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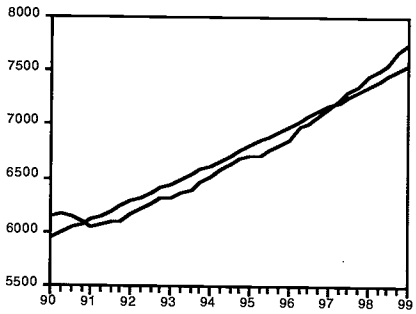
Program Report

Economic Fluctuations and Growth

Robert E. Hall*

In May 1999, the unemployment rate was 2.5 percent in Boston, 1.6 percent in Minneapolis, 2.2 percent in Denver, 2.5 percent in San Francisco, 3.0 percent in Dallas, and 2.6 percent in Washington, DC.[1] The U.S. economy has not been this healthy since the best years of the 1960s. Graph 1 shows the growth of total output (real GDP) of the U.S. economy since 1990. Since mid-1995, the economy has grown at an exceptional rate, above 4 percent per year, far outpacing its normal trend of growth, shown by the nearly straight line in the graph. Normal growth is a little over 2.5 percent per year.



The last time conditions like this existed in the U.S. economy, the late 1960s, inflation was building. Graph 2 shows the remarkable contrast between the good years of the late 1960s and the good years of the late

*Robert E. Hall is Director of the NBER's Economic Fluctuations and Growth Program and the Robert and Carole McNeil Professor of Economics at Stanford University.

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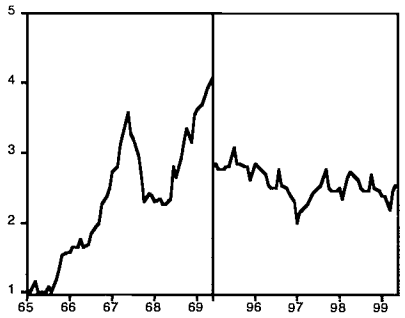
1990s. Despite incredibly tight conditions, inflation has been on a downward trend in recent years.



These developments have perplexed the Federal Reserve Board. Does the exceptional tightness of the labor market and the growth of output mean that inflation will increase? Or has the economy's natural unemployment rate fallen so much that a 4.5 percent rate of national unemployment no longer implies rising wage inflation? And, has productivity growth risen so much that a 4 percent annual growth rate of GDP is sustainable?

Researchers in the NBER's Program on Economic Fluctuations and Growth have a variety of views on this subject. Robert J. Gordon has shown that recent higher rates of productivity growth derive from special factors, especially the high growth that has been recorded in computer output, but he is skeptical about any long-term rise in overall productivity growth.[2] I, however, have pointed out that the dramatic rise in the stock market in the 1990s could be interpreted as showing that corporations have built up large amounts of new capital whose contributions to productivity will appear in the future.[3]

The EFG Program's activities revolve around fundamental research on the performance of modern economies in the short and long runs. During the Great Depression, macroeconomics entered a period of division into schools of thought. The

opposing schools of Keynesian and classical macroeconomics fought ideological as well as scientific battles. These schools have disappeared completely from the field in the past decade. Our program meetings and conferences feature many spirited scientific discussions but never debates between schools of thought.

Macroeconomics also has drawn closer to microeconomic theory in recent years—the long-sought microeconomic foundations for the field have been built. It is fair to say that macroeconomics, like such fields as industrial organization, public finance, and labor economics, is now a branch of applied microeconomics. Although a companion development is increased mathematical formalization—very few papers written within the EFG Program are understandable to readers untrained in modern mathematical economics—our work nonetheless focuses on substantive questions about fluctuations and growth, not on modeling technique.

Research Meetings

The EFG Program holds various types of meetings and conferences. Program members and many other guests attend Research Meetings three times a year: in February in the San Francisco area, in July in Cambridge (in connection with the NBER's Summer Institute), and in October in Chicago. These three geographical areas have the largest concentration of program participants. For a number of years, the Chicago meeting has been hosted by the Federal Reserve Bank of Chicago, and in February 2000, the West Coast meeting will be hosted by the Federal Reserve Bank of San Francisco.

