland, changes have been put in place remarkably rapidly. The implementation of the reforms that have already been put in place will take many years. But one recent lesson is that rapid decisions on reform on several broad fronts can be taken, and put into law, far more quickly than was generally believed two years ago.

While it is still too early to appraise the costs of the reform process, it is essential in considering those costs to ask, "Compared to what?" The choice to reform has been made; the next choice is the pace of reform. The appropriate question is whether gradual and partial reforms would have been less costly than rapid, comprehensive reforms. We do not know the answer definitively, but the evidence points increasingly in the direction of more rapid and comprehensive reforms.

Annual Research Conference—II: **Macroeconomics in Disarray**

N. Gregory Mankiw¹

The basic questions of macroeconomics are: "What causes output and employment to fluctuate?" and "How should monetary and fiscal policymakers respond to these fluctuations?" As we sit here in the midst of the first recession in about a decade, these questions seem all the more pressing. Yet the sad truth is that we don't have answers to these questions that would command anything like a consensus among macroeconomists. In fact, one can fairly say that academic macroeconomics is in a state of disarray. I'd like to discuss this disarray among my colleagues and me, and the progress—and in some cases perhaps regress—that we've made in the past 20 years in answering these questions.

It was easier being a student of macroeconomics 20 years ago. At that time, there was more agreement among macroeconomists about how the world works. At the textbook level, the accepted model of the economy was the IS-LM model—a theory that unified both Keynesian and monetarist views of the economy. Most economists used a Phillips curve of some sort to explain the adjustment of prices. There was disagreement about whether the trade-off between inflation and unemployment held only in the short run or also in the long run, and how long it took to reach the long run. But these disagreements seem relatively small from today's vantage point.

¹This presentation is based on N. G. Mankiw, "A Quick Refresher Course in Macroeconomics," NBER Reprint No. 1528, March 1991, and *Journal of Economic Literature* 28 (December 1990), pp. 1645-1660.

At the more applied level, this consensus of 20 years ago was embodied in the large-scale macroeconomic models, such as the MPS model and the DRI model. The job of refining these models generated many dissertations. Private and public decisionmakers confidently used the models for forecasting and for evaluating alternative economic policies.

Today, macroeconomists are much less sure of themselves. Graduate courses in macroeconomics, such as the one I teach at Harvard, hardly resemble those taught 20 years ago. The large-scale macroeconomic models are mentioned only occasionally at academic conferences; when they are mentioned, it is often with derision. A graduate student today is unlikely to devote his dissertation to improving the MPS model.

In contrast to this radical change in the way academic macroeconomists view their field of study, applied macroeconomists have not substantially changed the way they analyze the economy. The textbook IS-LM model, augmented by the Phillips curve, continues to provide the best way to interpret discussions of economic policy in the press and among policymakers. From my own experiences at the Congressional Budget Office and the Council of Economic Advisers, I know that economists in government continue to use the large-scale macroeconomic models for forecasting and policy analysis. The theoretical developments of the past 20 years have had relatively little impact on applied macroeconomics.

Why is there such a great disparity between academic and applied macroeconomics? The view of some academics is that practitioners have simply fallen behind the state of the art, that they continue to use obsolete models because they have not kept up with the quickly advancing field. Yet this self-serving view is suspect, for it violates a fundamental property of economic equilibrium: it assumes that a profit opportunity remains unexploited. If recent developments in macroeconomics were useful for applied work, they would have been adopted. The observation that recent developments have had little impact on applied macroeconomics creates at least the presumption that these developments are of little use to applied economists.

One might be tempted to conclude that, because the macroeconomic research of the past 20 years has had little impact on applied economists, the research has no value. Yet this conclusion also is unwarranted. The past 20 years have been a fertile time for macroeconomics. Recent developments have just not been the sort that can be adopted quickly by applied economists.

A Parable for Macroeconomics

A tale from the history of science is helpful for understanding the current state of macroeconomics. Approximately five centuries ago, Nicholas Copernicus suggested that the sun, rather than the earth, is the center of the planetary system. At the time, he mistakenly thought that the planets followed circular orbits; we now know that these orbits are actually elliptical.

Compared to the then prevailing geocentric system of Ptolemy, the original Copernican system was more elegant and, ultimately, it proved more useful. But at the time it was proposed and for many years thereafter, the Copernican system did not work as well as the Ptolemaic system. For predicting the positions of the planets, the Ptolemaic system was superior.

Now imagine yourself, alternatively, as an academic astronomer and as an applied astronomer when Copernicus first published. If you had been an academic astronomer, you would have devoted your research to improving the Copernican system. The Copernican system held out the greater promise for understanding the movements of the planets in a simple and intellectually satisfying way.

Yet if you had been an applied astronomer, you would have continued to use the Ptolemaic system. It would have been foolhardy to navigate your ship by the more promising yet less accurate Copernican system. Given the state of knowledge immediately after Copernicus, a functional separation between academic and applied astronomers was reasonable and, indeed, optimal.

I would like to discuss three recent developments in macroeconomics. My goal is not to proselytize. Rather, it is to show how these developments point the way toward a better understanding of the economy, just as Copernicus's suggestion of the heliocentric system pointed the way toward a better understanding of planetary motion. Yet, just as Copernicus did not see his vision fully realized in his lifetime, we should not expect these recent developments, no matter how promising, to be of great practical use in the near future. In the long run, however, many of these developments—although surely not all of them—will change profoundly the way all economists think about the economy and economic policy.

The Breakdown of the Consensus

Let me begin with a breakdown of the consensus. The consensus in macroeconomics that prevailed until the early 1970s faltered because of two flaws, one empirical and one theoretical. The empirical flaw was that the consensus view could not cope adequately with the rising rates of inflation and unemployment experienced during the 1970s. The theoretical flaw was that the consensus view left a chasm between microeconomic principles and macroeconomic practice that was too great to be intellectually satisfying.

These two flaws came together most dramatically and most profoundly in the famous prediction of Milton Friedman and Edmund Phelps. According to the unadorned Phillips curve, one could achieve and maintain a permanently low level of unemployment merely by tolerating a permanently high level of inflation. Many economists in the 1960s viewed the Phillips curve as a menu of combinations of inflation and unemployment, and they thought policymakers could choose whatever combination they liked. In the late 1960s, when the

consensus view was still in its heyday, Friedman and Phelps argued from microeconomic principles that this empirical relationship between inflation and unemployment would break down if policymakers tried to exploit it. They reasoned that the equilibrium, or natural, rate of unemployment should depend on labor supply, labor demand, optimal search times, and other microeconomic considerations, not on money growth and inflation. Maybe the Fed could choose from a menu of inflation and unemployment in the short run, but in the long run all meals come with the same rate of unemployment. Subsequent events proved Friedman and Phelps correct: inflation rose in the 1970s without a permanent reduction in unemployment.

The breakdown of the Phillips curve predicted by Friedman and Phelps—and the remarkable success of this prediction—made macroeconomics ready for Robert Lucas's more comprehensive attack on the consensus view. Lucas contended that many of the empirical relationships that make up the large-scale macroeconomic models were no better founded on microeconomic principles than was the Phillips curve. In particular, the decisions that determine most macroeconomic variables, such as consumption and investment, depend crucially on expectations of the future course of the economy.

Macroeconometric models treated expectations in a cavalier way, most often by resorting to plausible but arbitrary proxies. Lucas pointed out that most policy interventions change the way individuals form expectations about the future. Yet the proxies for expectations used in these models failed to take account of this change in expectation formation. Lucas concluded, therefore, that these models should not be used to evaluate alternative policies. The "Lucas critique" became the rallying cry for those young turks intent on destroying the consensus. During the 1970s, these young turks led a revolution in macroeconomics that was as bloody as any intellectual revolution can be.

Much of the research in macroeconomics during the past 20 years attempts to rebuild in the rubble that this revolution left. Economists have focused renewed and more intensive effort on placing macroeconomics on a firm microeconomic foundation. Very often, the relevance of the research to current economic problems is sacrificed. To macroeconomic practitioners, much of the research must seem esoteric and useless. Indeed, for practical purposes, it is.

To understand the motivation and goals of the research that many academic economists have undertaken in recent years, it is useful to divide developments in macroeconomics into three broad categories.

One large category of research tries to model *expectations* in a more satisfactory way than was common 20 years ago. More careful attention to the treatment of expectations can often extract new and surprising implications from standard models. The widespread acceptance of the axiom of rational expectations is perhaps the largest single change in macroeconomics in the past two decades.

A second category of research attempts to explain macroeconomic phenomena using *new classical* models. These models maintain the assumption that prices continually adjust to equilibrate supply and demand. Twenty years ago, macroeconomists commonly presumed that a nonmarket-clearing theory of some sort was necessary to explain economic fluctuations. Recent research has shown that market-clearing models have much richer implications than was once thought, and they are not so easily dismissed.

A third category of research attempts to reconstruct macroeconomics using *new Keynesian* models. This last category is most compatible with the consensus view that existed 20 years ago. This research can be viewed as attempting to put textbook Keynesian analysis on a firmer microeconomic foundation.

Expectations and the Case for Policy Rules

Let me start with the widespread acceptance of rational expectations. Economists routinely assume that firms rationally maximize profits, and that consumers rationally maximize utility. It would be an act of schizophrenia not to assume that economic agents act rationally when they form their expectations of the future.

Much of the research in macroeconomics since the breakdown of the consensus has explored the assumption of rational expectations. By itself, the assumption of rational expectations has no empirical implication, just as the assumption of utility maximization has no direct empirical implication. Yet, together with other auxiliary hypotheses, many of which predate the introduction of rational expectations and at the time seemed unobjectionable, the assumption of rational expectations can have profound and startling implications.

Of the many questions that have been reexamined, perhaps the most important is whether public policy should be conducted by rule or by discretion. Various authors have provided new and often persuasive reasons to be skeptical about discretionary policy when the outcome depends on the expectations of private decisionmakers.

The argument against discretion is illustrated most simply in an example involving not economics but politics—specifically, public policy about negotiating with terrorists over the release of hostages. The announced policy of the United States and many other nations is that we will not negotiate over hostages. Such an announcement is intended to deter terrorists: if there is nothing to be gained from kidnapping, rational terrorists won't take hostages. But, in fact, terrorists are rational enough to know that once hostages are taken, the announced policy may have little force, and that the temptation to make some concession to obtain the hostages' release may become overwhelming. The only way to deter truly rational terrorists is somehow to take away the discretion of policymakers and commit them to a rule of never negotiating. If policymakers were truly unable to make concessions, the incentive for terrorists to take hostages would be reduced substantially.

The same problem arises less dramatically in the conduct of monetary policy. Consider the dilemma facing the Federal Reserve. The Fed wants everyone to expect low inflation, so that it will face a favorable trade-off between inflation and unemployment. But an announcement of a policy of low inflation is not credible. Once expectations are formed, the Fed has an incentive to renege on its announcement in order to reduce unemployment. Private economic actors understand the incentive to renege and therefore do not believe the announcement in the first place. Just as a president facing a hostage crisis is sorely tempted to negotiate their release, a Fed with discretion is sorely tempted to inflate to reduce unemployment. And, just as terrorists discount announced policies of never negotiating, private economic actors discount announced policies of low inflation.

The surprising implication of this analysis is that sometimes policymakers can achieve their own goals better by having their discretion taken away from them. In the case of hostages, there will be fewer hostages taken if governments are bound to follow the seemingly harsh rule of abandoning any hostages that are taken. In the case of monetary policy, there will be lower inflation without higher unemployment if the Fed is committed to a policy of zero inflation.

The issue raised here in the context of hostages and monetary policy is more generally called the time inconsistency of optimal policy. It arises in many other contexts. For example, the government may announce that it will not tax capital in order to encourage accumulation; but once the capital is in place, the government may be tempted to renege on its promise because the taxation of existing capital is nondistortionary. As another example, the government may announce that it will prosecute all tax evaders vigorously; but once the taxes have been evaded, the government may be tempted to declare a "tax amnesty" to collect some extra revenue. As a third example, the government may announce that it will give a temporary monopoly to inventors of new products to encourage innovation; but once a product has been invented, the government may be tempted to revoke the patent to eliminate the distortion of monopoly pricing. In each case, rational agents understand the incentive for the government to renege, and this expectation affects their behavior. And in each case, the solution is to take away the government's discretionary power by binding it to a fixed policy rule.

New Classical Macroeconomics

The increased importance of expectations in macroeconomic theory may be the most important development of the past two decades, but it is not the most controversial. Controversy peaks when economists turn to the theory of economic fluctuations. Broadly speaking, there are two schools of thought: new classical and new Keynesian economics. As an example of how much the debate has changed, today monetarists are members of the new Keynesian family. The distance between

the new classical and new Keynesian schools is so large that it makes the monetarist–Keynesian debates of the 1960s look like sibling rivalry.

The key difference between new Keynesians and new classicals is how wages and prices adjust. New Keynesians accept the view that was unquestioned 20 years ago: wages and prices adjust slowly over time. New classicals want to rebuild macroeconomics while maintaining the axiom that prices adjust very quickly to clear markets.

Those working in the new classical tradition have recently been emphasizing "real" business cycle theory. This theory proceeds from the assumption that there are large random fluctuations in the rate of technological change. Because these fluctuations in technology lead to fluctuations in relative prices, individuals rationally alter their labor supply and consumption. According to this theory, the business cycle is the natural and efficient response of the economy to changes in the available production technology.

Real business cycle theory contrasts sharply with the consensus view of the 1960s. I will mention briefly three assumptions of these models that would have been considered ridiculous 20 years ago and that remain controversial today.

First, real business cycle theory assumes that the economy experiences large and sudden changes in the available production technology. Many real business cycle models explain recessions as periods of technological regress—that is, declines in society's technological ability. Advocates of this theory point to the procyclical behavior of productivity as evidence that technology shocks are the source of economic fluctuations.

Second, real business cycle theory assumes that fluctuations in employment reflect changes in the amount people want to work. Because employment fluctuates substantially while the determinants of labor supply—the real wage and the real interest rate—vary only slightly, these models require that leisure be highly substitutable over time. This assumption conflicts with the beliefs of many economists that high unemployment in recessions is largely involuntary.

Third, real business cycle theory assumes—and this is the assumption from which the theory derives its name—that monetary policy is irrelevant for economic fluctuations. Before real business cycle theory entered the debate in the early 1980s, almost all macroeconomists agreed on one proposition: money matters. Although there was controversy about whether systematic monetary policy could stabilize the economy, it was universally accepted that bad monetary policy could be destabilizing. Real business cycle theorists have challenged that view using the old Keynesian argument that any correlation of money output arises because the money supply responds to changes in output. They also give little weight to anecdotal evidence on the effects of monetary policy—such as the Volcker disinflation of the early 1980s—that seems to shape the views of many other economists.

New Keynesian Macroeconomics

At the same time that many macroeconomists have been advancing real business cycle theory, many other macroeconomists, including myself, have been attempting to resurrect the old consensus view, with more modern emendations. As I've mentioned, the rubric "new Keynesian" is very broad. We who fall under this term view ourselves as following in the traditions of both John Maynard Keynes and Milton Friedman.

If there is a single theme that unites new Keynesian economists, it is the belief that economic fluctuations reflect not the efficient response of the economy to changes in tastes and technology, but rather some sort of market failure on a grand scale. The market imperfection that recurs most frequently in new Keynesian theories is the failure of wages and prices to adjust instantly to equilibrate supply and demand. Certainly, the short-run sluggishness of wages and prices was the key assumption of the consensus view of the 1960s. And the absence of an adequate theoretical justification for that assumption was one of the fatal flaws that undermined the consensus. Much of new Keynesian research of the 1980s can be viewed as attempting to provide a cogent theoretical foundation for short-run price rigidity.

Let me mention briefly two recent lines of research that attempt to explain the failure of wages and prices to clear markets.

The first emphasizes the sluggish behavior of goods prices. Much effort has been devoted to examining the behavior of monopolistically competitive firms that face small "menu costs" when they change prices. Taken literally, these menu costs are the resources required to post new price lists. More metaphorically and more realistically, these menu costs include the time taken to inform customers, the customer annoyance caused by price changes, and the effort required to even think about a price change.

This line of research is still too new to judge how substantial its impact will be. What is clear now is that one can explain in rigorous microeconomic terms the failure of price-setters to adjust prices quickly enough to prevent recessions. Monopolistically competitive firms do not have much incentive to cut their prices when demand declines. Yet because of the preexisting distortion of monopoly pricing, the benefit to the firm is small. If firms face even a small menu cost, they might maintain their old prices, despite the substantial social loss from this price stickiness.

There has also been growing microeconomic evidence that many firms, in fact, adjust their prices very infrequently. One extreme example is the price of magazines at newsstands. Steve Cecchetti has documented that the prices change every four or five years. In a more comprehensive survey that is still in its preliminary stages, Alan Blinder has found that the median firm in the U.S. economy changes its prices about once a year.

A second line of new Keynesian research is on "efficiency wage" theory, which emphasizes the failure of

wages to clear labor markets. According to efficiency wage theory, firms do not reduce wages in the face of persistent unemployment because to do so would reduce productivity. Various reasons have been proposed to explain how wages affect productivity, the most popular of which holds that a high wage improves worker effort. This theory posits that firms cannot monitor their employees' work effort perfectly, and that employees themselves must decide how hard to work. Workers can choose to work hard, or they can choose to shirk and risk getting caught and fired. The higher the wage, the greater is the cost to the worker of getting fired. By paying a higher wage, a firm induces more of its employees not to shirk and thus increases their productivity. If this productivity effect is sufficiently large, the normal competitive forces moving the labor market to the equilibrium of supply and demand are absent.

Conclusion

I began by suggesting that recent developments in macroeconomics are akin to the Copernican revolution in astronomy: immediately they may have little practical value but ultimately they will point the way to a deeper understanding. Perhaps the analogy is too optimistic. Copernicus had a vision of not only what was wrong with the prevailing paradigm, but also of what a new paradigm would look like. In the past decade, macroeconomists have taken only the first step in this process; there remains much disagreement on how to take the second step. It is easier to criticize the state of the art than to improve it.

Yet some developments of the past two decades are now widely accepted. Although some economists still doubt that expectations are rational, the axiom of rational expectations is as firmly established in economic methodology as the axioms that firms maximize profit and households maximize utility. The debate over rules versus discretion continues, but time inconsistency is generally acknowledged to be a problem with discretionary policy. Most fundamentally, almost all macroeconomists agree that basing macroeconomics on firm macroeconomic principles should be higher on the research agenda than it has been in the past.

On the crucial issue of business cycle theory, however, there appears to be little movement toward a new consensus. The "new classicals" and the "new Keynesians" each have made substantial advances within their own paradigms. To explain economic fluctuations, new classical theorists now emphasize technological disturbances, intertemporal substitution of leisure, and real business cycles. New Keynesian theorists now speak of monopolistic competition, menu costs, and efficiency wages. More generally, the classicals continue to believe that the business cycle can be understood within a model of frictionless markets, while the Keynesians believe that market imperfections of various sorts are necessary to explain fluctuations in the economy.

Ultimately, recent developments in macroeconomic theory will be judged by whether they prove to be use-

ful to applied macroeconomists. The passage of time will make efficiency wages, real business cycles, and the other breakthrough of the past decade less novel. The attention of academic researchers surely will turn to other topics. Yet it is likely that some of these recent developments will permanently change the way in which economists of all sorts and discuss economic behavior and economic policy. Twenty years from now we shall know which of these developments has the power to survive the initial debate and to permeate economists' conceptions of how the world works.

Annual Research Conference—III:

Working and Earning Under Different Rules: What the United States Can Learn from Labor Market Institutions in Other Developed Countries

Richard B. Freeman

Labor markets are the most idiosyncratic feature of developed countries, differing across national lines in more ways than markets for goods, finance, and the like. Some advanced capitalist countries are highly unionized; others are largely nonunion. Some countries rely on specific institutions to set pay: courts determine pay increases in Australia; the government extends collective bargaining agreements throughout the economy in Germany; in Japan, a large proportion of pay consists of bonuses, and the Shunto Offensive sets standards for wage increases throughout the economy. The United States, Canada, and the United Kingdom rely more on the free operation of markets.

There is a similar range of variation among countries in programs and institutions to aid those without work. Some countries have extensive income maintenance, social welfare, and labor market mobility and training programs, devoting considerable resources to redistributing income. Sweden is the typical example, but throughout Western Europe unemployment insurance systems have been more generous than the American system. The United States has relatively limited social welfare programs for most workers and for those without work, and relies to an unprecedented extent on the private charitable sector to deal with many social problems.

One of the most striking features of the 1980s was the substantial divergence in institutions and outcomes among developed western countries, often in ways that contravened the patterns of previous postwar history. The United States, which traditionally had higher rates of unemployment but relatively shorter durations of joblessness than Europe, experienced a "jobs explo-

sion" with resultant lower unemployment than Western Europe. At the same time, the United States suffered rising inequality in earnings and poverty rates that eventually exceeded those in many other developed countries, and lost much of its lead in productivity and real earnings per person. The proportion of the work force organized in trade unions fell dramatically in the United States while remaining at higher levels in many other countries, including Canada. In earlier decades, the United States led the world in reducing working time toward the 40-hour week and extending vacation and holiday pay, but in the 1980s American workers put in more hours than did workers in Europe.

When unemployment rates rose in Europe in the early 1980s, most discussion of the difference between Western European and American labor markets focused on the advantages of labor arrangements of the U.S. style. The buzzword was "flexibility" of markets. Some analysts argued instead for "neocorporatist" arrangements, such as Sweden's, with central labor unions, employer confederations, and the state regulating the labor market. But most discussion focused on the problems of unemployment insurance systems that grant high benefits for years, long-term labor contracts that make firing workers difficult and hiring presumably more expensive, and so on. There was much concern with what Western Europe could learn from the flexible arrangements of the United States, but little thought as to what the United States might learn from European labor institutions.

The situation in the early 1990s looks quite different. There are rising inequality, high rates of poverty, particularly among children, homelessness, and related social problems in the United States. Unemployment rates, while still moderate, are now higher than those in West Germany. Widespread concern about the quality of the American labor force and American managerial practices has raised serious doubts about the way the United States has responded to the economic changes of the past decade or so. From an American perspective, the question is how foreign countries avoided some of our problems. We now need to ask what we can learn from our OECD peers to improve our society and our competitive economic performance.

The NBER's labor program has begun a large research endeavor to understand the operation of labor markets and income maintenance/safety net programs in other countries. We began with a research project comparing the United States with Canada. Ultimately there will be research projects on different aspects of labor relations and income maintenance programs in the United States and other OECD countries:

- 1) The Operation of Works Councils Within Enterprises
- 2) Private Firm Training of Workers
- 3) Wage Structures and Alternate Wage-Setting Systems
- 4) Income Maintenance and Social Welfare Programs
- 5) Programs to Aid the Extremely Poor

Some Early Results

A key area in which the U.S. labor market has diverged from many other OECD countries is the representation of labor at enterprises and in national economic decisionmaking. While the decline in union density is not unique to the United States—density dropped in the United Kingdom during Mrs. Thatcher's term in office, in the Netherlands, in Japan, and in France—nowhere has density fallen as much as in the private sector of the United States, and it has remained high in many other OECD countries, such as Germany, Belgium, Denmark, Sweden, and most notably Canada.

At the same time, most European countries have developed and strengthened the powers of "works councils," designed to allow management and labor to treat local workplace problems cooperatively. The United States, by contrast, has come to rely increasingly on the competitive market and on legal means of regulating local workplace arrangements, through legislation and judicial intervention. Consistent with the mixed results of the U.S. system, the European experience with quality-of-work circles and other innovative labor practices is that for labor-management cooperative arrangements to work, workers must be given some genuine authority or influence over decisions, by legislation or through union activity. The interesting question, on which research has yet to speak, is the extent to which these differing practices affect productivity and worker well-being in, say, similar plants of comparable multinational firms across the countries.

Although earnings differentials between more and less skilled or educated labor, and inequality among workers, appear to be rising in most developed countries—presumably as a result of shifts in demand based on technological and other factors, and to the growth of world trade—the extent of the increase seems less extensive elsewhere. In Canada, wage differentials between more and less educated workers barely increased in the 1980s, while the differentials skyrocketed in the United States. One reason is that the number of college graduates grew more rapidly in Canada than in the United States in the 1980s. In Sweden, earnings differentials also rose. Swedish employers, unions, and workers came to realize that wage differentials had been compressed too much to make economic sense, and centralized collective bargaining broke down. However, the levels of differentials and increases are magnitudes different from those in the United States. Only in the United Kingdom have earnings differentials seemingly risen as much as in the United States.