In one day, research meetings cover six papers selected from recent working papers on fluctuations and growth written by authors around the world. Since the Program's inception in 1978, most of the papers we now consider path-breaking were presented as working papers at our research meetings. A good example is Finn Kydland and Edward C. Prescott's paper that launched the framework—now standard in macroeconomic theory—called dynamic stochastic general equilibrium.[4] The papers for each research meeting are selected by a pair of organizers with complementary interests. Rotation of the organizing function among a large number of program members ensures a wide variety of topics and authors.

The Macroeconomics Annual

Ben S. Bernanke and Julio J. Rotemberg organize the NBER's Annual Conference on Macroeconomics, which is held in March each year. Whereas the research meetings involve papers intended for publication in scientific journals, *The NBER Macroeconomics Annual* performs a complementary function for this meeting: the organizers commission papers from researchers who recently have opened up new areas of work. Published in an annual volume, the papers summarize and synthesize research and present new results.

Business Cycle Chronology

The EFG Program is responsible for maintaining the semi-official chronology of the U.S. business cycle. The committee that carries out this responsibility meets well after the economy appears to have passed a turning point—a peak or trough in overall activity. The committee last met in 1992 to determine the date of the trough in early 1991. Thus, more than seven years after that date, there is no reason for a meeting anytime soon. This period of inactivity is now almost as long as the one from early 1983 until 1991.

Service in the Nation's Capital

The EFG Program continues to supply public servants to the federal government and to international agencies. Lawrence H. Summers is currently Secretary of the U.S. Treasury. Martin Baily is Chairman-Designate of the President's Council of Economic Advisers. Stanley Fischer is the First Deputy Managing Director of the International Monetary Fund. Joseph E. Stiglitz is Vice President and Chief Economist of the World Bank. John C. Haltiwanger has served as Chief Economist of the U.S. Census Bureau.

Research Groups

The EFG Program encompasses several small research groups that focus on specialized topics. Each group brings together researchers with common interests, ranging from senior graduate students to established researchers. These groups generally meet at the NBER's Summer Institute in July, and sometimes in conjunction with our research meetings in October or February, or independently.

Economic Growth: Charles I. Jones and Alwyn Young, Directors

This group conducts research on a range of topics related to economic performance in the long run. Some of its meetings have focused on one particular topic, such as technical progress and wage inequality, or firm-level productivity growth, while others have considered a wider range of issues, illustrated by the following papers.

Boyan Jovanovic and Rafael Rob[5] observe that machines are more expensive in poor countries; they seek to understand how much of the income differences between countries can be attributed to distortions asso-

ciated with the price of machines. Daron Acemoglu and Fabrizio Zilibotti[6] take a different approach to explaining income differences. They argue that even in a world in which the latest technological advances are freely available in all countries, differences in productivity can be substantial. New technologies are developed primarily in rich countries with large quantities of human capital. Therefore, these technologies may be inappropriate for countries with a different skill mix. In particular, countries with low ratios of skilled to unskilled workers will not be properly matched with advanced technologies, thus reducing their productivity.

What is the relationship between economic growth and other indicators of standard of living? This is the question examined in William Easterly's paper "Life during Growth,"[7] which shows that most measures of physical and social well-being, while being well correlated with the level of income, are not correlated with GDP growth rates. Finally, a number of authors have focused recently on explaining economic growth over the very long run—hundreds or thousands of years instead of decades. Oded Galor and David N. Weil summarize the facts and recent research related to this topic.[8] They then present a theory to explain the transition from a Malthusian regime in which per capita growth is virtually absent to the modern world of rapid per capita growth and demographic transition.

Impulse and Propagation Mechanisms: Lawrence J. Christiano and Martin S. Eichenbaum, Directors

This group's research activities revolve around two questions: What are the key sources of business cycle shocks? and What are the key mechanisms by which these shocks are propagated over time? In exploring these questions, group members have focused on five related activities: empirically identifying the effects of exogenous shocks to the business cycle, with an emphasis on shocks to monetary and fiscal policy[9]; assessing the empirical plausibility of alternative structural business cycle models[10]; constructing new general equilibrium business cycle models[11]; exploring the nature of actual and optimal monetary policy, and analyzing the impact of different institutions within which policy is conducted[12]; and considering the role of monetary, fiscal, and regulatory policy as well as self-fulfilling expectations in causing recent currency crises.[13]

Consumption: Orazio Attanasio, Christopher D. Carroll, and Jose Victor Rios-Rull, Directors

Because consumption accounts for roughly two-thirds of GDP, an understanding of consumption dynamics is essential for any useful model of business cycles. And because saving is the source of capital accumulation, a model for the average level of aggregate consumption is a fundamental requirement for any model of economic growth. In both the business cycle and the economic growth literature, the traditional approach has been to suppose that aggregate consumption levels and dynamics can be explained as the result of an optimization problem by a "representative agent." This agent's characteristics represent an average of the characteristics of individual households within the economy.

The consumption group seeks to explore the relationship between aggregate behavior and the microeconomic consumption problems solved by individual households. A broad theme that has emerged from much of the group's work is that the behavior of a collection of consumers subject to both personal and aggregate shocks does not usually resemble the behavior of a representative agent who has average preferences and faces only aggregate shocks. Nor will aggregate behavior necessarily resemble the behavior of the individual microeconomic agents comprising that aggregate. Thus, the process of building a model with realistic microfoundations and then aggregating seems to be inescapable.

A paper by Sydney Ludvigson and Alexander Michaelides presented at last year's meeting provides a good example of how such an approach can help us to understand macroeconomic dynamics. The authors construct a model in which household income is subject to both idiosyncratic and aggregate shocks. They then examine whether the dynamics of the aggregated data from their model resemble U.S. time series consumption data. John Y. Campbell and Angus Deaton[14] show that the U.S. data exhibit "excess smoothness" relative to the optimal behavior of a representative agent. Ludvigson and Michaelides show that precautionary saving effects cause the dynamics of the aggregated simulation data to be substantially smoother than the dynamics implied by an identically calibrated representative agent model (though still not as smooth as aggregate data).

The group also has attempted to detect the direct influence of macroeconomic variables on household-level decisions. Papers have been presented on the relationship between aggregate "consumer confidence" and consumption as measured in household surveys[15]; on the relationship between regional unemployment risk and household-level home-purchase decisions[16] and saving behavior[17]; and on how unemployment spells affect household-level spending on semi-durable goods such as clothing.[18] Other work in the group has explored how idiosyncratic uncertainty has affected the

risksharing characteristics of alternative Social Security arrangements[19]; the implications of heterogeneous time preference factors for Social Security reform[20]; implications of the unequal distribution of wealth for the dynamics of business cycles[21]; the dynamics of aggregated household survey data as compared with the dynamics of national income accounts data[22]; the implications of standard microeconomic consumption models for household portfolio structure and the equity premium[23]; and the "wealth effect" that stock market movements have on household consumption and saving decisions.[24]

Income Distribution and Macroeconomics: Roland Benabou, Steven N. Durlauf, and Oded Galor, Directors

The marked rise in inequality in most developed countries over the past 20 years has brought income distribution back to the forefront of economists' and policymakers' concerns. At the same time, a rapidly growing body of theoretical and empirical research has identified many channels through which the distributions of income, human capital, and financial assets affects an economy's aggregate performance in the medium and long run.

The main mechanisms, as studied and discussed in this group, involve: 1) credit market frictions, which imply, for instance, that agents with insufficient net wealth cannot invest efficiently in education or entrepreneurial activities; 2) political economy feedbacks, whereby rising inequality leads to significant changes in taxation and redistribution, or even in political stability; and 3) a wide variety of nonmarket interactions between heterogeneous agents, operating at local or economywide levels. These interactions may be pecuniary (fiscal spillovers in school finance, the effects of the labor force's educational composition on the nature of technological innovations) or nonpecuniary (neighborhood effects in attitudes toward work and education, demographic implications of fertility decisions, and changes in the family's socioeconomic structure).