Canada's experience in the 1980s, when rates of poverty, in particular among children, fell below those in the United States, shows that alternative income maintenance programs in very similar economies can produce substantially different outcomes. The Canadian systems of child support, unemployment insurance, and health insurance appear to have worked better in "leaning against the wind" of rising inequality than comparable American programs. While virtually all research shows that there is a substantial labor supply

response to providing benefits for those who are not working, extending the durations of unemployment benefits and linking benefits to work—"workfare"—appears to induce high labor participation, particularly of women. The Swedish welfare system is largely a workfare system. The relatively generous unemployment insurance entitlements in Canada appear to have induced a substantial number of women, who otherwise would not have worked, to work for at least part of the year.

Surprisingly, countries with very different labor market arrangements—the United States, with its decentralized, largely nonunion system, and Sweden, with its highly coordinated union system—had quite similar macroeconomic outcomes, with better employment experiences but productivity and real wage experiences that were relatively poorer than countries with less "extreme" arrangements. The implication is that there may be quite different paths to the same macroeconomic outcomes, even though the systems produce different microeconomic outcomes.

Overall, the NBER project on "working and earnings under different rules" will widen the range of economic experiences and data on which labor economists and others test theories and derive generalizations about the operation of market economies. The project should increase our understanding of which aspects of economic behavior are universal and which are influenced by laws, culture, and so forth. While the project is empirical at its core, it has a potentially close tie with modern game-theoretic analyses of markets that show that rational behavior can lead to very different outcomes depending on the precise rules of the game. The question of how different labor practices fit together into a "system"—for instance, whether one can adapt European works councils or German apprenticeship programs, or Japanese style labor relations, to other countries—also calls out for theory as well as evidence.

NBER Profiles

Morton Ehrlich

Morton Ehrlich, president of Lifeco Services Corporation since 1988, has been on the NBER's Board of Directors since 1979. Lifeco, a Houston-based corporate travel management company, provides services to over 100 corporations and government agencies worldwide.



Prior to joining Lifeco, Ehrlich was executive vice president of TWA for three years and senior vice president for planning and government affairs with Eastern Airlines for 17 years.

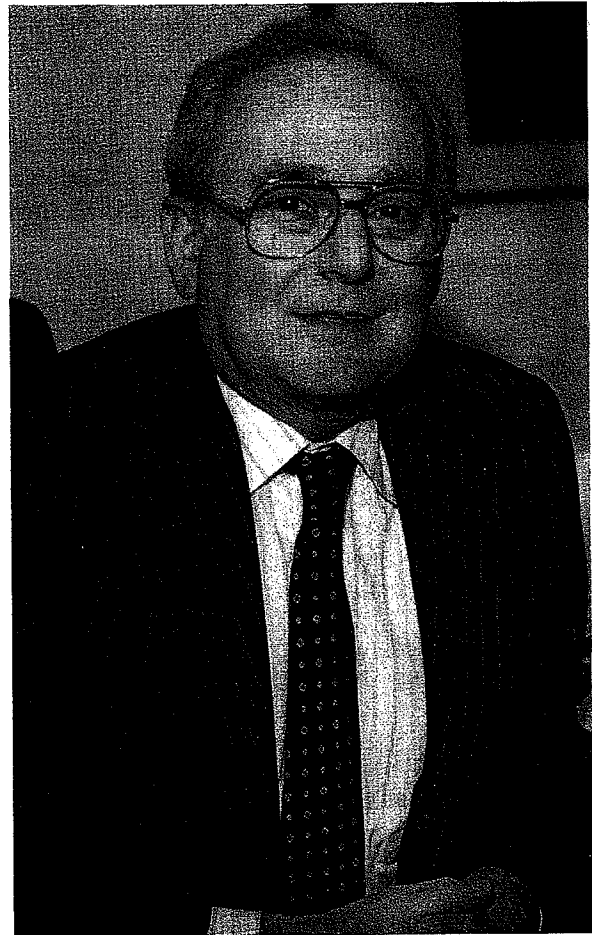
After completing his Ph.D. in economics from Brown University in 1965, Ehrlich worked as an economist for the Federal Reserve Bank of New York, and later as senior economist for the National Industrial Conference Board.

Ehrlich is married to the former Paula Cook. His hobbies include tennis, horseback riding, and collecting wood turnings, and celluloids from animated movies.

Donald S. Wasserman

Donald S. Wasserman, director of research and collective bargaining services of the American Federation of State, County and Municipal Employees (AFSCME), has been an NBER director since 1979. He also serves on the Labor Advisory Committee to the Bureau of Labor Statistics, U.S. Department of Labor; is former president of the Washington, DC Chapter of the Industrial Relations Research Association; and was formerly on the National Executive Board of that association.

Wasserman is the author of a variety of articles and papers dealing with collective bargaining, wages and working conditions, arbitration, productivity, and public sector collective bargaining legislation. Prior to joining AFSCME, he was an economist for the International Association of Machinists, the Communications Workers of America, and the U.S. Department of Labor.



Wasserman received an M.B.A. from the University of Pennsylvania and a B.S. from Temple University. He and his wife Natalie, have two adult sons. She was executive director of the Public Risk Management Association for ten years. In his spare time, he enjoys framing pictures.

Conferences

Tax-Exempt Bonds

Nearly two dozen economists and practitioners in municipal finance met on April 5-6 to discuss "The Economics of the Tax-Exempt Bond Market." The re-

search papers presented at this conference examine the operation of tax-exempt bond markets, particularly the changes induced by tax reforms of the last decade, as well as the effect of state and local government capital spending on economic activity. The program, organized by NBER Research Associate James M. Poterba, MIT, was:

John Capeci, Brandeis University, "Credit Ratings and the Cost of Borrowing by Local Governments"
Discussants: Randall Eberts, Federal Reserve Bank of Cleveland, and Robert P. Inman, NBER and University of Pennsylvania

Gilbert E. Metcalf, NBER and Princeton University, "The Role of Federal Taxation in the Supply of Municipal Bonds: Evidence from Municipal Governments"

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

John M. Quigley and Daniel Rubinfeld, University of California, Berkeley, "Private Guarantees for Municipal Bonds: Institutions and Economic Outcomes"
Discussant: Peter Fortune, Tufts University

Daphne Kenyon, Simmons College, "Effects of Federal Volume Caps on State and Local Borrowing"
Discussant: Dennis Zimmerman, Congressional Research Service

Daniel R. Feenberg, NBER, and James M. Poterba, "Who Owns Municipal Bonds?"
Discussant: Alan J. Auerbach, NBER and University of Pennsylvania

John Petersen, Government Finance Research Center, "Innovations in the Tax-Exempt Market"
Discussants: Jeremy I. Bulow, NBER and Stanford University, and Helen F. Ladd, Duke University

Douglas Holtz-Eakin, NBER and Syracuse University, "Bond Market Conditions and State-Local Capital Spending"
Discussant: Brian Cromwell, Federal Reserve Bank of San Francisco

Charles R. Hulten, NBER and University of Maryland, and Robert Schwab, University of Maryland, "Public Capital Formation and the Growth of Regional Manufacturing Industries"
Discussants: David Aschauer, Bates College, and Therese McGuire, University of Illinois

Capeci uses a new dataset on borrowing costs over time for a set of municipalities to show that the usual finding—that reductions in a borrower's bond rating raise interest costs—can be traced to coincident changes in the borrower's financial condition and not to the rating change per se. These results suggest that rating agencies are synthesizing information, rather than generating new data on borrower conditions.

Metcalf emphasizes that municipalities can substitute their own borrowing or investing for that of their residents. He points out that some municipalities accumulate large holdings of taxable assets. This form of

tax arbitrage is a potentially important determinant of municipal debt supply. Metcalf suggests that changes in federal tax policy affect the supply of tax-exempt debt through this channel.

Quigley and Rubinfeld describe the operation of municipal bond insurance and estimate its effect on the interest costs facing borrowers. By comparing the prices of pairs of municipal bonds, identical in every way except that one is insured while the other is not, they conclude that municipal insurance can save borrowers between 15 and 30 basis points of interest cost.

Kenyon finds that revenue cost caps have constrained borrowing by some states, thus reducing the volume of private-purpose, tax-exempt financing. Using a new dataset collected by state financial officers, she estimates that the caps have had only a small effect on the interest costs facing states and localities when they borrow for public purposes, though.

Feenberg and Poterba find that the vast majority of tax-exempt debt held by households belongs to individuals in or near the top marginal tax bracket. They note that the compression of marginal tax rates in the 1986 Tax Reform Act lowered the federal government's cost of not taxing the interest paid by state and local governments. They also argue that government estimates may overstate the amount of federal revenue lost because of this tax exemption.

Petersen explains that the shift over the last decade from institutions to individuals as the primary investors in tax-exempt securities, and the growing role of investment bankers in designing new securities, have resulted in new tax-exempt financing mechanisms. These include zero coupon municipals, debt "swaps" between different borrowers, floating-rate tax-exempt debt, default-insured municipals, and other new securities. Petersen catalogues these changes and describes their likely effects on state and local borrowing costs.

Holtz-Eakin analyzes how changes in the yield spread between taxable and tax-exempt debt affect spending on infrastructure. He finds that states and localities substantially vary their financing mix between debt and taxes in response to changing conditions in the bond market. However, Holtz-Eakin finds much less evidence of a powerful link between these conditions and the *level* of capital spending.

Hulten and Schwab develop a new dataset on the stocks of public capital in different regions, and on the productivity of the manufacturing sectors in those regions. Their results do not support the view that public capital is a key component of private productivity growth. Rather, they attribute virtually all of the differences in productivity growth across regions to differences in private inputs.

Also attending the conference were: Michael Ball, Johns Hopkins University; Susan Binder, U.S. Department of Transportation; Bruce Davie, Arthur Andersen Company; Andrew Hoerner, *Tax Notes*; Daniel Holland, MIT; Mark Mazur, Congressional Joint Committee on Taxation; and Joan Pryde, *The Bond Buyer*.

The conference proceedings will appear in the December 1991 supplementary issue of the *National Tax Journal*.

Economic Growth

About 40 economists participated in an NBER Conference on Economic Growth on April 12-13. Robert J. Barro, Harvard University, and Paul M. Romer, University of Chicago, organized the following program:

James E. Rauch, NBER and University of California, San Diego, "Productivity Gains from Geographic Concentration of Human Capital: Evidence from Cities"

Discussant: Robert E. Hall, NBER and Stanford University

Marvin Goodfriend, Federal Reserve Bank of Richmond, and John McDermott, University of South Carolina, "Early Development"

Discussant: Alwyn Young, MIT

Michael J. Boskin, President's Council of Economic Advisers, and Laurence J. Lau, Stanford University, "Postwar Economic Growth in the Group of Five Countries: A New Analysis"

Discussant: Glenn MacDonald, University of Western Ontario

Torsten Persson, NBER and University of California, Berkeley, and Guido Tabellini, NBER and University of California, Los Angeles, "Is Inequality Harmful for Growth? Theory and Evidence"

Discussant: Lawrence H. Summers, the World Bank

Ross Levine, the World Bank, and David Renelt, Harvard University, "A Sensitivity Analysis of Cross-Country Growth Regressions"

Discussant: Boyan Jovanovic, NBER and New York University

Edward Glaeser, Hedi D. Kallal, and Jose A. Scheinkman, University of Chicago, and Andrei Shleifer, NBER and Harvard University, "Growth of Cities"

Discussant: J. Vernon Henderson, NBER and Brown University

Martin L. Weitzman, Harvard University, "Volume, Variety, and Versatility in Growth and Trade"

Discussant: Kenneth Arrow, Stanford University

Rauch argues that the average level of human capital is a local public good. Therefore, cities with higher average levels of human capital should have higher wages and higher land rents. This prediction is supported by data for Standard Metropolitan Statistical Areas (SMSAs) in the United States, where the average levels of formal education and work experience in the SMSA are used as proxies for the average level of human capital.

According to Goodfriend and McDermott, to achieve modern balanced growth, a model economy passes through a period in which a growing population enables it to benefit from increasing returns to specialization. When specialization has become sufficiently widespread, technical innovation, facilitated by access to specialized knowledge, begins. Innovation initiates an industrial revolution, after which productivity grows endogenously regardless of population growth. In developed countries, industrialization reconciles the crucial early role of population with its later weak relationship to per capita product. Faster population growth speeds early development; if it results from a highly productive primitive technology, the consequences for development are ambiguous.

Boskin and Lau estimate an aggregate production function using annual data for the postwar period from France, West Germany, Japan, the United Kingdom, and the United States. All countries are assumed to have the same underlying production function. Boskin and Lau find that technical progress may be represented as purely capital augmenting. In particular, the rate of augmentation is between 12 and 15 percent per annum for France, West Germany, and Japan, and between 7 and 9 percent per annum for the United Kingdom and United States. Technical progress is also capital saving rather than labor saving, and therefore is unlikely to be a cause of structural unemployment. Boskin and Lau also find that technical progress accounts for more than 50 percent of growth, followed by the growth of capital inputs. Together they account for more than 70 percent of the growth of real output. Finally, the authors find that the United States had the highest level of overall productive efficiency for the entire period under study. However, the productive efficiencies of France, West Germany, and Japan rose rapidly, from less than 40 percent of the U.S. level in 1949 to two-thirds of the U.S. level in 1985.

Persson and Tabellini suggest that inequality may reduce growth. In a society in which distributional conflict is important, political decisions are more likely to produce economic policies that allow private individuals to appropriate fewer returns to growth-promoting activities, such as accumulation of capital and productive knowledge. Using historical data back to the mid-19th century from the United States and eight European countries, and postwar evidence from a broad cross section of developed and less developed countries, the authors confirm that there is a negative relationship between inequality and growth.

Levine and Renelt find that broad measures of macroeconomic policy are significantly correlated with long-run growth in the cross section. However, estimates of the effects of specific measures, including government spending, deficits, consumption, monetary policy measures, exchange rates, political stability, and others are not robust. They do confirm the positive correlation between the share of investment in GDP and long-run growth, though.

Using a new dataset on the growth of large indus-

tries in 168 U.S. cities between 1956 and 1987, Glaeser, Kallal, Scheinkman, and Shleifer find that local competition and urban variety, but not regional specialization, encourage employment growth. The evidence suggests that important knowledge spillovers might be between industries rather than within them.

In Weitzman's model, firms choose the width of the market niche in which they will compete (versatility) according to some cost schedule. He derives a monopolistically competitive general equilibrium in which the degree of versatility is determined endogenously along with other variables, such as variety and volume of production. The system as a whole exhibits increasing returns to scale.

Japanese Monetary Policy

An NBER conference on "Japanese Monetary Policy" took place in Tokyo on April 18–19. Research Associate Kenneth J. Singleton, Stanford University, organized the following program:

Kazuo Ueda, University of Tokyo, "A Comparative Perspective on Japanese Monetary Policy: The Short-Run Monetary Control and the Transmission Mechanism"

Kunio Okina, Bank of Japan, "Market Operations in Japan: Theory and Practice"

Kenneth J. Singleton; Takeo Hoshi, University of California, San Diego; and David S. Scharfstein, NBER and MIT, "Japanese Corporate Investment and Bank of Japan Guidance of Commercial Bank Lending"

Discussant: Akiyoshi Horiuchi, University of Tokyo
John Y. Campbell, NBER and Princeton University, and Yasushi Hamao, University of California, San Diego, "Monetary Policy and the Term Structure of Interest Rates in Japan"

Discussant: Kermit Schoenholtz, Salomon Brothers Asia Limited

Hiroshi Yoshikawa, University of Tokyo, "Monetary Policy and the Real Economy"

Discussant: Shoichi Royama, Osaka University

Kenneth D. West, NBER and University of Wisconsin, "An Aggregate Demand–Aggregate Supply Analysis of Japanese Monetary Policy, 1973–90"

Discussant: Naoyuki Yoshino, Keio University

Takatoshi Ito, NBER and University of Minnesota, "Monetary Policy in the Age of Financial Innovations: The Case of Japan, 1985–90"

Discussant: Chikara Komura, Seikei University

Ueda notes that the Bank of Japan's (BOJ's) policy target in its daily operations has been the call rate; the

BOJ has never targeted bank reserves. Moreover, the call rate has been much more stable than the federal funds rate, because the BOJ uses defensive operations extensively. The past stability of the call rate also may have resulted from direct, nonmarket control of the rate by the BOJ. In the transmission of monetary policy in Japan, bank loans are more important than monetary aggregates as predictors of real variables. In addition, bank loans move in advance of other monetary indicators and almost coincidentally with the call rate. Ueda suspects that this is because of the use of window guidance in Japan. In this sense, abstracting from daily operations, bank loans and the call rate have been the two most important instruments of Japanese monetary policy.

Okina notes that, in principle, the BOJ can control overnight rates by transmitting "anchor" signals (overnight rates on the final day of the reserve maintenance period) to market participants. However, since the span of the reserve maintenance period in Japan is one month, market rates are formulated around the anchor rate predicted by market participants, which does not reflect the intention of the BOJ exactly. Since the most crucial element in determining the overnight rate is the expected anchor, the supply of daily reserves itself may not be important, except on the final day of the maintenance period. And, if the overnight rate is the operating target, then long-term interest rates can be used as indicators.

Singleton, Hoshi, and Scharfstein examine the impact of direct credit restrictions by the BOJ on the borrowing and investment activities of Japanese corporations. They find that investments by independent firms are more sensitive to their liquidity positions than investments by firms that belong to a *keiretsu*, a group of companies centered around affiliated banks and other financial institutions. Further, members of industrial groups increase their investment more than independent firms during periods of tight monetary policy. These findings are consistent with a significant distributional effect of monetary policy (window guidance) on investments.

Campbell and Hamao find a change in the behavior of the Japanese term structure of interest rates in the mid-1980s. Short-term rates became less forecastable from their own past history; at the same time, the ability of the Japanese yield curve to forecast short-term rates increased.

Yoshikawa asks how monetary policy has been conducted in postwar Japan, and how it affects the real economy. He argues that, at business cycle frequencies, time-varying nominal interest rate smoothing is a good approximation of monetary policy in Japan, and that there is no rigid feedback rule.

West uses an aggregate demand–aggregate supply framework to analyze the effects of Japanese monetary policy in 1973–90. He finds that money supply shocks contribute relatively little to output and price variability, and in particular do not seem to be marked at business cycle turning-points. The effects of mone-

tary policy on prices and output are quite similar to those of a constant money growth rule.

Ito examines the sharp rise in the money stock in 1987 and in Japanese land prices in the second half of the 1980s. In particular, he asks whether the increase in the money stock was ignored because of financial deregulation (especially, lowering the minimum deposit requirement for large-time deposits); and whether exchange rate targeting played a role in allowing faster monetary growth and lower interest rates. He finds that the level of interventions in 1987, most of them unsterilized, reflected an attempt to stop further yen appreciation. There was far more intervention used in 1987 than in 1985 when it was designed to cause yen appreciation.

Also attending the conference were: Hidekazu Eguchi, Hitotsubashi University; Keikichi Honda, Bank of Tokyo; Keimei Kaizuka, University of Tokyo; Keiichi Miyata and Hiroo Taguchi, Bank of Japan; and Yoshio Suzuki, Nomura Research Institute.

A conference volume is forthcoming from the University of Chicago Press.

International Asset Pricing

NBER researcher Karen K. Lewis, University of Pennsylvania, organized a conference on international asset pricing held on April 26. The program was:

David Backus, New York University, and Allan Gregory and Chris Telmer, Queen's University, "Accounting for Forward Rates in Markets for Currency"
Discussant: Fabio Canova, Brown University

Kenneth A. Froot, NBER and MIT, "On the Efficiency of Foreign Exchange Markets"
Discussant: David Bates, University of Pennsylvania

K. C. Chan, G. Andrew Karolyi, and Rene Stulz, Ohio State University, "Global Financial Markets and the Risk Premium on U.S. Equity"
Discussant: Robert F. Stambaugh, NBER and University of Pennsylvania

Philippe Jorion, Columbia University, "Term Premiums and the Integration of the Eurocurrency Markets"
Discussant: Robert E. Cumby, NBER and New York University

Alberto Giovannini, Columbia University, and Martha de Melo, the World Bank, "Government Revenue from Financial Repression" (NBER Working Paper No. 3604)

Discussant: Nelson Mark, Ohio State University

Backus, Gregory, and Telmer verify that, with moderate risk aversion and time-additive preferences, the

representative agent theory accounts for less than 5 percent of the variability of expected returns from currency speculation observed for major currencies versus the U.S. dollar. However, with strong habit persistence, the theory can account for one-half to two-thirds of the estimated standard deviation of expected returns from currency speculation.

Froot uses tests of forward discount bias as a basis for discussing the efficiency of foreign markets. He asks whether a wide variety of models of foreign risk are capable of explaining the forward rates bias, and concludes that there is little evidence that predictable excess returns on forward speculation are related to risk premiums.

Chan, Karolyi, and Stulz show that there is a significant foreign influence on the risk premium of U.S. assets. They find that the conditional expected excess return on U.S. stocks is related positively to the conditional covariance of the return on these stocks with the return on the Nikkei 225 index, weighted by the capitalization of foreign stocks in the world market portfolio.

Jorion compares the time-variation of expected returns across the term structure of Eurocurrency markets. First he shows that forward rate spreads have significant forecasting ability for future one-month to five-year spot interest rates denominated in dollars and in marks. Next, he constructs a model that allows for different benchmark portfolios across currencies. Integration implies that the time variation of the benchmark portfolio must be the same across currencies. Jorion finds little evidence against integration of the Eurocurrency markets.

Giovannini and de Melo explicitly account for the interaction between capital controls and financial repression. Their proposed empirical estimate of the revenue from financial repression is based on the difference between the domestic and the foreign cost of borrowing by the government.

Also attending the conference were: William H. Branson, NBER and Princeton University; Kevin Chang, New York University; Richard H. Clarida and Richard K. Lyons, NBER and Columbia University; Bruce Grundy, University of Pennsylvania; John Huizinga, University of Chicago; Robert Korajczyk, Northwestern University; A. Craig MacKinlay, Richard C. Marston, and Stephen P. Zeldes, NBER and University of Pennsylvania; and Alan C. Stockman, NBER and University of Rochester.

Business Cycles, Indicators, and Forecasting

NBER Research Associates James H. Stock, University of California, Berkeley, and Mark W. Watson, North-

western University, organized a conference on "New Research on Business Cycles, Indicators, and Forecasting," held in Cambridge on May 3-4. The agenda was:

Christopher A. Sims, NBER and Yale University, "A Nonlinear BVAR Approach to Turning-Point Prediction"

Discussant: Pierre Perron, Princeton University

Francis X. Diebold, University of Pennsylvania, and Glenn D. Rudebusch and Daniel E. Sichel, Federal Reserve Board, "Further Evidence on Business Cycle Duration Dependence"

Discussant: Bruce Hansen, University of Rochester

Benjamin M. Friedman, NBER and Harvard University, and Kenneth Kuttner, Federal Reserve Bank of Chicago, "Why Is the Paper-Bill Spread Such a Good Predictor of Real Economic Activity?"

Discussant: Ben S. Bernanke, NBER and Princeton University

Ray C. Fair, NBER and Yale University, "Estimating Event Probabilities from Macroeconometric Models Using Stochastic Simulation"

Discussant: James Hamilton, University of Virginia

James H. Stock and Mark W. Watson, "Predicting Recessions"

Discussant: Kenneth Wallis, University of Warwick

Victor Zarnowitz, NBER and University of Chicago, and Phillip Braun, University of Chicago, "Twenty-Two Years of the NBER-ASA Quarterly Economic Outlook Surveys: Aspects and Comparisons of Forecasting Performance"

Discussant: Allan Sinai, The Boston Company Economic Advisors

Danny Quah, NBER and MIT, and Thomas J. Sargent, NBER and Stanford University, "A Dynamic Index Model for Large Cross Sections"

Discussant: John Geweke, Duke University

Heather Anderson and Clive W. J. Granger, University of California, San Diego, and Timo Terasvirta, Research Institute of the Finnish Economy, "Modeling Nonlinearity over the Business Cycle"

Discussant: Andrew Harvey, London School of Economics

Sims describes a nine-variable macroeconomic model of the U.S. economy. The model imposes generally agreed upon views about the importance of lags, and the weights given to additional variables, in forecasting key aggregate time series. It adapts to changing relationships among macroeconomic variables as the economy evolves over time.