Some of these mechanisms are particularly relevant to developing countries, others to advanced countries, but they all share the fundamental property that the evolutions of macroeconomic and distributional variables are jointly determined. To study these issues, the group brings together researchers representing a broad spectrum of approaches, including some who would normally not have many opportunities to interact. This includes, of course, macroeconomists interested in various forms of heterogeneity and market incompleteness, but also development, public finance, and labor economists, as well as econometricians.

Theoretical emphasis has been on "building up" from microfoundations (individual abilities, incentives, wealth constraints, local spillovers, and policy expectations) and on working toward dynamic general equilibrium models. The papers presented show how "poverty traps" tend to arise for individuals, regions, or whole countries; they also study the extent to which government policy may improve or compound these inefficiencies. In several areas, the research has progressed to the stage at which the models allow a quantitative analysis (through calibrated simulations) of various policy or regime changes: local versus state education finance, optimal unemployment insurance, increased socioeconomic sorting in marriages. On the empirical side, the papers presented have ranged from methodological contributions on the econometric identification of credit constraints and local spillovers, to cross-country regression analyses of the inequality-growth relationship, to panel data studies of the roles of technological progress and trade in magnifying wage inequality.

Some of the broad themes that have emerged in recent years are reflected in the following selected papers. Several papers relate to persistent inequality, social mobility, and growth. For example, how do the rate and nature of technological progress interact with individual ability, effort incentives, and inherited skills to shape the distribution of income? How do these factors, in turn, feed back onto the incentives to innovate?[25] In work presented this year,[26] Oded Galor and Omer Moav integrate models of human and physical capital accumulation to explain how inequality can impede growth in certain phases of the development process, and yet foster it at other stages. Yona Rubinstein and Daniel Tsiddon present the results from an ongoing empirical project on ability using Panel Study of Income Dynamics data. They show that even after controlling for workers' education and other observable individual characteristics, their parents' education significantly affects their wage and employment prospects over their tenure in the labor market.

In work on endogenous sorting (in neighborhoods, marriages, and firms) and its implications for inequality and efficiency,[27] Raquel Fernandez and Richard Rogerson critically revisit the conclusion from a previous paper by Michael Kremer, who found that increased assortative matching in marriages will have little effect on the long-run distribution of income. Timothy Conley and Giorgio Topa use Census data for Chicago to estimate spillovers in employment probabilities attributable to geographical, ethnic, or occupational proximity. William A. Brock and Steven N. Durlauf develop a methodology for the identification of local spillovers in

linear, binary choice, longitudinal and nonparametric models.

In the area of endogenous skill-biased technological progress, Ann P. Bartel and Nachum Sicherman[28] presented a paper last year in which they matched industry-level measures of technological change to a panel of young workers from the National Longitudinal Survey of Youth. They show that the wage premium associated with technological change is primarily attributable to the sorting of better workers into those industries. Andrew Bernard and Bradford Jensen[29] use data on U.S. states to study the sources of rising wage inequality since the 1970s. They find that changes in industrial composition, and especially the loss of durable manufacturing jobs, are correlated strongly with increases in inequality. This year, Philippe Aghion, Peter Howitt, and Gianluca Violante developed a model of endogenous technical progress in which ex-ante identical individuals experience growing wage disparities, because of accumulated experience on different vintages of capital goods. David Thesmar and Mathias Thoenig presented a model and some empirical evidence (at the establishment level) to support the idea that periods of rapid technological change lead firms to restructure in ways that favor skilled workers, which in turn makes future innovations more profitable.[30]

Several papers consider the determinants and macroeconomic effects of redistributive public policy. For example, Roland Benabou and Efe Ok[31] show that the prospects of upward social mobility (intra- or intergenerational) can lead even quite poor agents to oppose long-lasting redistributive policies. Daron Acemoglu and Robert Shimer[32] study the trade-off between the costs (lower incentives to find a job) and benefits (risksharing and better matching) of unemployment insurance. Herschel I. Grossman and Minseong Kim[33] examine the trade-off faced by a developing country's ruling elite, between spending resources on the protection of property and on educating (some of) the poor.

On the broad subject of fertility, family structure, and distribution and growth, Rao Aiyagari, Jeremy Greenwood, and Nazih Guner have used a calibrated general equilibrium model to study the effects on income distribution and aggregate output of marriage, fertility, and separation decisions (via the resources devoted to children's education).[34] Daniel Chen and Michael Kremer[35] argue that high fertility rates among the poor and low unskilled wages caused by an abundant supply of uneducated workers can be mutually reinforcing phenomena, resulting in a poverty trap at the country level.

Macroeconomic Complementarities: Russell Cooper, Director

This group studies the macroeconomic implications of positive feedback among participants in the economy as a result of complementarities. The group's research has improved our understanding of complementarities, and its quantitative research links these models to the data. Over the past few years, the group has progressed in two directions. First, they have found additional environments in which macroeconomic complementarities are present, including social learning, financial instability, debt rollovers, informational complementarities, and exchange rate/debt crises. Second, they have continued to undertake quantitative evaluations of the implications of these sources of complementarities. For the most part, this includes trying to match the implications of the models with aggregate, microeconomic, and experimental data. For instance, papers on social learning consider the information conveyed to a representative agent by the actions of others. This includes learning at the plant or firm as well as learning from the investment decisions of other investors. The quantitative implications of learning at the plant level and the aggregate implications of this learning are both important.[36]

Heterogeneity: Andrew Caplin, Ricardo J. Caballero, and John V. Leahy, Directors

Nine years ago, when this group began to meet, two ideas differentiated it from other groups in the program: belief in the importance of heterogeneity among individuals and firms for explaining aggregate phenomena; and recognition of the importance of nonconvexities, fixed costs in particular, in influencing the behavior of economic actors. At the microeconomic level, fixed costs lead to infrequent and lumpy actions because the small gains associated with small adjustments do not justify paying the fixed costs. This can help to explain why consumers purchase durable goods, including cars, at discrete points in time and why firms invest in periodic bursts. In this view, what becomes important for understanding aggregate fluctuations is the degree of synchronization and coordination in these lumpy microeconomic decisions.

Making progress in understanding the macroeconomic importance of these microeconomic frictions has required the development of new theoretical tools and new empirical techniques. Several studies, many using the Longitudinal Research Database but others working with aggregate data and data from countries other than the United States, have shown that inaction and lumpiness are ubiquitous features of many microeconomic decisions, including firms' labor, investment, and inven-

tory decisions as well as consumer purchases of durable goods. Other studies have shown that accounting for lumpy individual behavior can greatly improve our understanding of macroeconomic time series.

Theoretical developments have evolved in three directions. The first has been to embed heterogeneity and lumpiness into quantifiable general equilibrium models. While these purely neoclassical models are not yet developed to the point at which they can be applied to the U.S. economy with much confidence, all signs point to this being the case in the near future. The other two directions, which currently define the core of this group, emphasize the fact that fixed costs and irreversibilities interact in very powerful ways with informational and contractual frictions. These interactions amplify the effects of shocks and exacerbate the nonlinearities that accompany fixed costs. On the one hand, inaction is a natural information trap; the inaction on the part of some naturally makes others cautious. Information may be bottled up until the lumpy actions of a few trigger a process of information revelation that in turn triggers the lumpy actions of others. On the other hand, irreversible investments are fertile ground for contractual problems such as hold ups and rent bargaining. Underinvestment, unemployment, and inefficient scrapping of capital arise naturally in these settings, and become most severe during recessions.