Diebold, Rudebusch, and Sichel document striking differences between prewar and postwar U.S. business cycle dynamics. Before World War II, the probability of an expansion ending increased with each additional month, while the probability of a recession ending was almost independent of duration. After World War II, the opposite has been true. The authors find that the char-

acteristics of prewar European business cycle durations are very similar to those of the United States.

The spread in interest rates for commercial paper and Treasury bills has borne a systematic relationship to subsequent fluctuations in nonfinancial economic activity in the United States. Friedman and Kuttner present three explanations for this predictive power of the paper-bill spread. First, changing perceptions of default risk for commercial paper exert a clearly recognizable influence on the spread, an influence that is all the more discernable after allowance for "supply" effects of paper issuance. Second, when investors view commercial paper as an imperfect substitute for Treasury bills, a widening paper-bill spread is also a symptom of a contraction in bank lending caused by tighter monetary policy. Finally, there is some evidence of a further role for independent changes in the behavior of borrowers in the commercial paper market caused by their changing cash requirements.

Fair shows how probability questions can be answered within the context of macroeconomic models by using stochastic simulation. One can estimate, for example, the probability of a recession occurring within some fixed time in the future. He presents probability estimates for three recessionary events and one inflationary event occurring within 1989:1-1990:4.

Stock and Watson first provide a detailed description of the construction of an experimental recession index (XRI), which forecasts whether the economy will be in a recession six months hence, and its related forecast of overall economic growth, the experimental leading index (XLI). These indexes performed well from 1988 through the summer of 1990—for example, in June 1990 the XLI model forecast a 0.4 percent (annual rate) decline in the experimental coincident index from June through September, when in fact the decline was only slightly greater: 0.8 percent. However, they failed to forecast the sharp declines of October and November 1990. Stock and Watson conclude that the XLI was wrong because it relied on financial variables during a recession that was not associated with a particularly tight monetary policy. However, an examination of over 50 leading indicators not used to construct the XLI or XRI shows that almost all indicators failed to forecast the 1990 recession, and that the few that did provided unclear signals going into the recessions of the 1970s and the 1980s.

The NBER, in cooperation with the American Statistical Association, conducted a regular quarterly survey of professional macroeconomic forecasters for 22 years beginning in 1968. Over time, the survey covered a range of 21 important variables and attracted responses from more than 150 different sources. Zarnowitz and Braun examine these data and find that the dispersion among the individual predictions is often large, and typically increases with the length of the forecast span, as do the mean absolute (or squared) errors. Further, the more volatile the time series, the larger are the errors as a rule. Forecast errors also tend to be larger as the extent of the revisions becomes greater. There is little

evidence of an overall improvement or deterioration in forecasts between the 1970s and 1980s, but some important changes emerge for particular variables. Combining the individual forecasts into group mean or "consensus" forecasts from the surveys generally results in large gains in accuracy relative to individuals.

Quah and Sargent show how standard methods can be used to estimate and test a dynamic index model for random fields—stochastic processes that are indexed by both time and cross section dimensions are comparable in magnitude. They find that the dynamics of employment in over 50 sectors of the U.S. economy can be well explained using only two unobservable factors.

Anderson, Granger, and Terasvirta explore the possibility of forecasting postwar changes in GNP from the index of leading indicators. They find that a nonlinear model is appropriate, and that using lagged, detrended log leading indicators as the switching variable fits the sample, 1948:1–1984:1, well. However, over the following 20 quarters, the switching variable was unusually lacking in volatility, so not all regimes occurred.

Also attending the conference were: Jose I. Alameda-Lozada, University of Puerto Rico; Roger Brinner, DRI/McGraw Hill; Fabio Canova, Brown University; Geoffrey Carliner, NBER; Timothy Cook, Federal Reserve Bank of Richmond; George Green, Bureau of Economic Analysis; Stephen McNees, Federal Reserve Bank of Boston; Charles I. Plosser, NBER and University of Rochester; Victor Solo, Johns Hopkins University; and Jeffrey Woolridge, MIT.

Productivity Conference in Honor of Zvi Griliches

The NBER and the Maurice Falk Institute for Economic Research cosponsored a conference on productivity in Jerusalem on May 7–8 in honor of the sixtieth birthday of Zvi Griliches. Research Associate Reuben Gronau of Hebrew University organized the following program:

Timothy F. Bresnahan, NBER and Stanford University, and Manuel Trajtenberg, NBER and Tel Aviv University, "General Purpose Technologies"

Discussant: Moshe Justman, Ben-Gurion University
Mark Schankerman, NBER and London School of Economics, "How Valuable Is Patent Protection? Estimates by Technology Field"

Discussant: Benjamin Bental, Technion

Ernst R. Berndt, NBER and MIT, and Catherine J. Morrison, NBER and Tufts University, "High Tech Capital, Economic Performance, and Labor Com-

position in U.S. Manufacturing Industries: An Exploratory Analysis"

Discussant: Moshe Kim, University of Haifa

Sigbjorn Atle Berg, Norges Bank, and Moshe Kim, "Oligopolistic Interdependence and Banking Efficiency: An Empirical Evaluation"

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

Aryeh Bregman, Bank of Israel; Melvyn A. Fuss; and Haim Regev, Israel Central Bureau of Statistics, "The Production and Cost Structure of Israeli Industry: Evidence from Individual Firm Data"

Discussant: Saul Lach, NBER and Hebrew University
Zvi Griliches, NBER and Harvard University, and Haim Regev, "Firm Turnover and Productivity Growth in Israeli Industry, 1979–88"

Discussant: Reuben Gronau

Jacob A. Mincer, NBER and Columbia University, "Human Capital, Technology, and the Wage Structure: What Do Time Series Show?"

Discussant: Michael Beenstock, Hebrew University
Franklin M. Fisher, MIT, "The Production-Theoretic Measurement of Input Price and Quantity Indices"

Discussant: Ernst R. Berndt

Steven T. Berry, NBER and Yale University, "Discrete Choice Models of Oligopoly Product Differentiation"

Discussant: Franklin M. Fisher

Ariel Pakes, NBER and Yale University, "Dynamic Behavioral Responses in Longitudinal Datasets: Productivity in the Telecommunications Equipment Industry"

Discussant: Zvi Eckstein, Tel Aviv University

Alberto Holly, University of Lausanne, "Strong Consistency of Extremum Estimators for Semiparametric Models"

Discussant: Jacob Ritov, Hebrew University

Jacques Mairesse, NBER and Institute National de la Statistique et des Etudes Economiques, and Patrick Sevestre, Ecole Nationale de la Statistique et de l'Administration Economique, "Correlated Effects versus Errors in Variables in Panel Data Econometrics: A New Look Using Chamberlain's π Matrix Approach"

Discussant: Jerry A. Hausman, NBER and MIT

Moshe Buchinsky, Harvard University, "Changes in the United States, 1963–87: Application of Quantile and Censored Quantile Regressions"

Discussant: Giora Hanoch, Hebrew University

Whole areas of technical progress and economic growth are driven by General Purpose Technologies (GPTs). Broadly applicable capital goods (such as the steam engine, the electric motor, and the computer) and broadly adaptable process technologies (such as interchangeable parts, the assembly line, or "just in time") may represent a large fraction of the technical advance of an era. GPTs can be used as inputs by many downstream sectors; they have the inherent potential

for technological improvements; and the productivity of R and D in a downstream sector increases as a consequence of innovation in the GPT. Thus, as GPTs improve, they spread throughout the economy, bringing about generalized productivity gains. Bresnahan and Trajtenberg show that GPTs play a large role in determining the (overall) rate of technical advance.

Schankerman estimates the private value of patent protection using a new dataset of patents applied for in France during 1969–87 in four technology fields (pharmaceuticals, chemicals, mechanical, and electronic) by five countries of origin (France, Germany, the United Kingdom, the United States, and Japan). He finds that, on average, patent protection generates rents equivalent to a 15 percent subsidy to R and D. The two oil price shocks in 1974 and 1980 had large negative impacts on the private value of patent rights, on the same order of magnitude as the decline in the value of firms registered in the stock markets.

Berndt and Morrison find limited evidence of a positive correlation between industry profitability and the share of office and information technology capital in the total physical capital stock (OF/K). Increases in OF/K are negatively correlated with growth in multi-factor productivity; this finding holds for various industries and across industries. Moreover, increases in OF/K tend to be labor-using. The evidence on positive correlations between OF/K and white collar (nonproduction) labor intensity is reasonably consistent; the evidence for OF/K and blue collar (production worker) hours is more mixed. Finally, Berndt and Morrison find skill upgrading between blue collar and white collar occupations, and within the blue collar occupations, that is related to OF/K .

Berg and Kim incorporate the oligopolistic nature of the banking industry into the (conventional) production model in order to measure scale economies and efficiency. They find that the largest banks behave as market leaders, whereas the small banks compete among themselves. The medium-sized banks seem to be in a middle position, competing both with smaller and larger banks. The authors also demonstrate that measurements of scale economies and inefficiencies in the banking sector are not independent of market structure characteristics.

Bregman, Fuss, and Regev use a dataset of 850 Israeli firms from 1979–83. They confirm that capital, labor, and materials in industry are substitutes for each other. They also find that the smallest firms are much more vulnerable to market failures than other firms are. Their results also indicate that the union-owned Histadrut firms on average have low productivity and high costs. The large public sector firms are inefficient and have higher costs than the large private firms do, but the opposite is true for the small public firms.

Griliches and Regev analyze a large panel dataset on Israeli industrial firms. They find that most of the growth in aggregate productivity comes from productivity changes within firms rather than from entry, exit, or differential growth. Firms that will exit in the future

have lower productivity performance several years earlier (the “shadow of death” effect). Overall, there was little total factor productivity growth in Israeli industry during 1979–88 (another lost decade), they find.

Mincer studies the effects of technologically based changes in the demand for human capital on the educational and experience wage structure in annual Current Population Survey data, 1963–87. He finds that year-to-year educational wage differentials are quite closely tracked by relative supplies of young graduates, and by indexes of relative demand, such as R and D expenditures per worker, and ratios of service-to-goods employment. Of these, R and D indexes account for most of the explanatory power. Indexes of productivity growth and of international competition are significant as alternatives, but show weaker explanatory power. The observed steepening of experience profiles of wages is explained, in part, by changes in relative demographic supplies (cohort effects), and in part by the growing profitability of human capital that extends to that acquired on the job.

Fisher considers the construction of price and quantity index numbers for inputs from the point of view of production theory. He develops the theory of input price deflation for different forms of market organization and shows that the central case—of a competitive industry facing rising factor-supply schedules—is different.

Berry considers methods for estimating differentiated product models in the presence of unobserved product characteristics. The issue of unobserved product characteristics has important implications for studies of oligopoly behavior, or public policy in differentiated products markets, and for hedonic pricing studies.

New technology and a gradual liberalization of the regulatory environment has led to a dramatic restructuring of the U.S. telecommunications industry. Pakes uses data from the Longitudinal Research Database at the U.S. Bureau of the Census on a plant-level panel of establishments operating in the appropriate five-digit product classes at some time between 1975 and 1986. He finds that productivity increased during this period largely from a reallocation of capital to more productive plants: cost efficiency conditional on the distribution of fixed factors actually decreased somewhat over the period.

Holly suggests a method for obtaining efficiency bounds in the context of semiparametric models. The theory developed in this paper is illustrated by the computation of the efficiency bound for the so-called Cox regression model.

Mairesse and Sevestre use observations on value added, capital stock, and employment for 250 large manufacturing firms in France over the 21-year period, 1966–86, and find that both errors in variables and correlated specific effects affect estimates of production functions. Errors in variables affect the estimates at least as much as correlated effects do, but correlated effects are still present in first differences. The usual assumptions about the nonautocorrelation and stationarity of measurement errors do not seem warranted.

Buchinsky finds that changes in wage inequality during the 1970s can be attributed to differential changes in the returns to education and experience at different quantiles. These differential increases in the return to education and experience induce, especially from 1979 onward, increases in within-group wage inequality.

Also attending the conference were: Joram Mayshar and Morris Teubal, Hebrew University; Moshe Sicron, Israel Central Bureau of Statistics; and Oded Stark, Harvard University.

The Macroeconomic Effects of Fiscal Policy

Sixty economists met in Cambridge on May 10-11 for an NBER-Universities Research Conference on "The Macroeconomic Effects of Fiscal Policy." Research Associate Andrew B. Abel, University of Pennsylvania, organized the two-day program:

Kei-Mu Yi, Rice University, "Can Government Purchases Explain the Recent U.S. Net Export Deficits?"
Discussants: David Backus, New York University, and Roger Kormendi, University of Michigan

Daniel Levy, University of California, Irvine, "Investment-Saving Comovement, Capital Mobility, and Fiscal Policy"
Discussants: Maurice Obstfeld, NBER and University of California, Berkeley, and Marianne Baxter, University of Rochester

Giuseppe Bertola, NBER and Princeton University, and Allan Drazen, NBER and Tel Aviv University, "Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity"
Discussants: Henning Bohn, University of Pennsylvania, and Shaghil Ahmed, Pennsylvania State University

Neil Bruce, Queen's University, "Time-Consistent Fiscal Policy and the Choice Between Direct and Indirect Taxation"
Discussants: Carol Rogers, University of Pennsylvania, and V. V. Chari, Federal Reserve Bank of Minneapolis

Alan J. Auerbach, NBER and University of Pennsylvania; Jagadeesh Gokhale, Federal Reserve Bank of Cleveland; and Laurence J. Kotlikoff, NBER and Boston University, "Generational Accounts: A Meaningful Alternative to Deficit Financing" (NBER Working Paper No. 3589)
Discussants: Robert Eisner, Northwestern University, and Robert E. Lucas, NBER and University of Chicago

Willem H. Buiter, NBER and Yale University, and Kenneth M. Kletzer, Yale University, "Fiscal Poli-

cies and Productivity Growth in an Interdependent World Economy"

Discussants: Assaf Razin, NBER and Tel Aviv University, and Paul M. Romer, NBER and University of California, Berkeley

Lawrence A. Jones, Northwestern University; Rodolfo Manuelli, Stanford University; and Peter Rossi, University of Chicago, "Optimal Taxation in Models of Endogenous Growth"

Discussants: R. Anton Braun, University of Virginia, and Kenneth Judd, NBER and Stanford University

Yi asks how U.S. government purchases can explain movements and comovements in U.S. net exports during the 1970s and 1980s. He finds that modeling government purchases and private consumption as complements in preferences, and allowing for people to revise their expectations of future government purchases downward, can account for much of the time path of net exports and for their comovements with consumption and government purchases and over time.

Levy studies the long-run relationship between investment and saving in the United States, and tries to identify the factors that determine it. He shows that fiscal policy may be important in determining the comovement of investment and saving. Also, the degree of capital mobility is related directly to the crowding-out effect of fiscal policy on investment and external balance.

In several countries the correlation between private consumption and government spending is positive when government spending is high relative to GDP. Bertola and Drazen explain this phenomenon in terms of expectational effects. If government spending follows a random upward trend and the public believes it may fall sharply when it reaches specific "trigger points," then optimizing consumption behavior and simple budget constraints imply a theoretical relationship very similar to the empirical one.

Bruce shows that direct taxes, for which rates can be made contingent on household characteristics, dominate indirect taxes levied on transactions. The government's ability to levy different tax rates on households of different ages introduces a time-consistency problem that is not present with the "anonymous" indirect tax rates. As a result, a government that restricts itself to indirect taxation may improve welfare relative to one that resorts to direct taxation.

Auerbach, Gokhale, and Kotlikoff present a "generational accounting system" as an alternative to using the federal budget deficit to assess the fiscal burden that current generations are placing on future generations. The accounts indicate, in present value, the net amount that current and future generations are projected to pay to the government now and in the future. The authors estimate that under current spending policies, the fiscal burden facing all future generations over their lifetimes will be at least 23 percent larger than newborns faced in 1989.

Buiter and Kletzer show that persistent differentials in both levels and rates of growth of productivity are possible even when there is free trade, free international capital mobility, and all production techniques are available globally. They believe that there are important "local" (regional or national) essential complementary inputs into production that cannot be imported but must be "home-grown." These are the social, political, cultural, legal, and educational infrastructure without which modes of production and economic organization conducive to high productivity cannot be realized. When public spending is neither more nor less efficient than private spending, an increase in public spending on education will crowd out private spending by more than one-to-one, unless the income effect of the public transfer in kind for the generation receiving it is offset by tax increases. A higher subsidy rate to educational private spending raises the relative growth rate of productivity and a higher source-based tax on capital income lowers it. Residence-based taxes affect the worldwide productivity growth rate through their effect on the world rate of interest. They affect the productivity growth differential across countries through their differential effect on the cost of borrowing by households to finance educations. Changes in source-based taxes on capital income also affect global saving and have a differential effect on productivity growth by altering relative wages across borders.

Jones, Manuelli, and Rossi study output growth under Ramsey optimal taxation in endogenous growth models calibrated to U.S. data. The authors calculate the growth and welfare effects of a switch to the Ramsey tax system, and find that the potential growth and welfare effects may be quite large.

The Economics of Health Care

Over 30 economists and physicians convened in Cambridge on May 17 for an NBER workshop on the economics of health care. Research Associate Alan J. Garber, Stanford University, organized the following program:

Martin Gaynor, NBER and Johns Hopkins University, and Paul J. Gertler, NBER and Harvard University, "Moral Hazard in Partnerships" (NBER Working Paper No. 3373)

Discussant: Thomas McGuire, Boston University

Joel Hay, Hoover Institution, and Frank A. Wolak, NBER and Stanford University, "A Procedure for Estimating the Unconditional HIV Infection Distribution and Its Variability"

Discussant: Jeffrey E. Harris, NBER and MIT

Jayencu Patel, Harvard University; John Rizzo, Agency for Health Care Policy and Research; and Richard J. Zeckhauser, NBER and Harvard University, "Unions, Employment, and Firm Ownership: Evidence from the U.S. Hospital Industry"

Discussant: Sherry Glied, Columbia University

David M. Cutler, MIT, "Empirical Evidence on Hospital Delivery Under Prospective Payment"

Discussant: Sherwin Rosen, NBER and University of Chicago

Gaynor and Gertler find that in medical group practices, increased risk aversion leads to compensation arrangements that spread more risk through greater sharing of output, and to smaller groups designed to counteract diminished incentives. Also, compensation arrangements with greater degrees of sharing of revenue by physicians significantly reduce each physician's productivity; reductions in group size, in contrast, significantly increase productivity. The estimated premium associated with risk aversion accounts for almost 11 percent of gross income, comparing the most risk-averse to the least risk-averse physicians in the sample.

Hay and Wolak present a procedure for estimating both the HIV/AIDS infection distribution—the cumulative number of seropositive individuals as a function of time—and the unconditional sampling distribution of this estimate. The estimation procedure amounts to solving an inequality-restricted least squares estimation problem subject to smoothness priors on the regression coefficients. They find that both the point estimate of HIV/AIDS infection distribution and its associated upper and lower confidence-bound paths remain stable over a wide range of scenarios.

On April 23, 1991, the Supreme Court unanimously upheld a National Labor Relations Board regulation that will make it substantially easier for labor unions to organize workers at thousands of community hospitals, where fewer than 20 percent of the workers currently belong to unions. Patel, Rizzo, and Zeckhauser study an analogous episode in the 1970s and find that the likelihood of unionization is related to size, location in the South, prevailing rates of unionization in its area, and public versus private ownership. The union impact on wages is concentrated mainly in the for-profit hospitals; effects on public hospitals are smaller and virtually negligible for the community hospitals. The effects diminish over the 1970s. The evidence on whether unions and firms bargain over employment as well as wages is mixed. Data on changes in the 1970s show no effect on employment per bed. However, after 1979, there is an indication that unionization initially lowers employment growth but then raises it when the percentage of unionized workers within the hospital is sufficiently high.

Cutler uses data on hospitalizations in Massachusetts in 1984 and 1988 to examine the effect of government price-setting on the number of admissions and the intensity of care. He concludes that fixed prices

cause the intensity of treatment to be rationed. Diagnoses with larger price reductions have larger declines in hospital stays and numbers of procedures than do diagnoses with price increases. Similar results are true across hospitals. Further, fixed prices do not limit the number of hospital admissions. There is no disproportionate decline in admissions in lower-priced diagnoses, nor is there evidence of shifting patients from more expensive to less expensive hospitals.

The Economics of Higher Education

An NBER conference on "The Economics of Higher Education" was held in Williamsburg, Virginia on May 17-19. Research Associates Charles T. Clotfelter, Duke University, and Michael Rothschild, University of California, San Diego, organized the program:

Michael Rothschild, and Lawrence White, New York University, "The University in the Marketplace: Some Insights and Some Puzzles"

Discussant: Charles T. Clotfelter

Ronald G. Ehrenberg, NBER and Cornell University, and Dominic Brewer and Daniel I. Rees, Cornell University, "How Would Universities Respond to Increased Federal Support for Graduate Students?" (NBER Working Paper No. 3741)

Discussant: Michael McPherson, Williams College

John M. Quigley and Daniel L. Rubinfeld, University of California, Berkeley, "Public Choices in Public Higher Education"

Discussant: Helen F. Ladd, Duke University

Philip J. Cook, Duke University, and Robert Frank, Cornell University, "Ahead of the Curve: The Growing Concentration of Top Students at Elite Schools"

Discussant: Malcolm Getz, Vanderbilt University

Robert C. Merton, NBER and Harvard University, "Optimal Investment Strategies for University Endowment Funds"

Discussant: George M. Constantinides, NBER and University of Chicago

Charles Manski, NBER and University of Wisconsin, "Adolescent Econometricians: How Do Youth Infer the Returns to Schooling?"

Discussant: Eric Hanushek, University of Rochester

Robert Hauser, University of Wisconsin, Madison, "Trends in College Attendance Among Blacks, Whites, and Hispanics"

Discussant: James J. Heckman, NBER and Yale University

Jerry R. Green, NBER and Harvard University, "Quality Variation in New Academics"

Discussant: Charlotte Kuh, Educational Testing Service

Rothschild and White apply competitive analysis to higher education. They discuss the purported subsidization of graduate education and research by undergraduate education, and the extent to which universities do and should compete in price. They also show that elite professional schools charge much less for their extremely valuable degrees than the market would bear.

Ehrenberg, Brewer, and Rees demonstrate that universities producing doctorates respond to changes in the number of graduate students supported with external funds by altering the number that they support with internal funds. Other things equal, an increase of 100 students who are supported externally appears to be associated with a reduction of 22 or 23 students supported internally. Changes in external support patterns also change internal support patterns across fields of study and across mechanisms of support (fellowships, research assistantships, and teaching assistantships) in ways that may not always be consistent with policy-makers' objectives.

Quigley and Rubinfeld use a 1984-5 cross-sectional analysis of 50 states to explain the provision of public higher education as a function of the availability of private alternatives, and of other supply and demand factors. Historical forces help to explain the overall pattern of higher enrollments in eastern private colleges and universities, and low enrollments in eastern public institutions, in comparison to low private enrollments and high public enrollments in the West.

Cook and Frank show that a large and growing proportion of the nation's top students are concentrated in a small number of top-ranked universities. This concentration occurred among elite private universities and also within state systems that have several campuses.

Merton develops a model for intertemporally optimal investment and expenditure rules for a university endowment. He takes explicit account of overall university objectives and of the availability of sources of cash flow other than endowment. The optimal portfolio strategy serves not only to provide an efficient risk-return trade-off, but also to hedge against cost uncertainties for university activities such as education, research, and storage of knowledge.

Manski argues that it is important to know how youths estimate the returns to schooling in order to understand their decision to attend college. Manski analyzes how different methods that youths may use to predict their return from additional schooling will affect their decisions.

Hauser demonstrates the rise and fall of blacks' chances of college entry, relative to those of whites, from the 1970s to the 1980s. The trend among blacks contrasts with lesser change among Hispanics relative to whites. Among blacks and whites, but not Hispanics, improvements in the social background of successive cohorts have given a continuous impetus to growth in college entry. Improved chances for women also have contributed to growth in college entry, and the improvement is similar in all ethnic groups.