Forecasting and Empirical Methods in Macroeconomics and Finance: Francis X. Diebold and Kenneth D. West, Directors

This group focuses on the development and assessment of econometric methods for use in empirical macroeconomics and finance, placing special emphasis on problems of prediction. It meets jointly with a group on forecasting, led by Diebold under the Committee on Econometrics and Mathematical Economics umbrella with support from the National Science Foundation. These groups meet jointly because they are exceptionally complementary. Finance was added only recently to the group's name, reflecting the explosive growth of interest in empirical financial economics and econometrics (in both the profession and the group), and the crucial links between finance and empirical macroeconomics.

Group meetings have produced several associated symposiums in leading journals, including *Econometric Forecasting* and *Forecasting and Empirical Methods in Macroeconomics and Finance*.[37] Additional symposiums are forthcoming in the *Review of Economics and Statistics* and in progress in *Journal of Econometrics*.[38]

Within the broad outlines of the focus just sketched, centered on predictive econometric issues in macroeconomic and financial contexts, the group's interests range widely. Recent topics include volatility modeling, vector autoregressions, dynamic factor structure, regime switching, Bayesian methods, rational expectations modeling, unit roots and persistence, instrumental variables estimation, long memory, aggregation, and continuous-time methods. Here we describe just a few of the group's contributions, in the areas of forecasting and forecast evaluation, all of which appear in the recent *International Economic Review* symposium.

Forecasting is central to economics. It is important in its own right—as when predicting next quarter's GDP, or interest rate term structure, for example—and therefore improved methods of constructing forecasts are of great interest. Hence, the group has devoted substantial attention to providing tools to facilitate or improve the construction of economic forecasts. Vector autoregressions, for example, have emerged as a great workhorse of applied forecasting, and the group has devoted substantial attention to that approach. For example, a paper by Christopher A. Sims and Tao Zha,[39] which shows how to construct Bayesian confidence intervals for forecasts from structural vector autoregressions with an informative prior distribution. The authors' methods are computationally feasible even in large models with "unruly" terms such as dummy variables, and they help with the crucial task of quantifying forecast uncertainty in large structural vector autoregressions with priors motivated by economic theory.

The group's interest in forecast construction also extends, for example, to the solution of dynamic rational expectations models, which are central to macroeconomic and financial economic theory. Many macroeconomic and financial models involve identities, which imply that the relevant vector difference equation is singular in a certain precise sense. Robert G. King and Mark W. Watson[40] characterize the existence of stable solutions to such systems using a canonical variables transformation, which separates dynamics associated with stable and unstable eigenvalues. The King-Watson results are effectively an extension of the popular Blanchard-Kahn canonical variable approach to the singular case, and they complement earlier extensions of other solution methods to the singular case, such as those based on undetermined coefficients and martingale methods.

Forecasting is also an important tool for model evaluation; out-of-sample forecast evaluation analysis is often the most effective way to detect in-sample overfitting in macroeconomics and finance, because of repeated use of a limited body of data, which leads to models that forecast poorly despite the superficial appear-

ance of good fit. Hence, this group focuses not only on forecast construction, but also on forecast evaluation. For example, Kenneth D. West and Michael W. McCracken[41] propose simple regression tests for evaluating the accuracy of point forecasts. Possible measures of accuracy include the degree of unbiased assessment and the ability to encompass an alternative model. The methods are designed to be directly applicable to forecasts that rely on estimated regression parameters, which arise frequently in empirical macroeconomics and finance.

Much of the group's work on forecast evaluation is motivated by the time varying volatility that characterizes high-frequency financial data. For example, Diebold, Todd A. Gunther, and Anthony S. Tay[42] propose that, although density forecasts (forecasts stated as complete densities rather than simply "best guesses" or confidence intervals) feature prominently in applications to financial risk management and elsewhere, appraisal of such forecasts has been hampered by lack of effective tools. Thus, they develop a framework for rigorously assessing the adequacy of density forecasts under minimal assumptions, and they illustrate their methods by applying them to a variety of density forecasts involving both simulated and actual U.S. equity returns.