Using data from 1985-90, Green examines the per-

centage of Harvard's graduating seniors who intend to pursue academic careers. He observes no overall trend, just a marked increase in 1990. Students of the humanities have increased their interest in academic careers greatly, especially those with middle-ranking grade records, as have certain science majors, in particular the more outstanding students. Green also attempts to measure the uncertainty that students have about their own careers, and the way this is expressed in immediate and subsequent post-graduation plans.

Also attending the conference were: Martin Cave, Brunel University; Roy Radner, Bell Laboratories; John J. Siegfried, Vanderbilt University; and Martin Weale, University of Cambridge.

There will be an NBER volume based on this conference, to be published by the University of Chicago Press. Its availability will be announced in a future issue of the *NBER Reporter*.

State and Local Taxes After TRA86

An NBER conference on "State and Local Taxes After TRA86," organized by Research Associate Robert P. Inman of the University of Pennsylvania, was held on May 30–June 1. The program was:

Helen F. Ladd, Duke University, "State Responses to the TRA86 Revenue Windfall"

Discussants: Edward Gramlich, University of Michigan, and John Brandl, University of Minnesota

Gilbert E. Metcalf, NBER and Princeton University, "Tax Exporting, Federal Deductibility, and Optimal State Tax Structure"

Discussants: Howard Chernick, Hunter College, and Robert Ebel, Peat Marwick Main and Co.

David Wildasin, Indiana University, "Interstate Fiscal Externalities Before and After Tax Reform"

Discussants: Roger H. Gordon, NBER and University of Michigan, and Thomas Downes, Northwestern University

Anne Case, NBER and Princeton University, "State Tax Competition Following TRA86"

Discussants: John D. Wilson, Indiana University, and Douglas Holtz-Eakin, NBER and Syracuse University

Marcus Berliant, University of Rochester, and Robert Strauss, Carnegie–Mellon University, "State Tax Equity and Federal Taxation: Estimates Before and After TRA86"

Discussants: James R. Hines, Jr., NBER and Princeton University, and Robert Tannenwald, Federal Reserve Bank of Boston

Robert P. Inman, "The Political Economy of TRA86: Local Interests and Washington Politics"

Discussants: James Snyder, Carnegie–Mellon University, and Michael Livingston, Rutgers University

More than half of the U.S. states raise revenue through income taxes that rely on the federal tax code to define their tax base. For those states, the expansion of the definition of federal taxable income in the Tax Reform Act of 1986 (TRA86) generated revenue windfalls: their tax collections would rise even if they did not change their income tax rates. For other states, notably the eight that do not levy an income tax, TRA86 did not affect revenue collections. Ladd investigates how state legislatures responded to the possible revenue windfall. She finds that on average states reduced tax rates to return three-quarters of the revenue windfall to their citizens.

Metcalf focuses on how recent changes in the federal tax code, notably eliminating deductibility of state sales taxes in computing federal taxable income, affected the mix of taxes used by states. He finds that federal tax deductibility has little effect on state sales tax burdens: there has been an increase in states' reliance on sales taxes since 1986. However, states that can "export" their sales tax to residents of other states (for example, states with substantial tourism) do tend to impose higher sales taxes.

When the federal tax code allows a deduction for state taxes, an individual's choice of which state to live in (and therefore of how much to pay in state taxes) imposes a fiscal externality on other citizens, Wildasin observes. When individuals move from a low-tax state to a high-tax state, they reduce their federal taxes and place a higher tax burden on everyone else in the fiscal system. Wildasin argues that the reduction in federal tax rates in 1986 made these fiscal externalities less important, and consequently reduced at least one source of inefficiency in the multijurisdictional tax system.

Case analyzes how states respond to the tax policies of their neighbors by looking at the tax burden on households of various income levels in geographically adjoining states. While there is no clear interstate competition for tax revenues from low- and middle-income households, there is such competition at high-income levels. Case estimates that a one dollar increase in the average tax burden on high-income households in all of the states adjoining a given state would induce roughly a 30-cent increase in the given state's tax burden.

Using estimates of the changes in tax payments by households in different states, Berliant and Strauss find that TRA86 raised the progressivity of most state tax codes, primarily because it redefined the federal income tax base to include more of the income typically received by high-income households. The federal tax changes nevertheless reduced the progressivity of the federal tax code by changing the marginal rate structure, particularly by lowering the marginal tax rates at top income levels. However, there is strong

evidence of disparities across states in the progressivity and equity properties of the tax code.

Inman examines how special benefits in TRA86, principally from transition rules affecting particular taxpayers, are distributed across lawmakers. He finds that states with senators on the Senate Finance Committee receive larger benefit allocations than those without such elected officials.

Also attending the conference were: John Capeci, Brandeis University; Elisabeth Coutts and Daniel R. Feenberg, NBER; Lee Friedman, University of California, Berkeley; Jonathan Jacobson, MIT; and James M. Poterba, NBER and MIT.

The conference proceedings will appear in a future issue of the *Journal of Policy Analysis and Management*.

Conference Calendar

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

Organizations wishing to have meetings listed in the Conference Calendar should send information, comparable to that given below, to Conference Calendar, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138. Please also provide a short (fewer than fifty words) description of the meetings for use in determining whether listings are appropriate for inclusion. The deadline for receipt of material to be included in the Fall 1991 issue of the *Reporter* is September 1. If you have any questions about procedures for submitting materials for the calendar, please call Kirsten Foss Davis at (617) 868-3900.

August 12-16, 1991

State and Local Government Finance, NBER

August 19-22, 1991

Joint Statistical Meetings, American Statistical Association*

August 25-29, 1991

47th Congress: Public Finance in a Changing Political Environment, International Institute of Public Finance*

September 12, 1991

U.S. Environmental Policy and Economic Growth: How Do We Fare? American Council for Capital Formation

September 12-13, 1991

Panel on Economic Activity: Macroeconomics, Brookings Institution

September 19-21, 1991

Differences and Changes in Wage Structures, NBER (with London School of Economics)

September 22-25, 1991

Annual Meeting, National Association of Business Economists*

September 26-28, 1991

International Taxation, NBER

September 27-28, 1991

Implementing Monetary Policy in Phase Two, Centre for Economic Policy Research

October 2-5, 1991

20th (biannual) Conference, Center for International Research on Economic Tendency Surveys*

October 3-6, 1991

Retrospective on the Bretton Woods System: Lessons for International Monetary Reforms, NBER

October 11, 1991

Research Meeting: Economic Fluctuations, NBER

October 11-14, 1991

International Atlantic Economic Conference, Atlantic Economic Society*

October 17-18, 1991

Economic Policy Panel, Centre for Economic Policy Research

October 17-19, 1991

Unemployment and Wage Determination, NBER (with Centre for Economic Policy Research)

October 22, 1991

Economic Prospects for Developing Countries, Overseas Development Institute

October 25-26, 1991

Economic Growth, NBER

October 31-November 1, 1991

The Uruguay Round Negotiations and the Global Trading System, University of Michigan

November 1, 1991

Program Meeting: Financial Markets and Monetary Economics, NBER

November 7-8, 1991

Program Meeting: Taxation, NBER

November 15, 1991

Political Economy, NBER

November 15, 1991

Symposium on Stolper and Samuelson, "Protection and Real Wages": A Golden Jubilee, University of Michigan

November 19, 1991

Tax Policy and the Economy, NBER

November 22, 1991

Program Meeting: Labor Studies, NBER

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

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

November 22-23, 1991

Public Policy Conference, Carnegie-Mellon University—University of Rochester

November 24-26, 1991

Annual Meeting, Southern Economic Association*

November 28-29, 1991

Fourth Australasian Finance and Banking Conference, University of New South Wales

December 5-6, 1991

Program Meeting: Industrial Organization, NBER

December 13-14, 1991

Universities Research Conference: Economics of the Environment, NBER

December 13-15, 1991

Finance and Development in Europe, Centre for Economic Policy Research

December 16-17, 1991

Private Sector Training, NBER

January 3-5, 1992

Annual Meeting, American Economic Association*

January 9-10, 1992

New Growth and Development Economics, NBER (with Tokyo Center for Economic Research and Centre for Economic Policy Research)

January 16-18, 1992

The Transition to Economic and Monetary Union in Europe, Bank of Portugal (with Centre for European Policy Studies)

January 23-24, 1992

Social Protection versus Economic Flexibility: Is There a Trade-Off? NBER

January 24-25, 1992

Monetary Policy, NBER

February 7, 1992

Economic Fluctuations Research Meeting, NBER

February 7-8, 1992

Export Market Access, NBER

February 12-15, 1992

U.S.-Japan Economic Forum, NBER

February 26-29, 1992

Industrial Restructuring in Eastern Europe, NBER

February 28, 1992

Program Meeting: Financial Markets and Monetary Economics, NBER

March 6-7, 1992

Seventh Annual Conference on Macroeconomics, NBER

March 15-17, 1992

Fifth Interamerican Seminar on Economics, NBER

March 26-28, 1992

Annual Meeting, Midwest Economic Association*

April 2-3, 1992

Panel on Economic Activity: Macroeconomics, Brookings Institution

April 3-5, 1992

Pacific Rim Conference, NBER

April 24, 1992

Workshop on Macroeconomic History, NBER

April 24-25, 1992

Public Policy Conference, Carnegie-Mellon University—University of Rochester

May 1, 1992

Conference on Aging, NBER

May 15, 1992

Foreign Direct Investment, NBER

June 1, 1992

Third Annual Asian Seminar on Economics, NBER (with Korea Development Institute)

September 15-18, 1992

Annual Meeting, National Association of Business Economists*

November 22-24, 1992

Annual Meeting, Southern Economic Association*

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

Bureau News

Bureau Researchers Head to D.C. and Beyond

A number of NBER researchers have recently left, or are about to leave, academia for a time to take up government posts. Lawrence H. Summers, an NBER Research Associate and professor of economics at Harvard University, became Vice President and Chief Economist of the World Bank in January 1991. He is expected to serve a 2½-year term.

Research Associate Alan J. Auerbach, a member of the NBER's Program in Taxation and professor of economics at the University of Pennsylvania, is currently serving as a consultant to the Congress's Joint Committee on Taxation. In 1992, he will become the committee's Chief Economist and Deputy Chief of Staff.

NBER Research Associate R. Glenn Hubbard will leave Columbia University Graduate School of Business this summer to become Deputy Assistant Secretary for Tax Analysis at the U.S. Department of the Treas-

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

surey. He will replace NBER Research Associate Harvey S. Rosen, who returns to Princeton University.

On August 15, former NBER Research Associate Jacob A. Frenkel will begin a five-year term as governor of the Bank of Israel (that country's central bank). He replaces NBER Research Associate Michael Bruno, who will return to teaching at Hebrew University. Most recently, Frenkel had been Economic Counsellor and Director, Research Department, at the International Monetary Fund in Washington.

Finally, Lawrence B. Lindsey, who was a member of the NBER's Program in Taxation and an economics professor at Harvard University, has been nominated to the Federal Reserve Board of Governors. He currently is Special Assistant to the President for Policy Development, working in the White House.

Program Meeting on Taxation

Over 40 members and guests of the NBER's Program in Taxation met in Cambridge on April 11-12. Program Director David F. Bradford, Princeton University, and Deputy Program Director James M. Poterba, MIT, organized the following program:

Louis Kaplow, NBER and Harvard University, "Taxation and Risk Taking Revisited" (NBER Working Paper No. 3709)

Discussant: James R. Hines, Jr., NBER and Princeton University

David Durbin, Milliman and Robertson, Inc.; Bruce D. Meyer, NBER and Northwestern University; and W. Kip Viscusi, Duke University, "Workers' Compensation and Injury Duration: Evidence from a Natural Experiment" (NBER Working Paper No. 3494)

Discussant: Leslie Papke, NBER and Boston University

Joram Mayshar, Hebrew University; Joel B. Slemrod, NBER and University of Michigan; and Shlomo Yitzhaki, NBER and Hebrew University, "The Optimal Two-Bracket Linear Income Tax"

Discussant: Jerry A. Hausmann, NBER and MIT

Mark Gertler, NBER and New York University, and R. Glenn Hubbard, NBER and Columbia University, "Corporate Overindebtedness and Macroeconomic Risk"

Discussant: John B. Shoven, NBER and Stanford University

William Gale, University of California, Los Angeles, and John Karl Scholz, University of Wisconsin, Madison, "Intergenerational Transfers and the Accumulation of Wealth"

Discussant: James M. Poterba

James Snyder, University of Chicago, "The Market for Campaign Contributions: Evidence for the U.S. Senate, 1980-6"

Discussant: Michael Rothschild, NBER and University of California, San Diego

Jeffrey K. MacKie-Mason and Roger H. Gordon, NBER and University of Michigan, "Taxes and the Choice of Organizational Form"

Discussant: Andrei Shleifer, NBER and Harvard University

Kaplow shows that many types of taxes can be decomposed into a combination of a wage tax, an ex ante wealth tax, and a modification of government investment policy. For example, a tax on investment returns, with an adjustment in government investment policy, is equivalent to a tax on the riskless component of investment returns or to an ex ante wealth tax—both of which absorb no private risk and yield certain revenue. Kaplow assumes that regimes are equivalent if, for each state of nature, individuals' wealth and government revenue are the same under both regimes, and total investment in each asset is the same.

In Kentucky and Michigan, two large increases in the maximum weekly benefit amount of workers' compensation raised benefits for high-earning individuals by over 60 percent; low-earning individuals, who were not eligible for the old maximum, experienced no change in their benefits. Durbin, Meyer, and Viscusi compare the behavior of people injured the year before the benefit increases to those injured the year after. Using individual records from a large number of insurance companies, they find that time out of work increases dramatically for those eligible for higher benefits. Those whose benefits do not change do not stay out of work any longer.

Mayshar, Slemrod, and Yitzhaki investigate the implications of adding a second tax rate and bracket to a linear income tax. They find that, in a two-class economy with Pareto-efficient taxes, at least one marginal tax rate must equal zero, and may be increasing or declining. The second marginal tax rate lies below the first rate; but progressivity, in the sense of uniformly rising tax rates, usually obtains. Adding a second tax bracket allows the lower marginal tax rate on high-wage people to coax out enough additional labor supply that the optimal demogrant is increased. Thus, compared to the simple linear income tax system, both the highest- and lowest-wage individuals are better off, while a middle range of taxpayers is worse off.

Gertler and Hubbard attempt to explain why firms designing an optimal capital structure may choose a level of debt ex ante that leaves them heavily exposed to macroeconomic risk. In their model, firms face both macroeconomic and idiosyncratic risk. The optimal financial contract is a mixture of debt and equity, in which equity effectively acts as a cushion against aggregate shocks. If corporate taxes on equity earnings provide a subsidy to debt, then an equilibrium with "excessive leverage" is possible. Gertler and Hubbard show

that dividend payments to equityholders are procyclical; that there are countercyclical patterns in business liquidations; and that (even small) movements in the tax subsidy to debt will change corporate borrowing.

Gale and Scholz examine the role of intergenerational transfers in the accumulation of net worth and on differences in transfers between blacks and whites. Using the 1983-6 Survey of Consumer Finances, which contains detailed information on households' gifts to and from other households, trusts, life insurance, and bequeathable net worth, they estimate that intended transfers (for example, gifts) can account for at least 20 percent of net worth, and possibly substantially more. Thus, a significant portion of wealth accumulation cannot be explained by the life-cycle model. They also find that differences between blacks and whites in accumulated transfers received are large relative to differences in the net worth of these groups. Therefore, transfers may play an important role in explaining large, previously unexplainable differentials in wealth across race. While Gale and Scholz find no evidence that race, per se, affects transfers, they do find that net worth and education, which differ substantially across race, are important.

Snyder models special-interest contributors as rational investors seeking private benefits in exchange for their campaign contributions. Examining the actual pattern of contributions in U.S. Senate races from 1980-6, he finds that the total amount of political action committee (PAC) contributions is not related to the state's population, but the level of individual contributions is. Further, a candidate's share of the total special-interest PAC contributions in his or her race is an excellent predictor of the probability of winning the race.

Double taxation of corporate income reduces the benefits of incorporation. MacKie-Mason and Gordon ask how this tax distortion affected the allocation of assets and taxable income between corporate and noncorporate forms of organization in the United States from 1965-86. They also estimate the extent to which easing the conditions that firms must satisfy to acquire Subchapter S status has increased the amount of activity organized in that way. The effects that they measured are small, throwing doubt on the economic importance of tax-induced changes in organizational form.

Industrial Organization Group Meets

A meeting on industrial organization, arranged by NBER researchers Nancy Rose and Paul L. Joskow, MIT, and Timothy F. Bresnahan and Garth Saloner, Stanford University, was held in Cambridge on April 19. The agenda was:

Andrea Shepard, MIT, "Contractual Form, Retail Price, and Asset Characteristics"

Discussant: Michael Salinger, Boston University

Scott Masten and Edward Snyder, NBER and University of Michigan, "*United States v. United Shoe Machinery Corporation: On the Merits*"

Discussant: Dennis W. Carlton, NBER and University of Chicago

William Evans, University of Maryland, and Ioannis Kessides, the World Bank, "Living by the 'Golden Rule': Multimarket Contact in the U.S. Airline Industry"

Discussant: Michael D. Whinston, NBER and Harvard University

Robert Porter, Northwestern University, and J. Douglas Zona, National Economic Research Associates, "The Detection of Bid-Rigging in Procurement Auction Data"

Discussant: Steven Berry, NBER and Yale University

Rebecca Henderson, NBER and MIT; Adam Jaffe, NBER and Harvard University; and Manuel Trajtenberg, NBER and Tel Aviv University, "Telling Trails Out of School or Basicness, Appropriability, and Agglomeration Effects in the Generation of New Knowledge: A Comparison of University and Corporate Research with the Aid of Patent Data"

Discussant: Ariel Pakes, NBER and Yale University

Shepard finds that gasoline refiners use contracts with strong performance incentives for stations where the operator's effort can be observed, for instance stations with automotive repair. On the other hand, if effort is hard to observe, for example, at stations with convenience stores, then refiners will prefer contracts with weaker incentives but more direct control. Shepard also finds that prices are lower at stations where the refiner sets the retail price directly.

Masten and Snyder analyze *United States v. United Shoe Machinery Corporation*, one of the most famous antitrust cases. The government contested United Shoe's insistence on leasing rather than selling its machinery. Masten and Snyder find that leasing served as an alternative to contractual warranties for assuring the quality of machines, and as a means of fostering the generation and dissemination of nonpatentable innovations and know-how. Both United Shoe's selective use of leasing and pricing arrangements, and the size of switching costs created by the "exclusionary" provisions of the leases, are consistent with this efficiency interpretation.

Evans and Kessides find that ticket prices in a market are higher when the airlines involved are competing in several markets than when they are competing in only one market.

Porter and Zona examine bidding in auctions for state highway construction contracts on Long Island in the early 1980s, in order to determine whether bid-rigging was occurring. In the auctions they study, collusion did not take the form of a bid-rotation scheme, in which only one ring member submits a bid. Instead,

several ring members bid on most jobs. Members of the cartel evidently met before each important contract to choose a low bidder. The other cartel members then submitted substantially higher bids. The authors find that both the lowest cartel bid, and the bids of non-cartel firms, are related to cost measures, including how much backlog a firm is carrying. The higher cartel bids are not related to similar cost measures.

Henderson, Jaffe, and Trajtenberg use patent data to test whether university research is more "basic" than the research conducted by private corporations, and therefore more deserving of public subsidy. They distinguish among four measures of an innovation's basicness: closeness to science; originality; fertility; and generality. The authors show that university patents can be differentiated quantitatively from a control sample of corporate patents on all four measures. Comparing the differences in the patterns of geographic diffusion of university and corporate research, however, suggests that both types of research have a markedly geographically local impact, at least in the short term.

Other participants in this meeting were: Severin Borstein, University of California, Davis; Geoffrey Carliner, NBER; Bronwyn H. Hall, NBER and University of California, Berkeley; R. Glenn Hubbard, NBER and Columbia University; Sarah Lane, Robin Prager, and Martha Schary, Boston University; Peter Pashigian, University of Chicago; Peter C. Reiss, NBER and Stanford University; Pablo Spiller, University of Illinois, Urbana-Champaign; Valerie Suslow, University of Michigan; and Jean Tirole, MIT.

Macroeconomic History Workshop

Nearly 40 economists attended an NBER Workshop on Macroeconomic History in Cambridge on April 25-26. Research Associates N. Gregory Mankiw, Harvard University, and Christina D. Romer, University of California, Berkeley, organized the following program:

Mark Toma, University of Kentucky, "The 3/4 Percent Treasury Bill Rate Peg and the 1940s Interest Rate Control System"

Discussant: David N. Weil, Brown University

George Bittlingmayer, University of California, Davis, "The Stock Market and Early Antitrust Enforcement"

Discussant: Daniel B. Nelson, NBER and University of Chicago

Charles W. Calomiris, Northwestern University, and R. Glenn Hubbard, NBER and Columbia University, "Investment and Financing Constraints during the Recovery from the Great Depression: Evidence from the Undistributed Profits Tax of 1936-7"

Discussant: David M. Cutler, MIT

J. Bradford De Long, NBER and Harvard University, "Liquidation Cycles: Old-Fashioned Real Business Cycle Theory and the Great Depression" (NBER Working Paper No. 3546)

Discussant: Matthew G. Shapiro, NBER and University of Michigan

Mark E. L. Griffiths, Virginia Polytechnic and State University, "Monetary Union in Europe: Lessons from the Nineteenth Century"

Discussant: Xavier Sala-i-Martin, Yale University

Mario J. Crucini, University of Rochester, "Price Deflation and Real Tariff Rates: The United States, 1903-40"

Discussant: Rudiger Dornbusch, NBER and MIT

In 1942, the U.S. Department of the Treasury and the Federal Reserve System agreed to keep the market interest rate on long-term government bonds below 2.5 percent. That ceiling on long-term market interest rates can be viewed as a government commitment to low long-run average inflation. Further, the Fed agreed to passively buy and sell three-month Treasury bills at a fixed rate of 3/4 percent. Toma shows that this bill policy was like a modern-day discount policy with a below-market "discount rate." It did not result in an inflationary explosion, because it was confined narrowly to three-month Treasury bills.

Bittlingmayer, using daily stock price data for 1897-1914, finds that each antitrust case filed during that period was associated with an average decline in the Dow industrials of one-half to several percentage points. Industrial production also was lower by a similar amount per case filed. Moreover, the component of the Dow associated with antitrust cases influenced industrial production by at least as much as the residual component. Finally, Bittlingmayer finds that nonrailroad cases lowered industrial stock prices, but not railroad stock prices. These findings support the widespread charges made during the Panic of 1907, and the recession of 1911, that antitrust policy hurt business activity.

Calomiris and Hubbard use data on manufacturing corporations from 1934-8 to test for the effect of the undistributed profits tax (or Surtax on Undistributed Profits) of 1936-7 on investment spending. This was a surtax on corporate retentions over and above normal corporate taxes. Because the maximum marginal rate was 27 percent, most firms had large incentives to change their payout policies. Working against this response for some firms was the potential difference in the cost of internal and external funds. The authors find that about 24 percent of publicly traded firms paid 22 to 27 percent marginal tax rates on retained profits. Moreover, the sensitivity of investment to internal finance, after controlling for differences in investment opportunities, was important only for those firms.

De Long observes that the Federal Reserve took almost no steps to halt the slide into the Great Depression over 1929-33, but allowed the oncoming Depression to run its course, and to "liquidate" the unprofitable portions of the private economy. In adopting such

"liquidationist" policies, the Fed was merely following the recommendations provided by an economic theory of depressions that was common before the Keynesian Revolution and held by Friedrich von Hayek, Lionel Robbins, and Joseph Schumpeter, among others. De Long reconstructs the logic of this "liquidationist" view, and argues that the perspective was carefully thought out (although not adequate to the Depression) and may have held some truth as applied to business cycles that preceded the Great Depression.

Griffiths studies the Latin Monetary Union, formed in 1865 by France, Italy, Belgium, Switzerland, and Greece to standardize the different purities of otherwise identical silver coins that were circulating freely in those countries. He reports that the need for seigniorage and to avert banking crises led some countries to issue their own currency when it was more convenient than borrowing or taxing. This and other pressures eventually led to the demise of the union.

Crucini notes that existing measures exaggerate the variability in, and distort the timing of, changes in legislated tariff rates. For example, between 1903 and 1940, the lowest average tariff rate was achieved in 1920, seven years after legislated reductions in 1913; the highest rate was reached in 1932, two years after the infamous Smoot-Hawley Tariff. These apparently anomalous movements are explained readily by the widespread use in the prewar period of specific duties, which give rise to an inverse relationship between import prices and ad valorem equivalent rates. Inflation during World War I and deflation in the Depression explain the large movements in real tariff rates following the legislative amendments of 1913 and 1930. However, the influence of price variation on real tariff rates is not confined to any particular episode of the prewar era.

Claude Chouraqui, Robert P. Hagemann, and Nicola Sartor, 1990

1548. "Legal Advice About Acts Already Committed," by Louis Kaplow and Steven Shavell, 1990 (NBER Working Paper No. 3005)
1549. "Intraday Yen/Dollar Exchange Rate Movements: News or Noise?" by Takatoshi Ito and V. Vance Roley, 1990 (NBER Working Paper No. 2703)
1550. "Targets, Indicators, and Instruments of Monetary Policy," by Bennett T. McCallum, 1990 (NBER Working Paper No. 3047)
1551. "What Do Rich Countries Trade with Each Other? R and D and the Composition of U.S. and Swedish Trade," by Magnus Blomström and Lennart Ohlsson, 1990 (NBER Working Paper No. 3140)
1552. "The Welfare Economics of Moral Hazard," by Richard J. Arnott and Joseph E. Stiglitz, 1990 (NBER Working Paper No. 3316)
1553. "Money and Business Cycles: A Real Business Interpretation," by Charles I. Plosser, 1990 (NBER Working Paper No. 3221)
1554. "R and D and Productivity Growth: Comparing Japanese and U.S. Manufacturing Firms," by Zvi Griliches and Jacques Mairesse, 1990 (NBER Working Paper No. 1778)
1555. "Investment Incentives Under the Alternative Minimum Tax," by Andrew B. Lyon, 1990 (NBER Working Paper No. 2912)
1556. "Devaluation Crises and the Macroeconomic Consequences of Postponed Adjustment in Developing Countries," by Sebastian Edwards and Peter J. Montiel, 1989, (NBER Working Paper No. 2866)
1557. "Economic Liberalization and the Equilibrium Real Exchange Rate in Developing Countries," by Sebastian Edwards, 1989 (NBER Working Paper No. 2179)
1558. "Capital Market Integration: Issues of International Taxation," by Assaf Razin and Efraim Sadka, 1991 (NBER Working Paper No. 3281)
1559. "An Aging Society: Opportunity or Challenge," by David M. Cutler, James M. Poterba, Louise M. Sheiner, and Lawrence H. Summers, 1990
1560. "World Real Interest Rates," by Robert J. Barro and Xavier Sala-i-Martin, 1990 (NBER Working Paper No. 3317)
1561. "The Aggregate Matching Function," by Olivier Jean Blanchard and Peter Diamond, 1990 (NBER Working Paper No. 3175)
1562. "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-87," by Robert Summers and Alan Heston, 1991

Reprints Available

The following NBER Reprints, intended for nonprofit education and research purposes, are now available. (Previous issues of the *NBER Reporter* list titles 1-1546 and contain abstracts of the Working Papers cited below.)

These reprints are free of charge to corporate associates. **For all others there is a charge of \$3.00 (\$4.00 outside of the U.S.) per reprint requested. Advance payment is required on all orders. Please do not send cash.** Reprints must be requested by number, in writing, from: Reprint Series, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

1547. "The Sustainability of Fiscal Policy: New Answers to an Old Question," by Olivier J. Blanchard, Jean-

Technical Papers Series

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105. "Confidence Intervals for the Largest Autoregressive Root in U.S. Macroeconomic Time Series," by James H. Stock, May 1991 (JEL Nos. C22, C32)
106. "The Relative Importance of Permanent and Transitory Components: Identification and Some Theoretical Bounds," by Danny Quah, June 1991 (JEL Nos. C32, E32)

Bureau Books

Tax Policy and the Economy, Volume 5

Tax Policy and the Economy, Volume 5, edited by David F. Bradford, is available from the MIT Press. The cloth volume is \$26.95; the paperback is \$13.95.

Among the topics discussed in this latest volume in the series are: restructuring U.S. corporations in response to tax changes; the income distribution of gasoline tax payments; and measuring the effect of today's economic policies on future generations.

Bradford is director of the NBER's Program in Taxation and a professor of economics at the Woodrow Wilson School, Princeton University.

Order this volume, either clothbound or paperback, directly from the MIT Press, 55 Hayward Street, Cambridge, MA 02142: (617) 253-2884.

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

National Saving and Economic Performance

National Saving and Economic Performance, edited by B. Douglas Bernheim and John B. Shoven, is now available from the University of Chicago Press for \$47.50.

In this volume, leading experts debate the need for more accurate measurement of official saving data; examine how corporate decisions to retain or distribute earnings affect household-level consumption and saving; and investigate the effects of taxation on saving behavior, correlations between national saving and international investment over time, and the influence of economic growth on saving.

This volume should interest academic and government economists and provide a valuable introduction to the economics of saving for graduate students.

Bernheim is an NBER research associate and the John L. Weinberg Professor of Economics and Business Policy at Princeton University. Shoven is an NBER research associate and professor of economics at Stanford University.

Reducing the Risk of Economic Crisis

Reducing the Risk of Economic Crisis, edited by Martin Feldstein, is available from the University of Chicago Press. The price is \$32.00 for the clothbound version and \$12.95 for the paperback.

Not since the Great Depression has the United States experienced the type of financial crisis and economic collapse that had been a recurring problem here and in Europe for decades. However, policy officials and members of the business sector have continued to worry

about the risk of major breakdowns in the economy. Certain conditions and events in the 1980s brought renewed attention to the possibility of a major economic crisis.

This volume is part of a larger NBER study aimed at increasing our understanding of the conditions under which financial markets are vulnerable to disruption, and the economic consequences that might ensue if these markets break down. Three background papers focus on: the origins of financial crises in domestic capital markets; the transition from financial crises to economic collapse; and the international origins and transmission of financial and economic crises. Each background paper is followed by remarks from four senior academics or leaders in business or government, and by a summary of the discussion that followed these presentations at the original conference.

Martin Feldstein is president and CEO of the NBER and the George F. Baker Professor of Economics at Harvard University.

New Volume on Financial Crises

Financial Markets and Financial Crises, edited by R. Glenn Hubbard, is available from the University of Chicago Press for \$52. It covers such topics as the origins of banking panics; the behavior of financial markets during periods of crisis (examining data from the Panic of 1857 to the October 1987 stock market crash); the current thrift institutions crisis; and the susceptibility of American corporations to downturns in the economy. The volume also includes a detailed study of the over-500 FSLIC-insured thrift institutions in the Southeast (the area covered by the Federal Home Loan Bank of Atlanta). Six of the ten essays cover either banking panics or the thrift institutions crisis, and several have an international focus. This book should be of interest to those in industry and government.

Hubbard is an NBER research associate and professor of economics at the Graduate School of Business, Columbia University. He will be on leave during the coming academic year to serve as Deputy Assistant Secretary of the Treasury, heading the Office of Tax Analysis.

Current Working Papers

Individual copies of NBER Working Papers and Historical Factors in Long-Run Growth Working Papers are available free of charge to corporate associates.

For all others, there is a charge of \$3.00 (\$4.00 outside of the U.S.) per paper requested. Advance payment is required on all orders. Please do not send cash. For further information or to order, please write: Working Papers, National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138.

Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the Working Paper. **Note that the JEL introduced a new classification system in its March 1991 issue. This system is incorporated in the Working Paper abstracts, issued since March 1991, presented below.** For previous papers, see past issues of the *NBER Reporter*. Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. They are not reviewed by the Board of Directors of the NBER.

Historical Factors in Long-Run Growth

Stature and Living Standards in the United States

Richard H. Steckel

Historical Working Paper No. 24

April 1991

JEL No. N10

This paper briefly reviews the literature on living standards, and then applies the methodology for "stature" to the United States from the late 18th through the early 20th centuries. Part I emphasizes two areas: national income accounting and related measures, developed by economists and government policymakers; and anthropometric measures (particularly stature), developed by human biologists, anthropologists, and the medical profession. I compare and contrast these alternative approaches to measuring living standards, and place anthropometric measures within the context of the ongoing debate over the system of national accounts.

Part II examines the relationship of stature to living standards, beginning with a discussion of sources of evidence and the growth process. A statistical analysis explores the relationship of stature to per capita income, and to the distribution of income, using 20th century data.

Part III presents evidence on time trends, regional patterns, and class differences in height. The major phenomena discovered to date are: the early achievement of near-modern stature; the downward cycle in stature for cohorts born around 1830 to near the end of the 19th century; the height advantages of the West and the South; and the remarkably small stature of slave children. The secular decline in height is puzzling for economic historians because it clashes with firm beliefs that the mid-19th century was an era of economic prosperity. I establish a framework for reconciling these conflicting views on the course of living standards, and discuss possible explanations for the height patterns noted in the paper.

**Louis Brandeis, Work, and Fatigue
at the Start of the Twentieth Century:
Prelude to Oregon's Hours Limitation Law**
Jeremy Atack and Fred Bateman
Historical Working Paper No. 25
May 1991
JEL Nos. N31, N41, K32

In the late nineteenth and early twentieth centuries there was considerable interest among the scientific and business communities about the relationship among work, fatigue, health, and productivity. Study after study not only documented well-known relationships between occupation and disease, such as mercury poisoning among "mad hatters," but also an increasing body of evidence suggested a causal chain among fatigue induced by long hours of work, specific occupational characteristics, and weakened resistance to diseases (especially viral diseases such as tuberculosis that posed specific public and private health hazards). This evidence first persuaded the courts to allow limitations on the hours of work for women, on the grounds of protecting the "weaker sex" and the health of future generations as a public health regulation. Eventually, such limits were extended to all workers.

In this paper we analyze the data from an 1892 California Bureau of Labor Statistics survey of 3493 wage earners that provided some evidence on the relationship between hours of work and time in a job and worsening health, or days of absence from work as a result of ill health. We conclude that long hours in hot and poorly ventilated workshops performing physically or mentally exhausting work at a pace set by inanimate machines was bad for employee health. However, it is hard to make a convincing case for the public regulation of hours and conditions in the workplace as a *public*, as opposed to a private, health question. The exception is the case of children, including infants *in utero*, or exposure to communicable diseases, such as tuberculosis.

**New Sources and New Techniques for the
Study of Secular Trends in Nutritional Status,
Health, Mortality, and the Process of Aging**
Robert W. Fogel
Historical Working Paper No. 26
May 1991
JEL Nos. N3, I12, J14

This paper describes the full dimensions of a new and rapidly growing research program that uses new data sources on food consumption, anthropometric measures, genealogies, and life-cycle histories to shed light on secular trends in nutritional status, health, mortality, and the process of aging. The exploitation of these types of data involves integration of analytical procedures in medicine and economics with demography. The discussion is divided into four parts. Part one deals with sources on food consumption and with methods of exploiting these sources that involve the integration of energy cost accounting with techniques for the analysis of income distributions. The second part is concerned with sources of anthropometric in-

formation and with techniques that may be used to relate such information to the assessment of health and mortality. Part three involves the more complex problem of relating socioeconomic and biomedical stress suffered by individuals early in life to their work levels, health, and mortality rates at middle and late ages. The final section discusses the uses of genealogies by themselves and in combination with the preceding data sources.

**The Labor Force Participation of
Older Americans in 1900: Further Results**
Robert A. Margo
Historical Working Paper No. 27
July 1991
JEL No. N31

I use data from the public use sample of the 1900 U.S. Census to study the proper labor force classification of older males who were unemployed for six months or more in the previous year ("long-term unemployed"). I find that, in terms of personal characteristics, the long-term unemployed were similar in many respects to those who were gainfully employed. I also find that the probability of experiencing long-term unemployment rose as persons aged. The Census data are consistent with the view that the older an individual was when he or she entered long-term unemployment, the more likely that person was to leave the labor force in a short time. However, I conclude that this is not a sufficient reason for excluding the long-term unemployed from the count of gainful workers in 1900, as has been advocated recently.

NBER Working Papers

**The Distribution of Family Income:
Measuring and Explaining Changes in the
1980s for Canada and the United States**
McKinley L. Blackburn and David E. Bloom
Working Paper No. 3659
March 1991

This paper attempts to measure and explain recent changes in the distributions of family income in Canada and the United States using comparable microdata for the two countries for 1979 and 1987.

We find first that the distributions of total family income (pretax, post-transfer) in the two countries changed in different directions in the 1980s. Average family income increased faster in Canada than in the United States, although income inequality increased unambiguously in the United States, but not in Canada. Imposing a simple structure on the data reveals that the

social welfare implications of these changes are generally indeterminate for each country.

Second, changes in the distribution of transfer income had important influences on the distribution of total family income in both Canada and the United States. Transfer income in Canada increased more rapidly than it did in the United States during the 1980s and also became more redistributive. Most notably, the shifts in transfer income left female-headed families in Canada with a higher mean income and less income inequality in 1987 than they had in 1979. Among female-headed families in the United States, income inequality increased while average income declined.

Third, increased income inequality in the United States partly reflects increased earnings inequality, which in itself is associated with a widening of education-earnings differentials that occurred in the 1980s. Earnings inequality also increased in Canada in the 1980s, despite the stability of education-earnings differentials.

The Earnings of Linguistic Minorities: French in Canada and Spanish in the United States

David E. Bloom and Gilles Grenier

Working Paper No. 3660

March 1991

This paper measures and compares the relative earnings in the 1970s and 1980s of workers who speak French and English in Canada, and those who speak Spanish and English in the United States.

In Canada, the earnings gap between French- and English-speaking workers narrowed over time, especially in Quebec. This decline appears to have been caused primarily by a sharp increase in the relative demand for French-speaking workers within Quebec during the 1970s and 1980s. By 1986, nearly all of the remaining earnings gap between French- and English-speaking workers in Canada could be accounted for by differences in annual hours worked, marital status, age, education, and region.

By contrast, the earnings gap between Spanish- and English-speaking workers in the United States remained high during the 1970s and 1980s and is not largely accounted for by differences in a standard set of control variables. If anything, there appears to have been a slight deterioration in the relative earnings of Spanish-speaking workers in the United States during the 1970s. The most likely explanation for this change is an increase in the relative supply of Spanish-speaking workers, mainly attributable to high levels of immigration.

Political-Economy Arguments for a Uniform Tariff

Arvind Panagariya and Dani Rodrik

Working Paper No. 3661

March 1991

JEL Nos. F13, F15

Uniform tariffs have become increasingly popular in recent years, but the economic rationale for them is

not strong. Governments might prefer tariff uniformity, as a means of alleviating political motives for excessive protection, for three reasons: First, a free-rider effect may be conducive to less lobbying under a uniform tariff regime than under a regime in which tariffs are allowed to differ. Second, an input-price effect may dampen the enthusiasm of final-goods producers for import protection. Third, a precommitment effect may increase the cost to a future government of protecting favored sectors. None of these arguments provides an unambiguous, airtight case for tariff uniformity. The decision on uniformity has to be made on a case-by-case basis.

Targeting the Exchange Rate: An Empirical Investigation

Shula Pessach and Assaf Razin

Working Paper No. 3662

March 1991

JEL No. F31

This paper empirically implements a variant of the new theory of exchange rate targeting, suitable for high-inflation, small open economies. The theory formulates an expectations-induced relationship between the exchange rate and fundamentals, subject to random shocks and target zone constraints on rates of depreciation. The empirical analysis identifies the roles played by policy and market fundamentals in foreign exchange markets and estimates the key parameters of the exchange rate dynamic equation.

Why Are There So Many Divided Senate Delegations?

Alberto Alesina, Morris Fiorina,

and Howard Rosenthal

Working Paper No. 3663

March 1991

JEL No. H11

The last three decades have witnessed a sharp increase in the number of states with split Senate delegations: that is, with senators of two different parties. In addition, senators of different parties do not cluster in the middle of the political spectrum: they are genuinely polarized.

We propose a model that explains this phenomenon. Our argument builds upon the fact that when a Senate election is held, there is already an incumbent senator. If the voters care about the policy position of their state delegation in each election, they may favor the candidate of the party that is *not* holding the other seat. We show that, in general: 1) a candidate benefits if the "non-running" senator is of the opposing party; and 2) the more extreme the position of the nonrunning senator, the more extreme may be the position of the opposing party candidate.

We test our "opposite-party advantage" hypothesis on a sample including every Senate race from 1946 to 1986. After controlling for other important factors, such as incumbency advantage, "coattails," and economic conditions, we find reasonably strong evidence of the opposite-party advantage.

Wage Bargaining and Unemployment Persistence

Olivier Jean Blanchard
Working Paper No. 3664
March 1991

This paper looks at models of unemployment with two central assumptions: First, wages are bargained between firms and employed workers, and unemployment affects the outcome only to the extent that it affects the labor market prospects of either employed workers or firms. Second, the duration of unemployment affects either the search behavior of the skills of the unemployed, and/or the perceptions of firms of such skills. Such models may explain not only the evolution of European unemployment over the last two decades—an evolution that triggered their development—but many of the cyclical features of labor markets in general.

Dispersion and Heterogeneity of Firm Performances in Nine French Service Industries, 1984–7

Elizabeth Kremp and Jacques Mairesse
Working Paper No. 3665
March 1991

We have taken advantage of the wealth of information provided by the French annual survey of market services to construct a panel sample of data on about 2300 large firms in nine selected service industries (at the four-digit level of the industrial classification) from 1984–7. We contrast the average performances of firms across industries, in terms of labor productivity ratios and profitability margins, both in levels and in growth rates. We compare these average indicators for more or less inclusive sample definitions, going from the survey of all firms to a “balanced” and “cleaned” panel data sample of large firms, and for the two kinds of averages usually considered in macro- and microanalyses. We then show that the differences across industries in average productivity and profitability are usually small when compared to the range of individual differences within industries. Finally, we ask to what extent the extreme variability in individual performances can be accounted for by other heterogeneity factors, besides the industry effects.

R and D and Productivity: A Survey of Econometric Studies at the Firm Level

Jacques Mairesse and Mohamed Sassenou
Working Paper No. 3666
March 1991

This paper surveys econometric studies of the relationship between R and D and productivity at the firm level, and assesses the results and some of the related problems. The reviewed findings fall into three major categories, based on the cross-sectional or time-series dimensions of the data, and specified in terms of the elasticity of R and D or the rate of return to R and D.

In view of the problems involved in modeling the effects of R and D on productivity, and in measuring the appropriate variables, it is an agreeable surprise that most studies have managed to produce statistically significant and frequently plausible estimates. However, many of the current studies are not fully comparable and their results leave much to be desired.

Changes in the Structure of Wages in the Public and Private Sectors

Lawrence F. Katz and Alan B. Krueger
Working Paper No. 3667
March 1991
JEL No. J31

The wage structure in the U.S. public sector responded sluggishly to substantial changes in private sector wages during the 1970s and 1980s. Despite a large expansion in the college/high school wage differential during the 1980s in the private sector, the public sector college wage premium remained fairly stable. Although wage differentials by skill in the public sector were fairly unresponsive to changes in the private sector, overall pay levels for state and local government workers were quite sensitive to local labor market conditions. But federal government regional pay levels appear unaffected by local economic conditions. We consider several possible explanations for the rigidity of the government internal wage structure, including employer size, unionization, and nonprofit status. None of these factors adequately explains the pay rigidity we observe in the government.

Distributive Politics and Economic Growth

Alberto Alesina and Dani Rodrik
Working Paper No. 3668
March 1991

This paper studies the relationship between political conflict and economic growth in a simple model of endogenous growth with distributive conflicts. We study both the case of two “classes” (workers and capitalists) and the case of a continuum distribution of agents, characterized by different capital/labor shares. We establish several results concerning the relationship between the political influence of the two groups and the level of taxation, public investment, and redistribution of income and growth. For example, we show that policies that maximize growth are optimal only for a government that cares only about the “capitalists.” Also, we show that in a democracy (where the “median voter theorem” applies), the rate of taxation is higher, the rate of growth is lower, and the more unequal is the distribution of wealth.

Government, Financial Markets, and Economic Development

Joseph E. Stiglitz
Working Paper No. 3669
April 1991
JEL No. O57

Ideological debates on the government’s role in development have focused on two contrasting prescrip-

tions: one calling for large-scale government interventions to solve massive market failures; the other for the unfettering of markets, with the dynamic forces of capitalism naturally leading to growth and prosperity. This paper is part of an exploration of a middle road, focusing in particular on the role of government in financial markets. After explaining the importance of, and the limitations on, capital markets, particularly in allocating scarce investment resources, I use the results to critique the two "extreme" approaches. Given the limitations of government intervention and of free markets, the "new view" of capital markets provides insights into a variety of policy issues, which I address in the final section of the paper.

On the Need to Allow for the Possibility That Governments Mean What They Say: Interpreting the Target-Zone Model of Exchange Rate Behavior in the Light of EMS Experience

Kathryn M. Dominguez and Peter B. Kenen

Working Paper No. 3670

April 1991

JEL No. F31

Empirical work on the behavior of exchange rates under a target-zone regime has used data produced by the European Monetary System (EMS). But the data contradict important predictions made by the standard target-zone model. We argue that the contradictions reflect a misinterpretation of the policies pursued by the EMS countries: they intervened intramarginally, to keep exchange rates well within the target zone, rather than intervening at the edges of the zone to prevent rates from crossing them.

However, in the Basle-Nyborg Agreement of 1987, the EMS countries agreed to make fuller use of the band. The effects of the agreement show up strongly in the data. Exchange rates behave differently after the agreement than they did before. The effect appears clearly in the behavior of the French franc, and less decisively in the behavior of the Italian lira. We conclude by examining and rejecting alternative explanations for the observed differences in exchange rate behavior.

Environmental Policy When Market Structure and Plant Locations Are Endogenous

James R. Markusen, Edward R. Morey, and Nancy Olewiler

Working Paper No. 3671

April 1991

JEL Nos. O19, H00, Q28

We develop a two-region, two-firm model in which firms choose the number and the regional locations of their plants. Both firms pollute; in this context, market structure is endogenous to environmental policy. There are increasing returns at the plant level, imperfect competition between the "home" and the "foreign" firm, and transport costs between the two markets. These

features imply that at critical levels of environmental policy variables, small changes in policy cause large, discrete jumps in a region's pollution and welfare as a firm: 1) closes or opens a plant, or 2) shifts production for the foreign region from the home plant to a foreign branch plant, or vice-versa. The implications for optimal environmental policy differ significantly from those suggested by traditional Pigouvian marginal analysis.

Investment Policies in the GATT

Rachel McCulloch

Working Paper No. 3672

April 1991

JEL No. F21

Host country policies toward inward direct investment can have predictable effects on trade flows. "Trade related investment measures" (TRIMs), such as local-content requirements and minimum-export requirements, recently have come under official scrutiny in the General Agreement on Tariffs and Trade. This paper examines the economic and political context of the Uruguay Round negotiations on TRIMs.

In the negotiations, investment measures were treated as a particular instance of a broader problem: the proliferation of nontariff trade distortions. As with other trade distortions, the negotiating strategy was to identify specific policies to be proscribed or limited. However, this approach ignored the typical interactions between multinational firms and host governments.

Observed investment regimes often are the result of a lengthy and complex bargaining process. While some investment regimes actually alter the allocation of resources in production and trade, others mainly affect the distribution of rents between firms and host countries. In particular, the trade impact, if any, depends as much on economic conditions as on the specific combination of investment measures imposed.

Rent Sharing in the Multifiber Arrangement: Theory and Evidence from U.S. Apparel Imports from Hong Kong

Refik Erzan, Kala Krishna, and Ling Hui Tan

Working Paper No. 3673

April 1991

JEL No. F13

Available estimates of tariff equivalents of quotas, and welfare calculations of the costs of MFA quotas for developing countries, are based on the premise of perfect competition in both product and license markets. These estimates assume that the exporting countries administering the MFA quotas receive all of the scarcity rent. We argue that, in the presence of market power on the buyers' side in the product market, and concentration in the license markets, the importing countries may retain part of this rent: that is, share it with the exporters.

We analyze U.S. imports of apparel products from Hong Kong to see if the data conform with all of the

relevant predictions of the competitive model. Our method essentially tests whether the license-price-inclusive Hong Kong price, adjusted for tariffs and transport costs, is equal to the domestic (U.S.) price. A deviation between the two prices is taken to indicate rent sharing.