Finally, Torben G. Anderson and Tim Bollerslev[43] reinterpret the findings of several recent studies that document small correlations between GARCH volatility forecasts and the realized squares of financial asset returns. They show that such small correlations are to be expected, and in particular, that they do not necessarily imply that GARCH volatility forecasts are in any sense poor. The problem, as they make clear, is not with GARCH and related models, but with the use of squared returns to proxy for realized volatility. An important byproduct of the Andersen-Bollerslev study, driven by the theory of continuous-time diffusion processes, is the insight that superior measures of realized volatility can be constructed by averaging high-frequency intraperiod squared returns.

The Labor Market in Macroeconomics: Richard Rogerson and Randall Wright, Directors

The labor market plays a central role in the analysis of many key issues of macroeconomics and growth, including business cycles, unemployment, income distribution, and capital accumulation. As a result, this group has seen a fairly diverse set of papers during the course of its meetings. Three recent themes are discussed here.

On the broad subject of crime, Ayse Imrohorglu, Antonio Merlo, and Peter Rupert[44] develop a quantitative general equilibrium model to study the relationship between the crime rate and income distribution. Both income redistribution and police expenditures are determined endogenously via the political process. Crime is obviously a big issue in public policy circles, and there is great interest in identifying the causes for the recent decrease in crime rates throughout the United States. It is important to bring modern economic theory to bear on this issue, and as this paper indicates, one must be very careful about treating statistical relationships as causal in a model in which key policy variables are endogenous. Significantly, the authors find that increased redistribution can actually lead to higher crime. Although the direct effect goes in the other direction, there is an indirect, general equilibrium effect associated with the higher tax rates needed to finance higher levels of redistribution.

In considering the distribution of income per capita across countries, some authors have stressed the need for theories that can account for differences in total factor productivity. Prescott and Stephen Parente[45] show that when a group of workers has monopoly rights with regard to a technology, they can effectively prevent other groups from adopting superior technologies. In a quantitative assessment, the authors find that these effects can be quite substantial, and, in particular, orders of magnitude larger than the welfare costs of monopolies that have been generated in the past in studies that merely examined the effects of the pricing distortion while abstracting from the effects on technology adoption. Parente, Rogerson, and Wright[46] tackle another issue in accounting for the distribution of income per capita across countries—how to get larger effects from given differences in policy. The standard growth model implies differences that are far too small for reasonably sized "barriers" or policy differences. The authors show that a model extended to include home production can potentially account for much greater differences in output across countries for a given difference in policy. The mechanics of this derive from how agents allocate their time. If home or nonmarket production is not as capital intensive as market production, then policies that make capital more expensive will encourage agents to devote less time to market production. The authors show that the predictions of the model are consistent with several observations from developing countries as well as the labor market experiences of the Asian miracles.

A number of researchers have described search models of the labor market. Dale Mortensen[47] integrates two important theoretical structures used to study labor market dynamics. His earlier work with Pissarides has become the standard model for ana-

lyzing how idiosyncratic shocks affect labor market dynamics, while his work with Burdett has become the standard model for analyzing the endogenous determination of wage distributions. This combined structure has rich potential for future empirical and theoretical work as well as for policy analysis.

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[1] Bureau of Labor Statistics Bulletin, *99, no. 180 (June 30, 1999).*

[2] *R. J. Gordon, "Has the 'New Economy' Rendered the Productivity Slowdown Obsolete?," working paper, Northwestern University, June 1999.*

[3] *R. E. Hall, "The Stock Market and Capital Accumulation," NBER Working Paper No. 7180, June 1999.*

[4] *F. Kydland and E. C. Prescott, "Time to Build and Aggregate Fluctuations,"* Econometrica *(November 1982), pp. 1345–70.*

[5] *B. Jovanovic and R. Rob, "Solow vs. Solow: Machine Prices and Development," NBER Working Paper No. 5871, January 1997.*

[6] *D. Acemoglu and F. Zilibotti, "Productivity Differences," NBER Working Paper No. 6879, January 1999.*