We test the hypothesis with homogeneous goods, modify it to take into account compositional differences and, finally, consider differentiated goods. We find that importers retain a substantial portion of the MFA quota rents.

Learning About Intervention Target Zones

Michael W. Klein and Karen K. Lewis

Working Paper No. 3674

April 1991

This paper provides a framework for evaluating how market participants' beliefs about foreign exchange target zones change as they learn about central bank intervention. First we generalize the standard target-zone model to allow for intramarginal intervention. Then we estimate a probability-of-intervention model, using daily exchange rates and market observations of central bank interventions following the Louvre Accord. Interestingly, even over the relatively stable Louvre Accord period, we find that the market's views of intervention target zones would have varied quite a bit over time.

Alcohol Consumption During Prohibition

Jeffrey A. Miron and Jeffrey Zwiebel

Working Paper No. 3675

April 1991

JEL Nos. N22, C82, K42

We estimate the consumption of alcohol during Prohibition using statistics on mortality, mental health, and crime. We find that alcohol consumption fell sharply at the beginning of Prohibition, to approximately 30 percent of its previous level. During the next several years, though, alcohol consumption increased sharply, to about 60-70 percent of its pre-Prohibition level. Immediately after Prohibition, the level of consumption was virtually the same as during the latter part of Prohibition, but consumption increased during the subsequent decade to approximately its pre-Prohibition level.

Earnings, Dividend Policy, and Present-Value Relations: Building Blocks of Dividend Policy Invariant Cash Flows

Bruce N. Lehmann

Working Paper No. 3676

April 1991

JEL Nos. G35, G31, G12

In a Modigliani-Miller world, price equals the risk-adjusted present value of future dividends, and dividend policy is irrelevant for asset pricing. This paper

searches for cash flows with two characteristics: asset prices can be calculated from their present values; and they are invariant with respect to dividend policy. I identify residual income measures with these features under two assumptions: dividend policy does not alter risk premiums; and income earned from investments associated with dividend policy includes capital gains and losses. These results hold for otherwise arbitrary risk premiums in the general no-arbitrage approach to the valuation of uncertain income streams.

Notes on Dynamic Factor Pricing Models

Bruce N. Lehmann

Working Paper No. 3677

April 1991

JEL Nos. G35, G31, G12

These notes discuss three aspects of dynamic factor pricing (that is, APT) models. First, diversifiable idiosyncratic risk is unpredictable in a no-arbitrage world. Second, the conditional factor loadings, or betas, on the common factors are approximately constant when returns follow an unconditional factor structure. Third, dynamic factor pricing models can be estimated in large cross sections when returns follow an unconditional factor structure.

Purchased Services, Outsourcing, Computers, and Productivity in Manufacturing

Zvi Griliches and Donald Siegel

Working Paper No. 3678

April 1991

JEL Nos. O47, C81, L84, L86

Increases in purchased services, foreign outsourcing, and investments in computers are alleged to have resulted in an understatement of input growth in manufacturing, and thus an overstatement of growth in productivity, GNP, and value added in industries heavily engaged in these activities. Using Census Bureau data, we examine whether the recent (post-1979) improvement in measured manufacturing productivity growth can be attributed to an increase in the rate of foreign and domestic outsourcing. Our preliminary evidence, based on data that are not comprehensive, suggests that an industry's propensity to outsource is unrelated to its acceleration in productivity.

In auditing the industry numbers, we found that a nonnegligible number of sectors were not defined consistently over time. Using industry and establishment-level datasets (the NBER four-digit SIC Productivity Dataset and the Longitudinal Research Database), we conclude that some of these anomalies may be the result of the general decline in the magnitude of information solicited from establishments by the Census Bureau in conducting its economic surveys.

Another consistency problem we explored is the industry reclassification of large plants. Although these definitional and sampling problems are troubling and need to be documented carefully, there does not appear

to be a systematic relationship between an industry's post-1979 productivity growth and attrition or "switches" in its ASM plants. However, we do find a positive and statistically significant relationship between total factor productivity growth and an industry's rate of investment in computers.

Trade Liberalization in a Multinational-Dominated Industry: A Theoretical and Applied General Equilibrium Analysis

Linda Hunter, James R. Markusen,
and **Thomas F. Rutherford**
Working Paper No. 3679
April 1991

Motivated by the possibility of U.S.-Mexico free trade, we develop a theoretical model and apply it to the North American auto industry. Special features of the model include: 1) significant scale economies at the plant level; 2) imperfect competition among firms; 3) joint ownership of plants, and production coordination across plants by each firm; 4) an (initial) ability of firms to segment markets; and 5) a separate treatment of nonresident firms in determining oligopolistic markups.

Using an applied general equilibrium model, we find that: 1) the gains to Mexico are significant, and there are basically no effects on the United States and Canada, following North American free trade, if firms can continue to segment markets; 2) because of the way North American multinationals determine markups, increased imports from Mexico do not result in a rationalization of U.S. and Canadian production the way they might if firms were strictly national; and 3) genuinely free trade for consumers (integrated markets) results in large gains for Mexico as the Mexican industry is forced to rationalize. Losses to the United States and Canada are very small.

Endogenous Capital Utilization and Productivity Measurement in Dynamic Factor Demand Models: Theory and an Application to the U.S. Electrical Machinery Industry

M. Ishaq Nadiri and Ingmar R. Prucha
Working Paper No. 3680
April 1991
JEL Nos. G32, O4, L64, J24

Studies of the firm's demand for factor inputs often assume a constant rate of utilization of the inputs, and ignore the fact that the firm simultaneously can choose the level and the rate of utilization of its inputs. In particular, the literature on dynamic factor demand models until recently has largely overlooked the issue of capital utilization, and/or did not distinguish carefully between the concepts of capital and capacity utilization.

This paper allows for variations in the rate of capital utilization within the context of a dynamic factor demand model. We adopt a modeling framework in which the firm combines its beginning-of-period stocks with other inputs to produce its outputs and its end-of-period

stocks. We also derive measures of productivity and capacity utilization for the adopted modeling framework. Given that the depreciation rate is endogenous, a consistent capital stock series must be generated during estimation from the investment data. As a by-product, this yields a consistent decomposition of gross investment into replacement and expansion investment. As an illustration, we apply the model to data on U.S. electrical machinery.

Measuring and Testing the Impact of News on Volatility

Robert F. Engle III and Victor K. Ng
Working Paper No. 3681
April 1991
JEL No. C12

This paper introduces the "news impact curve" to measure how new information is incorporated into estimates of volatility. We compare and estimate a variety of models with daily Japanese stock return data to determine the shape of the news impact curve. We then present new diagnostic tests emphasizing the asymmetry of volatility's response to news. We find that the best models are one by Glosten Jaganathan and Runkle, and Nelson's EGARCH. We get similar but less strong results on a precrash sample period.

Time-Varying Volatility and the Dynamic Behavior of the Term Structure

Robert F. Engle III and Victor K. Ng
Working Paper No. 3682
April 1991
JEL No. E43

This paper attempts to simultaneously study the cross-sectional and time-series behavior of the yield curve. We examine the relationship between the yield curve and the time-varying conditional volatility of the Treasury bill market. We demonstrate that different shaped yield curves can be the result of different combinations of volatility and expectations about future spot rates. Moreover, adjusting the forward rate for the volatility-related liquidity premium can improve its performance as a predictor of future spot rates, at least for August 1964 to August 1979.

Do Exchange Rate Auctions Work? An Examination of the Bolivian Experience

Kathryn M. Dominguez
Working Paper No. 3683
April 1991
JEL Nos. F31, O54

The Bolivian experience suggests that, even in highly indexed economies, exchange rate auctions can work. After Bolivia introduced its auction, the Bolsin, the parallel market premium for dollars all but disappeared and the Boliviano exchange rate remained surprisingly stable. How did the Bolsin accomplish this? The empirical evidence from daily auction data suggests that the credit should be given largely to central bank policy at the auction, rather than to the auction as an institution.

The EMS, the EMU, and the Transition to a Common Currency

Kenneth A. Froot and Kenneth Rogoff

Working Paper No. 3684

April 1991

JEL No. F31

When central banks are about to relinquish control over their exchange rates and enter into a currency union, the reputational costs of devaluation are very low. As with any finite-horizon game, the endpoint affects the earlier expectations of private agents, in this case causing them to demand higher interest rates and higher wages from countries whose currencies are relatively weak.

In looking at the countries within the EMS, we find that Italy's long-term interest rates, prices, and wage levels show evidence of growing gaps relative to Germany. We also find that the real appreciation of the lira predominantly is caused by increases in relative spending by the Italian government, not by relatively rapid growth in Italian productivity. Taken together, this suggests that convergence within the EMS may have peaked. Furthermore, moving forward the date of currency union in the short run may increase both the growth of the gaps and the need for exchange rate realignment.

Expected and Predicted Realignments: The FF/DM Exchange Rate During the EMS

Andrew K. Rose and Lars E. O. Svensson

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April 1991

JEL Nos. F31, F33

We develop an empirical model of time-varying realignment risk in an exchange rate target zone. Then, using French franc/Deutsche mark data from the European Monetary System, we estimate expected rates of depreciation within the exchange rate bands. The behavior of estimated expected rates of depreciation accords well with the theoretical model of Bertola-Svensson (1990). We also are able to predict actual realignments with some success.

Monetary Economics: A Review Essay

Herschel I. Grossman

Working Paper No. 3686

April 1991

JEL No. E00

In this essay, I define money to be whatever objects serve as generally acceptable mediums of exchange. I define monetary economics to be the study of the causes and economic consequences of the monetization of exchange—that is, of the use of mediums of exchange. These definitions lead me to specify the distinctive objectives of monetary economics to be to understand: 1) the monetization of exchange and its relationship to the technologies of production and of exchange; 2) the form that money takes and, especially, the viability of fiat money; 3) the determination and significance of

the real value of units of money; and 4) the relationship between the nominal quantity of money and aggregate economic activity. The essay tries to acquaint the reader with the contents of the recently published *Handbook of Monetary Economics* as they relate to these objectives of monetary economics, and to offer some critical thoughts on selected unsettled issues in monetary economics suggested by my reading of the *Handbook*.

Trading, Communication, and the Response of Price to New Information

James Dow and Gary Gorton

Working Paper No. 3687

April 1991

JEL Nos. G14, G15

We study the dynamic behavior of securities prices in a setting in which two agents trade strategically and learn over time from market prices. The model introduces a structure intended to capture the notion that information is difficult to interpret. Strategic interaction combined with the complexity of the information result in a protracted price response. Indeed, equilibrium price paths of the model may display reversals—in which the two traders rationally revise their beliefs, first in one direction, and then in the opposite direction—even though no new information has entered the system. A piece of information initially thought to be bad news may be revealed, through trading, to be good news.

Pensions, Bonding, and Lifetime Jobs

Steven G. Allen, Robert L. Clark,

and Ann A. McDermid

Working Paper No. 3688

April 1991

JEL Nos. J32, J41, J63, J68

A well-known, if underappreciated, finding in the mobility literature is that turnover is much lower in jobs covered by pensions than in other jobs. This could result from capital losses for job changes created by most benefit formulas, by the tendency of turnover-prone individuals to avoid jobs covered by pensions, or by higher overall compensation levels in such jobs.

We develop a model of pension coverage and turnover to estimate the effect of each of these factors. The results show that capital losses are mainly responsible for lower turnover in jobs covered by pensions, but self-selection and compensation levels also are important. This is the first direct evidence that bonding is important for understanding long-term employment relationships.

Money versus Credit Rationing: Evidence for the National Banking Era, 1880-1914

Michael D. Bordo, Peter Rappoport,

and Anna J. Schwartz

Working Paper No. 3689

April 1991

JEL Nos. E51, E65, G21

How did monetary and financial disturbances influence the real economy during the national banking

era, 1880–1914? According to the monetarist view, monetary disturbances affected the real economy through changes on the liability side of the banking system's balance sheet, independent of the composition of bank portfolios. According to the credit rationing view, equilibrium credit rationing in a world of asymmetric information can explain short-run fluctuations in real output.

We incorporate monetary variables in credit models, and credit variables in monetarist models, with inconclusive results. To resolve this ambiguity, we invoke the institutional features of the national banking era. Most of the variation in bank loans is accounted for by loans secured by stock, which in turn reflect volatility in the stock market. When account is taken of the stock market, the influence of credit in our model is greatly reduced, while the influence of money remains robust. The breakdown of the composition of bank loans into stock market loans (traded in open asset markets) and other business loans (a possible setting for credit rationing) reveals that other business loans remained remarkably stable over the business cycle.

Japan's High Saving Rate Reaffirmed

Robert Dekle and Lawrence H. Summers

Working Paper No. 3690

April 1991

Compared to the U.S. national accounts, the Japanese accounts understate consumption and government spending, and therefore overstate the national saving rate. Recently, Hayashi recalculated Japan's national saving according to the U.S. Department of Commerce definition. He found that from the mid-1970s until today, Japan's national saving rate was nearly halved.

In this paper, we argue that Hayashi's adjustments to the Japanese income accounts are exaggerated. We present measures of Japanese and U.S. private saving that are immune from national income accounting biases. Our saving measures are constructed from the balance sheets of the household sectors in the United States and Japan. Far from being equal, we find, the gap in saving rates between the two countries in the early 1980s has averaged between 15 and 30 percentage points, depending on the measure.

Immigration Policy, National Origin, and Immigrant Skills: A Comparison of Canada and the United States

George J. Borjas

Working Paper No. 3691

April 1991

JEL Nos. F22, J61

Over 12 million persons migrated to Canada or the United States between 1959 and 1981. Beginning in the mid-1960s, the immigration policies of the two countries began to diverge considerably: the United States stressed family reunification and Canada stressed skills.

This paper shows that the point system used by Canada generated, on average, a more skilled immigrant flow than that of the United States. However, this skill gap is attributable mostly to differences in the national origin mix of the immigrant flows admitted by the two countries. In effect, the point system "works" because it alters the national origin mix of immigrant flows, and not because it generates a more skilled immigrant flow from a given source country.

Bequest Taxes and Accumulation of Household Wealth: U.S.–Japan Comparison

Thomas A. Barthold and Takatoshi Ito

Working Paper No. 3692

May 1991

This paper first describes and compares the gift and bequest (estate) tax systems in the United States and Japan. Then we use tax data to estimate the magnitude of intergenerational transfers. The amount of outstanding wealth obtained through intergenerational transfers is currently an issue of controversy. A substantial portion of wealth, and especially of land in Japan, is bequeathed from one generation to the next in both Japan and the United States.

Omitted-Ability Bias and the Increase in the Return to Schooling

McKinley L. Blackburn and David Neumark

Working Paper No. 3693

May 1991

JEL Nos. J31, J24, I21

Over the 1980s there were sharp increases in the return to schooling estimated with conventional wage regressions. We use both a signaling and a human capital model to explore how the relationship between ability and schooling could have changed over the period so as to increase the schooling coefficient in these regressions.

Our empirical results reject the hypothesis that an increase in the upward bias of the schooling coefficient, caused by a change in the relationship between ability and schooling, underlies the observed increase in the return to education over the 1980s. We also find that the increase in the return to education has occurred largely for workers with relatively high levels of academic ability.

Unemployment and Infant Health: Time-Series Evidence from the State of Tennessee

Theodore J. Joyce and H. Naci Mocan

Working Paper No. 3694

May 1991

JEL No. I12

The relationship between unemployment and health continues to absorb social scientists, primarily be-

cause of its potential significance. If a substantial deterioration in aggregate health is related to economic downturns, then the cost of a recession may be much greater than foregone output.

This paper investigates the aggregate relationship over time between unemployment and low birthweight. We use monthly data from Tennessee for 1970–89. Our study differs from previous work in that we decompose the unemployment rate into its structural and cyclical components. Moreover, we test the relationship between unemployment and low birthweight. The well-defined exogeneity of unemployment, and the lag length restriction imposed by the duration of a pregnancy, strengthen the specification considerably.

We find no relationship between unemployment and low birthweight. This basic finding remains unchanged regardless of whether we test structural or cyclical unemployment, or whether we use total or race-specific rates of low birthweight.

The Evolution of Buyout Pricing and Financial Structure

Steven N. Kaplan and Jeremy C. Stein

Working Paper No. 3695

May 1991

This paper presents evidence on systematic changes in the pricing and financial structure of 124 large management buyouts completed between 1980 and 1989. We find that over time: 1) prices increased relative to current cash flows with no accompanying decrease in risk or increase in projected future cash flows; 2) required bank principal repayments accelerated, leading to sharply lower ratios of cash flow to total debt obligations; 3) private subordinated debt was replaced by public debt while the use of strip-financing techniques declined; and 4) management teams invested a smaller fraction of their net worth in post-buyout equity. These patterns of buyout prices and structures suggest that, based on ex ante data, lower returns and more frequent financial distress could have been expected in later buyouts. Preliminary post-buyout evidence is consistent with this interpretation.

Information and the Scope of Liability for Breach of Contract:

The Rule of *Hadley v. Baxendale*

Lucian Arye Bebchuk and Steven Shavell

Working Paper No. 3696

May 1991

JEL Nos. D21, K12

According to the principle of contract law established in the famous nineteenth century English case, *Hadley v. Baxendale*, and followed ever since in the world of common law, liability for a breach of contract is limited to losses “arising . . . according to the usual course of things,” or that may be reasonably supposed

“to have been in the contemplation of both parties, at the time they made the contract. . . .”

Using a formal model, we attempt to analyze systematically the effects and the efficiency of this limitation on contract damages. We ask the effect of the limited liability rule of *Hadley*, and an unlimited liability rule, on two types of decisions: buyers’ decisions about communicating their valuations of performance to sellers; and sellers’ decisions about their level of precautions to reduce the likelihood of nonperformance. We identify the efficient behavior of buyers and sellers. We then compare this efficient behavior with the decisions that buyers and sellers in fact make under the limited and unlimited liability rules. This analysis enables us to provide a full characterization of the conditions under which each of the rules induces, or fails to induce, efficient behavior, as well as the conditions under which each of the rules is superior to the other.

Productivity, Market Power, and Capacity Utilization When Spot Markets Are Complete

Benjamin Eden and Zvi Griliches

Working Paper No. 3697

May 1991

JEL Nos. E32, E37, L60, H54

Our test of price-taking behavior looks at the choice of capacity rather than the choice of output. It is motivated by a complete spot markets model in which goods are distinguished by selling probabilities and other characteristics. When output is explained by total man-hours and a proxy for capacity utilization, the coefficient of the man-hours is the elasticity of capacity with respect to fixed labor. Under competition and risk neutrality, this coefficient is equal to an average labor share.

We use this observation to interpret Abbot–Griliches–Hausman’s regressions. We argue that once the capacity utilization proxy is included in the regression, the joint hypothesis of competition and risk neutrality cannot be rejected by Hall’s data at the manufacturing level. We also argue that the coefficient of total man-hours does not tell us anything about monopoly power once the proxy for capacity utilization is omitted from the regression.

From Centrally Planned to Market Economies: The Road from CPE to PCPE

Guillermo A. Calvo and Jacob A. Frenkel

Working Paper No. 3698

May 1991

JEL Nos. P21, E52

This paper deals with the early stages of transformation of centrally planned economies (CPEs) into market economies during which expectations play a key role. It focuses on the transitional phase when the economy is no longer a CPE but has not yet become a market economy. During this phase, the economy is referred to as a “previously centrally planned economy” (PCPE).

We develop a simple model to analyze the conse-

quences of expected price liberalization. The model highlights the anticipatory character of economic behavior during the early stages of the transformation process. We focus in particular on credit markets. The CPEs undergoing transformation lack the depth and breadth of financial markets. The conduct of credit policy is complicated by a lack of information necessary to assess risk and creditworthiness. Our analysis illustrates the benefits of early development of credit markets, and of finding appropriate ways to "clean" bad loans from the balance sheets of enterprises and banks. It demonstrates the cost of a fine-tuning strategy and the benefits of quick implementation of price reform.

We also examine alternative ways of reducing "liquidity overhang," all of which involve taxation of one form or another. Finally, we analyze the consequences of privatization and the benefits of early development of an effective tax system.

The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation

Alan B. Krueger and Jörn-Steffen Pischke

Working Paper No. 3699

May 1991

JEL Nos. J14, J26

This paper uses aggregate birth year/calendar year level data derived from the Current Population Survey to estimate the effect of Social Security wealth on the labor supply of older men in the 1970s and 1980s. The analysis focuses on the 1977 amendments to the Social Security Act, which created a substantial, unanticipated differential in benefits for otherwise identical individuals depending on whether they were born before or after 1917. This differential has become known as the benefit notch. There are two principal differences between the present analysis and the previous literature. First, this paper uses time-series variations in benefit levels to estimate the relationship between benefits and labor supply in an era when real benefits for new recipients were *falling*. Second, variation in benefit levels across cohorts is used to estimate the relationship between benefits and labor supply. The results support a conclusion that labor supply continued to decline for the "notch babies" who received lower Social Security benefits than earlier cohorts.

Incentives, Optimality, and Publicly Provided Goods: The Case of Mental Health Services

Richard G. Frank and Martin Gaynor

Working Paper No. 3700

May 1991

JEL Nos. H77, I11, H40, H72

This paper investigates the incentives in intergovernmental transfers for public mental health care. This is an important issue because a large portion of mental health care is provided by local governments, the states

play a central role in financing care through governmental transfers, and some states have adopted innovations that alter the traditional terms of these transfers.

We use a relatively simple model and show that when a state government provides both financing and a free input into local government production, there will be excessive use of that input. If the preferences of society and those of the local provider of service are identical, then this problem can be remedied simply by charging the provider a price equal to marginal cost for use of the input. However, if the provider and society differ in their preferences, then neither setting the price of the input at marginal cost nor imposing capacity constraints will induce optimal behavior. The optimal prices are proportional to the sum of the elasticities of the provider's supply of services with respect to the subsidy (tax). These results are directly analogous to those for optimal commodity taxation.

Examining transfer contracts for Wisconsin, Ohio, and Texas reveals that these contracts may not be optimal. These departures from optimal decisions may be caused in part by the practical issues related to implementation of optimal transfer arrangements: for example, setting subsidy or tax levels, or imposing budget reductions.

The Socioeconomic Consequences of Teen Childbearing Reconsidered

Arline T. Geronimus and Sanders Korenman

Working Paper No. 3701

May 1991

JEL Nos. J12, J13, I31, J78, J11

Teen childbearing is commonly viewed as an irrational behavior that leads to long-term socioeconomic disadvantage for mothers and their children. Cross-sectional studies that estimate relationships between maternal age at first birth and socioeconomic indicators measured later in life form the empirical basis for this view. However, these studies have failed to account adequately for differences in family background among women who time their births at different ages.

We present new estimates of the consequences of teen childbearing that take into account observed and unobserved heterogeneity in family background, comparing sisters who have timed their first births at different ages. These comparisons suggest that previous estimates are biased by failure to control adequately for heterogeneity in family background; as a result, they have overstated the consequences of early fertility.

Growth, Macroeconomics, and Development

Stanley Fischer

Working Paper No. 3702

May 1991

JEL Nos. O11, O40

The 1980s were both the lost decade of growth for much of Latin America and Africa, and the period in

which—through the new growth theory—macroeconomists returned to the study of growth and development. The new growth theory is driven by the production function and concerned primarily with steady states. It has paid little attention to the role of macroeconomic policy—as reflected, for instance, in the rate of inflation and the budget deficit—in determining growth.

This paper presents a variety of evidence that macroeconomic policies matter for long-run growth. First, macroeconomic variables enter the typical cross-country regressions in new growth theory with statistical significance and the expected signs. Second, evidence from large multicountry case studies, and from case studies I present of Chile and Côte d'Ivoire, shows that macroeconomic policy choices have had a significant impact on growth over periods of more than a decade. I conclude that macroeconomic policy choices, including the budget deficit, the exchange rate system, and those choices that determine the inflation rate, matter for long-term economic growth.

Privatization in East European Transformation

Stanley Fischer

Working Paper No. 3703

May 1991

JEL Nos. L33, P21

Privatization of state assets is an essential step toward the creation of a viable private sector in the formerly socialist economies of Eastern Europe and the Soviet Union. A standard approach to the problem has emerged rapidly. Small firms are very rapidly being privatized by sale. The strategy then turns to larger industrial firms, which are to be "corporatized" as soon as possible, moved out of the shelter of the ministries that now control them in principle, and put under the direction of corporate boards. At the next stage, the intention is to distribute shares, through sale or free transfer, to some combination of current workers in the firms, current management, mutual funds, holding companies, banks, insurance companies, pension funds, citizens, and the government.

I analyze the standard approach and alternatives, as well as progress in implementing privatization, with emphasis on Poland, Hungary, and Czechoslovakia. Progress in privatizing small firms has been rapid in several East European countries, but privatization of large firms has been slow, with the most success to date in Hungary.

The Decline in Black Teenage Labor Force Participation in the South, 1900-70: The Role of Schooling

T. Aldrich Finegan and Robert A. Margo

Working Paper No. 3704

May 1991

JEL Nos. N32, O41, J71

Between 1950 and 1970, the labor force participation rate of southern black males aged 16-19 declined by

27 percentage points. This decline has been attributed to two demand-side shocks: the mechanization of cotton agriculture in the 1950s, and extensions in the coverage of the federal minimum wage in the 1960s. We show, however, that participation rates of southern black teens fell continuously between 1900 and 1950. The proximate causes of the pre-1950 decline in black teen participation were increases in school enrollment rates and decreases in labor force participation by teens enrolled in school. Because the underlying causes of both effects had not run their course by mid-century, we conclude that about half of the post-1950 decline in black teen participation in the South would have occurred even if cotton agriculture had not mechanized in the 1950s or if coverage of the minimum wage had not been extended in the 1960s.

The Company You Keep: The Effects of Family and Neighborhood on Disadvantaged Youths

Anne C. Case and Lawrence F. Katz

Working Paper No. 3705

May 1991

JEL No. J71

We examine the effects of family background and neighborhood peers on the behavior of inner-city youths in a tight labor market. Our data come from the 1989 NBER survey of youths living in low-income Boston neighborhoods.

We find that family adult behavior is strongly linked to analogous youth behavior. The links between the behavior of older family members and youths are important for criminal activity, drug and alcohol use, childbearing out of wedlock, schooling, and church attendance.

We also find that the behavior of neighborhood peers appears to substantially affect youth behavior in a manner suggestive of contagion models of neighborhood effects. Residence in a neighborhood in which a large proportion of other youths are involved in crime is associated with a substantial increase in an individual's probability of being involved in crime. Significant peer effects also are apparent for drug and alcohol use, church attendance, and the propensity of youths to be out of school and out of work. Our results indicate that family and peer influences both operate in a manner such that "like begets like."

Equalizing Exchange: A Study of the Effects of Trade Liberalization

Dan Ben-David

Working Paper No. 3706

May 1991

JEL Nos. F02, F14

It has been documented quite broadly that there has not been widespread historic convergence in levels of

income across countries. This paper addresses the question of whether the behavior of cross-country income differentials over time within a specified group of countries, might be affected by the removal of trade barriers.

The analysis focuses on the evolutionary period of the European Economic Community (EEC), which is characterized by a specific timetable for the removal of trade barriers. This liberalization is strongly related to a significant income convergence that took place among the members of the EEC. The evidence indicates that, until their trade became more liberalized, the income differentials among the countries of the EEC behaved very much like the income differentials among the industrialized countries today. After the onset of freer trade, the EEC countries achieved a reduction in income disparity that was markedly similar to the income convergence that occurred among the U.S. states. This came about despite the fact that interstate migration is considerably more widespread and unrestricted than are labor movements within the EEC.

National Finite Bubbles

Franklin Allen and Gary Gorton

Working Paper No. 3707

May 1991

JEL No. G12

There has been a long-running debate about whether stock market prices are determined by fundamentals, with no consensus to date. One important issue in this debate is how deviations from fundamentals can be consistent with rational behavior. We present a continuous-time example with a finite number of rational traders with finite wealth, and show that a finite-lived security can trade above its fundamental.

A Note on Taxation As Social Insurance for Uncertain Labor Income

Louis Kaplow

Working Paper No. 3708

May 1991

JEL Nos. H21, H24

Various authors, notably Eaton and Rosen (1980a) and Varian (1980), have proposed that income taxation may be justified to some extent on the ground that it serves as social insurance against uncertainties in labor income. They assume that private insurance is not available, primarily because of moral hazard, and they demonstrate that some taxation is efficient because the benefits of mitigating risk exceed the incentive costs.

This paper suggests that private insurance should be considered explicitly in examining this question. Moral hazard problems limiting private insurance coverage are not alleviated by government insurance. Moreover, in the presence of moral hazard, government insurance—through labor income taxation or otherwise—may be an inefficient policy, because it distorts private insurance decisions. More traditional justifications for redistributive taxation are not affected by this argument.

Taxation and Risk Taking: A General Equilibrium Perspective

Louis Kaplow

Working Paper No. 3709

May 1991

JEL Nos. H21, G11

This paper examines taxation and risk taking in a general equilibrium model that incorporates uncertain government revenue in a nonrestrictive manner, and allows the government to influence its revenue through portfolio investments as well as through tax policy. I demonstrate that each of a wide range of taxes can be decomposed into some combination of a wage tax, an ex ante wealth tax, and a modification of the government's investment portfolio. For example, a tax on investment returns (from risky and riskless assets) is equivalent—with an adjustment in the government's portfolio—to a tax on the riskless component of investment returns, or to an ex ante wealth tax, both of which absorb no private risk and yield certain revenue. I use a strong concept of equivalence: two regimes are equivalent if, for each state of nature, individuals' wealth and government revenue are the same under both regimes, and total investment in each asset is the same. The implications for behavior (private and total risk taking) and welfare are immediate. Moreover, these results are independent of the government's objective function, the manner in which individual utility depends on government expenditures, and some of the restrictive assumptions found necessary in previous treatments of the problem.

Do Minimum Wages Reduce Employment? A Case Study of California, 1987-9

David Card

Working Paper No. 3710

May 1991

JEL No. E24

In July 1988, California's minimum wage rose from \$3.35 to \$4.25. In the previous year, 11 percent of California workers, and fully half of its teenage workers, earned less than the new state minimum. The state-specific nature of the California increase provides a valuable opportunity for studying the effects of minimum wage legislation. As in a conventional nonexperimental program evaluation, labor market trends in other states can be used to infer what would have happened in California in the absence of the law.

Drawing on published labor market statistics and microdata samples from the Current Population Survey, I apply this strategy to estimate the effects of the rise in the minimum wage on various groups and industries in the state. I pay special attention to teenage workers and to employees in retail trade. The results are striking. The increase in the minimum wage raised the wages of teenagers and other low-wage workers by 5-10 percent. Contrary to conventional predictions, though, the employment rate of teenage workers rose, while their school enrollment rate fell.

Security Baskets and Index-Linked Securities

Gary Gorton and George Pennacchi

Working Paper No. 3711

May 1991

Security baskets and index-linked securities have values related to the cash flows or values of other assets. Creation of these "composite" securities seems to be redundant, since investors can replicate them costlessly. In this paper, we study the existence and optimal design of composite securities. First we show that, when some investors possess inside information, composite securities are not redundant. By holding composite securities, uninformed investors who need to trade unexpectedly can reduce their expected losses to insiders. Thus, the existence of these securities affects real investment decisions.

We then show that when uninformed investors are heterogeneous with respect to nontradable endowment risk, the size of a clientele determines whether the portfolio for a liquidity trader consists of a clientele-specific composite or of a single market composite, combined with individual security holdings. In the latter case, markets for the composite security and its component securities coexist. Our results do not depend on the existence of exogenous "noise" traders.

Invention and Bounded Learning by Doing

Alwyn Young

Working Paper No. 3712

May 1991

JEL No. O31

This paper presents a model of the interaction between invention and learning by doing. Learning depends on invention, in that learning by doing is viewed as the serendipitous exploration of the finite productive potential of invented technologies. At the same time, the profitability of costly invention depends on learning, since production costs depend on the society's aggregate historical learning experience.

With small markets, the profitability of invention is low. Hence the rate of invention becomes the constraining factor in growth. With large markets, invention is very profitable and tends to pull ahead of the society's learning experience. The consequent growing gap between the technological frontier and the society's industrial maturity squeezes returns, leading to an equilibrium in which the rate of invention (and growth) is paced by the society's rate of learning.

School Quality and Black-White Relative Earnings: A Direct Assessment

David Card and Alan B. Krueger

Working Paper No. 3713

May 1991

JEL Nos. I21, J71

The average wage differential between black and white men fell from 40 percent in 1960 to 25 percent in

1980. Much of this convergence in wages is attributable to a relative increase in the rate of return to schooling among black workers. It is argued widely that the growth in the relative return to education of blacks reflects the dramatic improvements in the quality of black schooling over the past century. To test this hypothesis, we assembled data on three aspects of school quality—pupil-teacher ratios, annual teacher pay, and term length—for black and white schools in 18 segregated states from 1915–66. We link the data on school quality to estimated rates of return to education for southern-born men from different cohorts and states, measured in 1960, 1970, and 1980. We find that improvements in the relative quality of black schools explain 20 percent of the narrowing of the black-white earnings gap between 1960 and 1980.

The Demand for and Return to Education When Education Outcomes Are Uncertain

Joseph G. Altonji

Working Paper No. 3714

May 1991

JEL Nos. D83, I21, J24

The vast literature on human capital and earnings assumes that individuals know in advance that they will complete a particular program of schooling. This paper treats education as a sequential choice that is made under uncertainty. I use a simple two-period structural model to explore the effects of ability, high school preparation, preferences for schooling, the borrowing rate, and ex post payoffs to college on the probability of various post-secondary college outcomes and on the ex ante return to starting college. The model provides the basis for a simple empirical method of accounting for uncertainty about educational outcomes and for nonlinearity in the relationship between years of education and earnings in estimating the expected return to the first year of college. I present estimates of the effects of gender, aptitude, high school curriculum, family background characteristics, and other variables on the expected return to starting college.

Industrial Shifts, Skills Levels, and the Labor Market for White and Black Males

John Bound and Harry J. Holzer

Working Paper No. 3715

May 1991

JEL Nos. J23, J64

This paper estimates the effects of industrial shifts in the 1970s and 1980s on the wages and employment of black and white males. We use micro Census data for 52 Metropolitan Statistical Areas, and estimate effects separately by age and education group. We find that industrial shifts did reduce the demand for blacks and less-skilled males in the 1970s and 1980s. In particular, shifts in demand away from manufacturing reduced

employment and wages for both black and white males. While the magnitudes of these effects are fairly small for many groups, they can account for one-third to one-half of the decline in employment of less-educated young blacks in the 1970s. These results imply fairly large effects on the earnings of less-skilled males in the 1980s, as well.

Trade Orientation, Distortions, and Growth in Developing Countries

Sebastian Edwards

Working Paper No. 3716

May 1991

JEL Nos. O10, O40, F14

In this paper, I use a cross-country dataset to analyze the relationship among trade orientation, trade distortions, and growth. First I develop a simple endogenous growth model that emphasizes the process of technological absorption in small developing countries. According to this model, countries that liberalize their international trade and become more open will tend to grow faster. Whether this higher growth is permanent, or only a short-run result, will depend on the relative size of some key parameters. Using nine alternative indicators of trade orientation, I find that more open economies do tend to grow faster than economies with trade distortions. The results are robust to the method of estimation, to correction for errors in variables, and to the deletion of outliers. Finally, I argue that future research should move toward the empirical investigation of the microeconomics of technological innovations and growth.

Convergence of International Output Movements

Andrew B. Bernard and Steven N. Durlauf

Working Paper No. 3717

May 1991

JEL No. O40

This paper explores the convergence of real per capita output in advanced industrialized economies. We observe that in a stochastic environment, convergence in per capita GDP requires that permanent shocks to one economy be associated with permanent shocks to other economies. Convergence is a natural outcome of models in which exogenous technical change migrates across countries with similar microeconomic specifications. Conversely, in a world where some component of permanent output movements is caused by technical change and other components are caused by domestic factors, national economies may diverge over time.

We formalize a general definition of convergence using the notions of unit roots and cointegration developed in the time-series literature. We construct bivariate and multivariate tests of convergence across ad-

vanced industrialized economies. Our evidence indicates that one cannot reject the "no convergence" null. Further, the estimated time-series representation of cross-country output deviations exhibits substantial persistence. These results suggest that previous empirical work on convergence has neglected some aspects of the null hypothesis.

Path Dependence in Aggregate Output

Steven N. Durlauf

Working Paper No. 3718

May 1991

JEL Nos. C30, E44, E62

I study an economy in which incomplete markets and strong complementarities interact to generate path-dependent aggregate output fluctuations. (Path dependence means the effect of a shock on the level of aggregate output is permanent in the absence of future offsetting shocks.) Extending the model I developed previously, I analyze the evolution of an economy that consists of a countable infinity of industries. The production functions of individual firms in each industry are nonconvex and are linked through localized technological complementarities. The productivity of each firm at t is determined by the production decisions of technologically similar industries at $t-1$. No markets exist in which firms and industries can exploit complementarities by coordinating production decisions. This market incompleteness produces several interesting effects on aggregate output behavior.

First, multiple stochastic equilibria exist in aggregate activity. These equilibria are distinguished by differences in both the mean and the variance of output. Second, output movements are path dependent, because aggregate productivity shocks indefinitely affect real activity by shifting the economy across equilibria. Third, when aggregate shocks are recurrent, the economy cycles between periods of boom and depression.

Nonergodic Economic Growth

Steven N. Durlauf

Working Paper No. 3719

May 1991

JEL Nos. O41, E32

This paper explores the role of complementarities and coordination failure in economic growth. I analyze the evolution composed of a countable set of infinitely lived heterogeneous industries. Individual industries exhibit nonconvexities in production and are linked across time through localized technological complementarities. Each industry employs one of two production techniques. One technique is more efficient in using capital than the other, but requires the payment of a fixed capital cost. Both techniques exhibit technological complementarities, in the sense that the productivity of capital investment in a technique is a function of the technique choices made by various industries in

the previous period. These complementaries, when strong enough, interact with incompleteness of markets to produce multiple Pareto-rankable equilibria in long-run economic activity. The equilibria have a simple probabilistic structure that demonstrates how localized coordination failures can affect the aggregate equilibrium. The model is capable of generating interesting aggregate dynamics as coordination problems become the source of aggregate volatility. Modifications of the model illustrate how leading sectors can cause a takeoff into high growth.

Externalities from Labor Mobility

Laurence M. Ball

Working Paper No. 3720

May 1991

JEL No. J60

This paper assumes that workers can move from a market with high unemployment to one with low unemployment at a cost. In principle, the equilibrium amount of mobility may be either greater or less than the social optimum. For most plausible parameter values, however, mobility is too low. Intuitively, mobility has a beneficial externality: it helps workers who remain in the high-unemployment market by reducing competition for jobs. Mobility hurts workers in the low-unemployment market, but this effect usually is smaller.

Political Instability, Political Weakness, and Inflation: An Empirical Analysis

Sebastian Edwards and Guido Tabellini

Working Paper No. 3721

May 1991

JEL Nos. D72, E31, F40

We empirically analyze the most important implications of two political economy models of inflation: the "myopic" government approach and the "weak" government approach. In myopic government models, inflation is the deliberate outcome of politicians' strategic behavior; in weak government models, inflation is the unavoidable result of a political struggle among different factions. In testing the implications of these two models, we use a new dataset on political developments in 76 countries for 1971-82. Using a number of alternative definitions of the inflation tax, we find that the data support the implications of the myopic government models: countries with a more unstable political environment tend to rely more heavily on the inflation tax. There is no evidence in favor of the weak government hypothesis.

Wage Dispersion Between and Within U.S. Manufacturing Plants, 1963-86

Steve J. Davis and John C. Haltiwanger

Working Paper No. 3722

May 1991

JEL Nos. J31, L60

This paper exploits a rich and largely untapped source of information on the wages and other characteristics

of individual manufacturing plants to study recent changes in the U.S. wage structure. Our primary source, the Longitudinal Research Datafile (LRD), contains observations on more than 300,000 manufacturing plants during Census years (1963, 1967, 1972, 1977, 1982) and 50,000-70,000 plants during intercensus years since 1972. We use the information in the LRD to investigate changes in the plant wage structure over the past three decades. We also combine plant-level wage observations in the LRD with wage observations on individual workers in the Current Population Survey to estimate the between-plant and within-plant components of overall wage dispersion.

The Income Tax as Insurance: The Casualty Loss and Medical Expense Deductions and the Exclusion of Medical Insurance Premiums

Louis Kaplow

Working Paper No. 3723

May 1991

JEL Nos. H24, K34

Whether personal income tax deductions are appropriate refinements to the concept of income or unwarranted tax expenditures continues to be the subject of debate. The casualty loss and medical expense deductions frequently are justified on the ground that ability to pay is reduced by largely unavoidable expenditures or losses. This paper reconsiders the question, taking account of the availability of private insurance, which in fact is widespread for relevant losses in both areas. When individuals can insure, the second level of insurance implicit in the casualty loss and medical expense deductions distorts consumption choices and insurance decisions. In particular, individuals may be more exposed to losses because of tax deductions commonly believed to mitigate them. Given the option, individuals would prefer a regime that eliminated the deductions and offered corresponding lower tax rates.

Relationships Among the Family Incomes and Labor Market Outcomes of Relatives

Joseph G. Altonji and Thomas A. Dunn

Working Paper No. 3724

June 1991

JEL Nos. D31, J1, J30

This paper examines the links between the labor market outcomes of individuals who are related by blood or by marriage. We use panel data on pairs of matched family members from the National Longitudinal Survey of Labor Market Experience. We examine the intergenerational and sibling correlations among a broad set of labor market variables using time average, method of moments, and regression techniques designed to reduce the biases introduced by transitory and measurement errors. We also show that family

data can be exploited to investigate theories of job turnover, labor supply, and the industry structure of wages.

Our primary findings are, first, that there are strong correlations between the family incomes of relatives. Our method-of-moments estimates are .38 for pairs of brothers, .73 for pairs of sisters, and .56 for brother-sister pairs. The intergenerational family income correlations are .36 for father-son pairs, .48 for father-daughter pairs, and .56 for mother-son and mother-daughter pairs. These estimates, except for the father-son results, are large compared to those in the literature for the United States.

Second, we find strong correlations in the wages and earnings of relatives. Wage correlations vary around .40 for all family member pairs, and earnings correlations vary around .35. Work hours of family members of the same sex also are related fairly strongly. We also find strong correlations in the earnings of "in-laws" that may support a theory of assortive mating in which parental earnings have value.

Further, we show that job turnover rates depend on family characteristics and are negatively correlated with labor market productivity. We show too that young men whose fathers work in high-wage industries tend to work in high-wage industries themselves. Finally, we find that a father's collective bargaining coverage has a strong positive influence on his son's collective bargaining status.

U.S. Trade Policy in the 1980s: Turns—And Roads Not Taken

J. David Richardson

Working Paper No. 3725

June 1991

This paper is an assessment of three tilts in U.S. trade policy during the 1980s: minilateralism, managed trade, and congressional activism. It describes their economic and political causes, and whether or not alternative policy directions might have been possible.

Taking the unfavorable macroeconomic environment for trade policy as given, a few alternatives do seem possible, but only a few. Sectoral minilateralism might have been a feasible replacement for the more aggressive managed trade experiments, for example, in semiconductors. Earlier Executive Branch initiative in drafting trade legislation in the late 1980s might have blunted some of the sharper edges of the congressional arsenal in the 1988 act.

Minilateralism is forecast to have mildly liberalizing effects in the near term. The prognosis for the effects of managed trade and for congressional activism is decidedly more mixed.

Was the Great Depression a Low-Level Equilibrium?

John Dagsvik and Boyan Jovanovic

Working Paper No. 3726

June 1991

JEL No. E32

Was the Great Depression the outcome of a massive coordination failure? Or was it a unique equilibrium

response to adverse shocks? More generally, do aggregates fluctuate partly because agents occasionally settle on inferior, low-level equilibriums? These questions lie at the heart of the current disagreement over how one should view business cycles.

This paper estimates an employment model with monetary and real shocks. In one region of the parameter space the model yields uniqueness, while in the other it yields up to three equilibriums. When more than one equilibrium exists, a selection rule is needed. The equilibrium selection rule that we use has a Markovian structure, but the money supply is denied a coordination role—it cannot affect the choice of the equilibrium point. The global maximum likelihood estimates lie in the uniqueness region, implying that instead of being a low-level, coordination-failure equilibrium, the Depression era was caused by movements in fundamentals only. The result held for each of the three sub-periods (since 1900) for which the estimation was done, but the estimates are imprecise and the conclusions that we draw from them are tentative. The paper also computes the local maximums in the region of multiplicity, and here some of our estimates indicate that 1932 and 1933 would have exhibited low-level equilibriums had more than one equilibrium existed.

Do the Benefits of Fixed Exchange Rates Outweigh Their Costs?

The Franc Zone in Africa

Shantayanan Devarajan and Dani Rodrik

Working Paper No. 3727

June 1991

JEL Nos. F31, O11, O55

We develop a simple formal framework to clarify the trade-offs involved in the choice between a fixed and flexible exchange rate system. We then apply the framework to the CFA Zone countries in Africa, which have maintained a fixed parity with the French franc since independence. Thanks to the predominance of a few agricultural products and natural resources in their exports, CFA member countries have suffered frequent shocks in their terms of trade. A flexible exchange rate possibly could have alleviated the costs of these external shocks. On the other hand, CFA member countries have managed to maintain lower inflation levels than their neighbors. Our framework provides a way of weighing these costs and benefits.

The inflation differential between CFA and non-CFA African countries has been around 14 percentage points. We attribute this differential to the standard time-consistency problem inherent in discretionary macroeconomic policy. Nonetheless, our highly stylized calculations suggest that fixed exchange rates have been, on the whole, a bad bargain for the CFA member countries. Under "reasonable" output-inflation trade-offs, the output costs of maintaining a fixed exchange rate have outweighed the benefits of lower inflation.

Gross Job Creation, Gross Job Destruction, and Employment Reallocation

Steve J. Davis and John C. Haltiwanger

Working Paper No. 3728

June 1991

JEL Nos. J63, J23, E32

This study measures the heterogeneity of establishment-level changes in employment in the U.S. manufacturing sector from 1972 to 1986 in terms of the gross creation and destruction of jobs, and the rate at which jobs are reallocated across plants. Our measurement efforts enable us to quantify the connection between job reallocation and worker reallocation, to evaluate theories of heterogeneity in plant-level employment dynamics, and to establish new results related to the cyclical behavior of the labor market.

out of foreign earnings at rates that are three times higher than their payout rates from domestic earnings. Why firms do so is unclear, although this behavior may be consistent with a signaling view of dividends. There is a curious tax consequence of this high payout rate on foreign earnings: the tax system, which grants foreign tax credits to U.S. corporations for the foreign taxes they pay, may receive more revenue from taxing the dividends of U.S. shareholders than from the corporate tax on foreign earnings.

Nonrational Actors and Financial Market Behavior

Darryll Hendricks, Jayendu Patel,

and **Richard J. Zeckhauser**

Working Paper No. 3731

June 1991

JEL Nos. G14, G10, G11

The insights of descriptive decision theorists and psychologists, we believe, have much to contribute to our understanding of financial market macrophenomenons. We propose an analytic agenda that distinguishes those individual idiosyncrasies that prove consequential at the macro level from those that are neutralized by market processes, such as poaching. We discuss five behavioral traits—barn-door closing, expert/reliance effects, status quo bias, framing, and herding—that we employ in explaining financial flows. We show that patterns in flows to mutual funds, to new equities, and across national boundaries, as well as movements in debt-equity ratios, are consistent with deviations from rationality.

Heterogeneity and Output Fluctuations in a Dynamic Menu-Cost Economy

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

Working Paper No. 3729

June 1991

JEL Nos. E30, E32

When firms face menu costs, the relationship between their output and money is highly nonlinear. At the aggregate level, however, this need not be so. In this paper, we study the dynamic behavior of a general equilibrium menu-cost economy in which firms are heterogeneous in the shocks they perceive, and the demands and adjustment costs they face. In this context we: 1) generalize the Caplin and Spulber (1987) steady-state monetary neutrality result; 2) show that uniqueness of equilibria depends not only on the degree of strategic complementarities but also on the degree of dispersion of firms' positions in their price cycle; 3) characterize the path of output outside the steady state and show that as strategic complementarities become more important, expansions become longer and smoother than contractions; and 4) show that the potential effectiveness of monetary policy is an increasing function of the distance of the economy from its steady state, but that an uninformed policymaker will have no effect on output on average.

The Diffusion of Technology and Inequality Among Nations

Boyan Jovanovic and Saul Lach

Working Paper No. 3732

June 1991

JEL No. O30

Output growth usually is explained in terms of the growth of the primary inputs: labor, physical capital, and possibly human capital. In this paper, we account for growth with labor and intermediate goods. Because we have no measures of the extent of adoption of most intermediate goods in most countries, we have to assume something about how they spread, based on what we see in U.S. data. We find that we can easily account for the extent and persistence of inequality among nations if all countries have: 1) the same production function; 2) the same speed of adoption technology; and 3) imperfectly correlated technology shocks. Unfortunately, while it easily generates the sorts of low-frequency movements that we observe, our technology shock seems to have little to do with high-frequency movements in GNP, so that if our definition of this shock is correct, real business cycle models are way off the mark.

Dividends and Profits: Some Unsubtle Foreign Influences

James R. Hines, Jr.

Working Paper No. 3730

June 1991

JEL Nos. G35, H87

American corporations earn a large and growing share of their profits from their foreign operations. This paper evaluates the effect of foreign earnings on dividend payments by American corporations. The results suggest that the effect may be rather dramatic: all other things equal, U.S. corporations pay dividends

Technology Adoption and Growth

Stephen L. Parente and Edward C. Prescott

Working Paper No. 3733

June 1991

We model technology change as the result of decisions of individuals and groups of individuals to adopt more advanced technologies. The structure is calibrated to the U.S. and postwar Japan growth experiences. Using this calibrated structure, we explore how large the disparity in the effective tax rates on the returns to adopting technologies must be to account for the huge disparity in per capita income across countries. We find that this disparity is not implausibly large.

Dynamic (S,s) Economies

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

Working Paper No. 3734

June 1991

JEL Nos. E10, E20, E30

This paper provides a framework for studying the aggregate dynamic behavior of an economy in which individual units follow (S,s) policies. We characterize structural and stochastic heterogeneities that ensure convergence of the economy's aggregate toward its frictionless counterpart, determine the speed at which convergence takes place, and describe the transitional dynamics of this economy. In particular, we consider a dynamic economy in which agents differ in their initial positions within their bands and face both stochastic and structural heterogeneity, in which the former refers to the presence of (unit specific) idiosyncratic shocks, and the latter to differences in the widths of units' (S,s) bands and their response to aggregate shocks. We study the evolution of the economy's aggregate, and of the differences between this aggregate and that of an economy without macroeconomic friction (a situation in which individual units adjust with no delay to all shocks). We also examine the sensitivity of this difference to common shocks. For example, in the retail inventory problem, the aggregate deviation and sensitivity to common shocks correspond to the aggregate inventory level and its sensitivity to aggregate demand shocks, respectively.

A Fallacy of Composition

Ricardo J. Caballero

Working Paper No. 3735

June 1991

JEL Nos. B41, E20

The representative agent framework has given macroeconomists powerful microeconomic tools. Unfortunately, it also has blurred the distinction between statements that are valid at the individual level and those that apply to the aggregate. In this paper I argue that probability theory severely restricts the joint behavior of a large number of units that are less than fully synchronized; many fallacies arise from disregarding these

restrictions. For example, the observation that the aggregate price level is more rigid to downward changes than to upward changes has led many authors to suggest that asymmetries at the firm level are responsible for the alleged macroeconomic fact. However, this paper shows that asymmetric pricing policies at the firm level do not necessarily imply asymmetries in upward and downward adjustments of the aggregate price level. Also, asymmetries in the aggregate price level need not come from asymmetries at the firm level. Similarly, asymmetric factor adjustment costs at the firm level need not imply asymmetric responses of the aggregate capital stock and the level of employment to positive and negative shocks.

Black-White Earnings over the 1970s and 1980s: Gender Differences in Trends

Andrea H. Beller and Francine D. Blau

Working Paper No. 3736

June 1991

JEL No. J15

This paper uses Current Population Survey data to analyze gender differences in black-white annual earnings trends over the 1970s and 1980s. We find that, in at least two respects, black women fared better than men over this period. First, because black men, but not black women, worked less per year relative to whites, the annual earnings and estimated wages of black women compared to white women rose, while black men gained only in terms of their wages compared to white men. Second, since the gender earnings gap among whites was narrowing during this time, and black women's wages were rising relative to those of white women, the black women also made faster progress relative to white males than black males did. In other important respects, however, the experience of black men and women over the period was similar. For both groups, while earnings and wages relative to whites of the same sex rose during the 1970s, they stagnated or declined during the 1980s. Second, in contrast to their experience in the 1960s, younger blacks did not fare better than older blacks during the 1970s and 1980s. In 1971, both unadjusted wage ratios and adjusted earnings ratios were highest for blacks entering the labor market. By 1988 these ratios were fairly similar across experience groups.

Japanese Foreign Direct Investment

Kenneth A. Froot

Working Paper No. 3737

June 1991

JEL No. F21

Japan's outflows of foreign direct investment (FDI) have increased dramatically in recent years, to the point where Japan has become the world's largest overseas direct investor. This paper documents the increase in Japanese FDI, as well as its breakdown across industries and countries. Investments in real estate and financial

services have grown most rapidly, as has Japanese FDI into North America, which now accounts for fully half of Japan's outflows. I discuss and evaluate some of the most popular explanations for this explosion in investment: Japanese current account surpluses; actual or anticipated protectionism abroad; appreciated stock prices and value of the yen; and changes in international tax policy.

Determinants of External Imbalances: The Role of Taxes, Government Spending, and Productivity

Leonardo Leiderman and Assaf Razin

Working Paper No. 3738

June 1991

JEL No. F32

This paper develops and estimates a dynamic optimizing model of the current account. The model focuses on real factors that determine the evolution of saving and investment, and hence the external balance. Three types of shocks are at the center of the analysis: productivity shocks; shocks to labor input; and tax policy shocks. While our approach is in line with the real business cycle models of the current account, the distinguishing feature of the work is the application of econometric methods to time-series data for a small open economy. This enables us to directly estimate the parameters governing saving and investment under rational expectations restrictions.

A Model of Optimal Fines for Repeat Offenders

A. Mitchell Polinsky and Daniel L. Rubinfeld

Working Paper No. 3739

June 1991

JEL Nos. K14, K42

This paper analyzes optimal fines in a model in which individuals can commit up to two offenses. The fine for the second offense is allowed to differ from the fine for the first offense. There are four natural cases in the model, defined by assumptions about the gains to individuals from committing the offense. In the case fully analyzed, it may be optimal to punish repeat offenders more severely than first-time offenders. In another case, it may be optimal to impose less severe penalties on repeat offenders. And in the two remaining cases, the optimal penalty does not change.

First Nature, Second Nature, and Metropolitan Location

Paul R. Krugman

Working Paper No. 3740

June 1991

JEL Nos. F12, R10, R12

This paper develops models of spatial equilibrium in which a central "metropolis" emerges to supply manu-

factured goods to an agricultural hinterland. The location of the metropolis is not fully determined by the location of resources: as long as it is not too far from the geographical center of the region, the concentration of economic mass at the metropolis makes it the optimal location for manufacturing firms, and is thus self-justifying. Therefore, the approach in this paper helps explain the role of historical accident and self-fulfilling expectations in metropolitan location.

How Would Universities Respond to Increased Federal Support for Graduate Students?

**Dominic J. Brewer, Ronald G. Ehrenberg,
and Daniel I. Rees**

Working Paper No. 3741

June 1991

JEL Nos. I28, H52

Projections of forthcoming shortages of Ph.D.s, and thus new faculty for the academic sector, abound. Among the policies proposed to prevent such shortages is increased federal support for graduate students. Lost in the policy debate, however, has been concern for the possibility that increased federal support might induce academic institutions to redirect their own internal resources in a way that frustrates the intent of the policy change at least partially.

Our paper analyzes this issue using institutionally based data for science and engineering fields. We find that doctorate-producing universities do respond to changes in external support for graduate students by altering the number of students they support on institutional funds. While adjustments to changes in external support levels appear to be quite rapid, the magnitude of these responses is quite small. On average, we estimate, 100 additional students supported by external funds reduce the number supported on institutional funds by 22 to 23. We also find that the magnitude of the response varies across fields. Within science and engineering, there is some fungibility of external support across fields. Changes in external support also influence the distribution of internal support by type (fellowship, research assistantship, and teaching assistantship).

No News Is Good News: An Asymmetric Model of Changing Volatility in Stock Returns

John Y. Campbell and Ludger Hentschel

Working Paper No. 3742

June 1991

JEL No. G12

Sometimes it is argued that an increase in stock market volatility raises required stock returns, and thus lowers stock prices. This paper modifies the generalized autoregressive conditionally heteroscedastic (GARCH) model of returns to allow for this volatility feedback ef-

fect. The resulting model is asymmetric, because volatility feedback amplifies large negative stock returns and dampens large positive returns, making stock returns negatively skewed and increasing the potential for large crashes. The model also implies that volatility feedback is more important when volatility is high. The asymmetric model fits U.S. monthly and daily data for 1926-88 better than the standard GARCH model, accounting for almost half the skewness and excess kurtosis of standard monthly GARCH residuals. Estimated volatility discounts on the stock market range from 1 percent in normal times to 13 percent after the stock market crash of October 1987 and 25 percent in the early 1930s. However, volatility feedback has little effect on the unconditional variance of stock returns.

Expected Changes in the Work Force and Implications for Labor Markets

Philip B. Levine and Olivia S. Mitchell

Working Paper No. 3743

June 1991

JEL Nos. J40, J26

This paper examines the likely effects of the aging of the baby-boom generation on labor force attachment, unemployment, and wages. The focus of analysis is labor market trends from now to 2020, when the majority of the baby-boom generation will confront its decision to retire.

On the basis of the best available evidence, we conclude that the trend toward earlier retirement will slow, and perhaps reverse, in the next few decades. Unemployment among older workers should fall. The aggregate, full-employment unemployment rate also should decline as the baby-boom generation ages. In addition, the aging of the baby-boom generation will not depress wages substantially, neither for older workers nor for other demographic groups.

Trends in Pension Benefit Formulas and Retirement Provisions

Olivia S. Mitchell

Working Paper No. 3744

June 1991

JEL Nos. J26, G23

Drawing on data collected and tabulated by the U.S. Department of Labor's Employee Benefits Survey of medium and large firms, I study changes in pension plan retirement formulas and benefit provisions over the last decade and conclude that pension provisions have changed a great deal, among both defined-benefit and defined-contribution plans.

For defined-benefit plans, participation and vesting rules changed substantially. Early retirement became more accessible, and benefits somewhat more generous. Normal retirement ages declined, and pension benefits increasingly depended on final, rather than career, earnings. Integration of pension benefits with

Social Security also extended to almost two-thirds of all participants in defined-benefit plans. Overall, pension replacement rates rose slightly over time, but benefit ceilings remained pervasive for older workers, and disability benefit provisions became more stringent.

Defined-contribution plans also changed a great deal over the 1980s. Workers were increasingly likely to be covered by combinations of defined-benefit and defined-contribution plans, with the latter usually a saving and thrift plan permitting a lump-sum distribution. Profit-sharing and stock plans appear to have stagnated during the latter part of the 1980s.

The Asset Allocation of Private Pension Plans

Leslie E. Papke

Working Paper No. 3745

June 1991

JEL Nos. J26, H50

This paper describes the Form 5500 data on private pension fund investments and discusses the investment policies of private pension funds. I find that the average, single-employer defined-benefit plan holds about 50 percent in fixed-income securities, 20 percent in equities, and 20 percent in pooled funds (a 50/20/20 mix). Larger single-employer defined-benefit plans hold a 60/30/2 portfolio, on average. While portfolio theory for these plans predicts extreme investment policies, few of the portfolios are extreme. About 20 percent of the plans hold more than 60 percent in equity; about 9 percent of the plans hold more than 60 percent in long-term, fixed-income securities. Multiemployer defined-benefit plans hold a 63/19/8 mix.

Single-employer defined-contribution plans invest in a 41/30/20 mix on average; for larger plans, the mix is 49/38/2. A defined-contribution plan that is one of several plans invests more in equities and less in fixed-income securities than the average sole defined-contribution plan. Multiemployer defined-contribution plans invest more heavily in fixed-income securities (73/5/8) than single-employer plans do.

A Longitudinal Analysis of Young Entrepreneurs in Australia and the United States

David G. Blanchflower and Bruce D. Meyer

Working Paper No. 3746

June 1991

JEL No. J21

This paper examines the pattern of self-employment in Australia and the United States, particularly among young people. We find that in both countries, skilled manual workers, older workers, and men are particularly likely to become self-employed. Also, previous firm size, union status, and earnings all are important determinants of transitions to self-employment.

The main difference between the two countries is that additional years of schooling have a positive im-

fact on the probability of being self-employed in the United States but are not significant in Australia. The factors influencing the probability of leaving self-employment are different across the two countries, though. The countries' only similarity is that younger individuals are more likely to leave self-employment than older people are.

A Note on Internationally Coordinated Policy Packages Intended to Be Robust Under Model Uncertainty

Scott Erwin, Jeffrey A. Frankel,
and **Katharine E. Rockett**

Working Paper No. 3747

June 1991

JEL No. F42

This paper makes available a printout of all 1000 cases of coordination considered in Frankel and Rockett (1988). It shows that if coordination is restricted to policy packages that are robust with respect to model uncertainty, such as the so-called "strong" bargains, then coordination is more likely to result in welfare gains.

Durable Goods: An Explanation for Their Slow Adjustment

Ricardo J. Caballero

Working Paper No. 3748

June 1991

JEL No. E21

Aggregate expenditure on durable goods responds too slowly to wealth and other innovations to be consistent with the simplest, frictionless version of the permanent income hypothesis. This paper presents a model of aggregate expenditure on durables that builds on the lumpy nature of microeconomic purchases and supports its contribution to the resolution of the "slowness" puzzle. The paper also contains several new results on the problem of dynamic aggregation of stochastically heterogeneous units.

Mergers, Deregulation, and Cost Savings in the U.S. Rail Industry

Ernst R. Berndt, Judy Shaw-Er Wang Chiang,
Ann F. Friedlaender, and Christopher A. Velturo

Working Paper No. 3749

June 1991

JEL Nos. L51, L40, L91

The success of deregulation in creating a viable private rail freight system in the United States since 1979 is relatively undisputed. Deregulation has eased rate-setting restrictions, simplified merger applications and approval procedures, and relaxed route abandonment policies.

This paper attempts to disentangle the effects of deregulation from the effects of mergers and acquisitions on rail costs. We employ a translog variable cost function, based on an unbalanced panel dataset of annual observations for major U.S. Class I railroads from 1974 to 1986.

We find that both deregulation and mergers contributed significantly to cost savings. However, of the accumulated cost savings achieved by 1986 by the six major firms involved in mergers after deregulation, about 91 percent of the reduction in accumulated costs is the result of deregulation and about 9 percent is the direct result of mergers and acquisitions (which in turn were facilitated by regulatory reforms), we estimate. We find that both deregulation and mergers resulted in a substantial labor-saving bias; the point estimate of the deregulation labor-saving bias is larger than that for mergers, but we were not able to estimate this bias precisely.

We conclude that mergers were not a prerequisite for railroads achieving substantial cost and productivity improvements from 1974-86. Deregulation also had an enormous direct impact; indeed, its impact appears to have been much larger than that of mergers.

Lifetime versus Annual Perspectives on Tax Incidence

Don Fullerton and Diane Lim Rogers

Working Paper No. 3750

June 1991

JEL Nos. D3, D58, D91, H22

This paper discusses the nature and analysis of lifetime tax incidence, and compares this perspective with the more familiar annual perspective. We find that the lifetime perspective requires much more data over longer periods of time, because results depend critically on the whole shape of the lifetime earnings profile. Also, individuals classified by annual income decile often are reclassified into very different lifetime income deciles. The personal income tax and the corporate income tax appear to be progressive on a lifetime basis, while consumption taxes appear less regressive on a lifetime basis. Finally, despite the different approaches and the different reasons underlying the incidence of each particular tax, the lifetime incidence of the entire U.S. tax system is strikingly similar to the annual incidence.

An Indicator of Future Inflation Extracted from the Steepness of the Interest Rate Yield Curve Along Its Entire Length

Jeffrey A. Frankel and Cara S. Lown

Working Paper No. 3751

June 1991

JEL Nos. E43, E37, G1, E52

It is often suggested that the slope of the term structure of interest rates contains information about the

expected future path of inflation. This paper applies a simple existing theoretical framework to the problem of predicting the inflation spread, allowing the real interest rate to vary in the short run but to converge to a constant in the long run. We show that the appropriate indicator of expected inflation can use the entire length of the yield curve, in particular by estimating the steepness of a specific nonlinear transformation of the curve, rather than being restricted to a spread between two points. The resulting indicator does a relatively good job of predicting the inflation rate over 1960-88.

The Equity Premium and the Risk-Free Rate: Matching the Moments

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

Working Paper No. 3752

June 1991

JEL Nos. E20, G12

We investigate the ability of a representative agent model with time-separable utility to explain the mean vector and the covariance matrix of the risk-free interest rate and of the return to leveraged equity in the stock market. The paper generalizes the standard calibration methodology by accounting for the uncertainty in both the sample moments to be explained and the estimated parameters for which the model is calibrated. We develop a testing framework to evaluate the model's ability to match the moments of the data.

We study two forms of the model, both of which treat leverage in a manner consistent with the data. In the first, dividends explicitly represent the flow that accrues to the owner of the equity, and are discounted by the marginal rate of intertemporal substitution defined over consumption. The second form of the model introduces bonds, and treats equities as the residual claim to the total endowment stream.

We find that the first moments of the data can be matched for a wide range of preference parameter values. But for both models, the implied first and second moments taken together are always statistically significantly different from the data at standard levels. This last result contrasts sharply with other recent treatments of leverage in the literature.

from the asymmetric tax treatment of interest income and interest payments. Intergenerational transfers are motivated altruistically.

Under the assumption that altruistic transfers occur in at least some family lines, and under other plausible conditions, we prove that the steady-state marginal product of capital does not vary with government expenditures, government debt, the labor income tax schedule, and the tax rate on capital income. Instead, we find, the tax treatment of interest payments has powerful effects on the marginal product of capital and on aggregate savings in life-cycle models and, especially, in altruistic linkage models.

Our theoretical analysis also generates new testable implications for empirical work on how tax policy affects aggregate savings, and on the connection between the age distribution of resources and consumption. Our simulations suggest that the 1986 Tax Reform Act's elimination of interest deductibility on consumer loan repayments will increase per capita savings significantly.

Real Interest Rates and the Savings and Loan Crisis: The Moral Hazard Premium

John B. Shoven, Scott B. Smart, and Joel Waldfoegel

Working Paper No. 3754

June 1991

JEL Nos. E43, G21

Real interest rates rose to historically high levels in 1980 and remained high throughout the decade. Macroeconomists attribute this phenomenon to a combination of tight monetary policy, fiscal deficits, and variable inflation rates. In this paper, we present preliminary evidence for an additional explanation related to the decade-long savings and loan crisis. Deposit insurance, moral hazard, and regulatory forbearance provide both the incentives and the means for insolvent thrifts to issue liabilities that compete with Treasury securities in the market for funds. Thus, as the magnitude of the thrift crisis grew during the 1980s, so did the pressure on Treasury yields. Even if the S&L crisis has little effect on interest rates, the increased cost of financing the public debt adds significantly to the total costs associated with it.

The Timing of Intergenerational Transfers, Tax Policy, and Aggregate Savings

David Altig and Steve J. Davis

Working Paper No. 3753

June 1991

JEL Nos. E62, E21, D91

We analyze the effects of fiscal policy on interest rates and savings in an overlapping-generations framework that accommodates two observations: 1) the interest rate on consumption loans exceeds the rate of return to household savings; and 2) private intergenerational transfers are widespread and primarily occur early in the life cycle of recipients. In our model, the wedge between borrowing and lending rates arises

Technology Commitment and the Cost of Economic Fluctuations

Garey Ramey and Valerie A. Ramey

Working Paper No. 3755

June 1991

JEL Nos. E23, E32

When firms must make technology commitments, economic fluctuations impose costs, in the form of excess post inefficiency in production technology. Greater volatility of productivity shocks leads to *lower mean output* because of technology commitments. When we take into account learning-by-doing, mean output becomes *permanently lower* because of the higher vola-

tility of productivity shocks. Our data strongly verify the theoretical negative and persistent relationship between mean and variance of output. We estimate that observed volatility in productivity has imposed a cost amounting to almost two percentage points of U.S. GNP growth.

The Source of Fluctuations in Money: Evidence from Trade Credit

Valerie A. Ramey

Working Paper No. 3756

June 1991

JEL Nos. E13, E44

How important are technology shocks versus financial shocks for explaining fluctuations in money? I extend the theory of King and Plosser by recognizing that both money and trade credit provide transactions services. My model shows that the comovements between money and trade credit can reveal the nature of the underlying shocks. My results strongly suggest that shocks to the financial system explain most of the fluctuations in money. Thus, I cast doubt on the hypothesis that nonfinancial shocks to technology are the main source of the money-income correlation.

How Fast Do Old Men Slow Down?

Ray C. Fair

Working Paper No. 3757

June 1991

This study uses data on men's track and field and road racing records by age to estimate the rate at which men slow down. For most of the running events (400 meters through the half marathon), the slowdown rate is estimated to be 0.8 percent per year between ages 35 and 51. At age 51, the rate begins to increase. It is 1.04 percent at age 60, 1.46 percent at age 75, and 2.01 percent at age 95. The slowdown rate is smaller for 100-meter events. For events longer than the half marathon, the rate is smaller through about age 60, and larger after that. The slowdown rate is generally larger at all ages for the field events.

I show that the age factors in *Masters Age-Graded Tables* are excessively variable and biased against older runners and then present the age factors implied by this study. My figures can be used to estimate one's projected time or distance by age. They also can be used by race officials for age-graded events.

Economic Development, Urban Underemployment, and Income Inequality

James E. Rauch

Working Paper No. 3758

June 1991

JEL Nos. O11, O15, O17

I investigate the evolution of inequality in permanent income during the course of a less developed country's

transformation from a primarily agricultural to a primarily industrial, urban economy. The source of income inequality is luck in obtaining employment in the protected urban "formal sector" versus the unprotected urban "informal sector." I show that, with development, inequality follows an "inverted U": it rises when urbanization is low and the consequent pressure on the land keeps rural incomes low, making workers willing to take high risks of "underemployment" in the urban informal sector. Eventually, inequality falls after urbanization and when rural incomes have increased enough to allow workers to pursue more secure positions in the industrial sector. These results, in combination with new empirical evidence, suggest that inverted-U behavior of inequality may be driven by the important social phenomenon of mass urban underemployment.

Minimum Wages in Puerto Rico: Textbook Case of a Wage Floor?

Alida Castillo Freeman and Richard B. Freeman

Working Paper No. 3759

June 1991

This paper uses time-series and cross-industry data on employment and wages in Puerto Rico to assess the effects of applying the U.S. minimum wage to the Puerto Rican labor market. We find that the U.S. minimum has a massive effect on the earnings distribution in Puerto Rico; it has substantially lowered employment and altered the allocation of labor across industries. The reduction in employment is caused by the fact that the minimum is high relative to average earnings or productivity, not because the estimated elasticity of employment to the minimum wage is especially high. We claim that the results support the textbook model of the minimum wage more strongly than studies of the United States, because the U.S. minimum has real bite in Puerto Rico.

What Moves the Stock and Bond Markets? A Variance Composition for Long-Term Asset Returns

John Ammer and John Y. Campbell

Working Paper No. 3760

June 1991

JEL No. G12

We break down movements in stock and bond returns into changes in expectations of future stock dividends, inflation, short-term real interest rates, and excess returns on stocks and bonds. We find that in monthly postwar U.S. data, excess stock returns are driven largely by news about future excess stock returns, while excess 10-year bond returns are driven largely by news about future inflation. Real interest rate changes have little impact on either stock returns or 10-year bond returns, although they do affect the short-term nominal interest rate and the slope of the term structure. These findings help to explain why postwar excess stock and bond returns have been almost uncorrelated.

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