[7] *W. Easterly, "Life during Growth," Mimeo, 1998.*

[8] *O. Galor and D. N. Weil, "Population, Technology, and Growth: From the Malthusian Regime to the Demographic Transition," NBER Working Paper No. 6811, November 1998.*

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[10] *See Christiano, Eichenbaum, and C. L. Evans, "Modeling Money," NBER Working Paper No. 6371, January 1998; Christiano, Eichenbaum, and Evans, "Sticky Price and Limited Participation Models of Money: A Comparison," NBER Working Paper No. 5804, October 1996; V. V. Chari, P. J. Kehoe, and E. R. McGrattan, "Sticky Price Models of the Business Cycle: Can the Contract Multiplier Solve the Persistence Problem?," NBER Working Paper No. 5809, October 1996; and C. Burnside, J. D. M. Fisher, and Eichenbaum, "Assessing the Effects of a Fiscal Policy Shock," presented at the EEG Research Meeting, July 1999.*

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[13] *See Chari and Kehoe, "Hot Money," NBER Working Paper No. 6007, April 1997; Burnside, Eichenbaum, and S. Rebelo, "Hedging and Financial Fragility in Fixed Exchange Rate Regimes," NBER Working Paper No. 7143, May 1999; and Burnside, Eichenbaum, and Rebelo, "Prospective Deficits and the Asian Currency Crisis," NBER Working Paper No. 6758, October 1998.*

[14] *J. Y. Campbell and A. Deaton, "Why Is Consumption So Smooth?"* Review of Economic Studies *(July 1989), pp. 357–74, originally published as NBER Working Paper No. 2134, November 1989.*

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Research Summaries

Monetary Policy Regimes, the Gold Standard, and the Great Depression

Michael D. Bordo*

My research over the past decade has largely focused on three related themes: monetary policy regimes in history; the gold standard as a rule; and the Great Depression. In this article, I discuss all three.

Monetary Policy Regimes in History

Historically, two types of monetary regimes have prevailed: one based on the convertibility of domestic currency into specie (gold and or silver), prevalent until 1971, and the other based on fiat, which has since become the norm. My research, however, focuses on the domestic and international aspects of four monetary regimes: the classical gold standard (1880–1914); the interwar gold exchange standard (1925–39); the Bretton Woods international monetary system (1944–71); and the present system of managed float.[1]

In the last quarter of the nineteenth century, most countries abandoned silver and paper standards in favor of gold. Under the convertibility principle, governments attached the highest priority to maintaining the fixed price of their currency in terms of specie.

During the twentieth century, though, the convertibility principle's importance declined steadily, clashing with the increasingly accepted goal of domestic macro stability.[2] The techniques and doctrine of monetary policies developed under the gold standard proved insufficient for achieving economic stability during the interwar period, setting the stage for the Great Depression. Although the adjustable-peg exchange-rate system that arose from the Bretton Woods talks maintained an indirect link with gold, the convertibility principle was abandoned after World War II and replaced worldwide by the goal of full employment. That goal, combined with the legacy from the interwar period of inadequate policy tools and theory, set the stage for the managed float and the Great Inflation of the 1970s. That experience convinced monetary authorities in many countries to re-emphasize the goal of low inflation and to commit themselves to convertibility-rule–like behavior.

Bordo is a Research Associate in the NBER's Programs on Monetary Economics and Development of the American Economy. He is also a professor of economics and director of the Center for Monetary and Financial History at Rutgers University. His "Profile" appears later in this issue.

Evidence on macro performance in successive monetary regimes shows that inflation was lowest and most stable under convertible regimes (the gold standard and the Bretton Woods convertible regimes of 1959–71). Inflation was less persistent under convertible, as compared with fiat, regimes. The price level tended to be trend-stationary in convertible regimes and difference-stationary in fiat regimes.[3] Also, the performance of real output (both in terms of the growth rate and the standard deviation of growth) was better in the post-World War II period than in the preceding 60 years. This could reflect the fact that both supply (permanent) and demand (temporary) shocks were larger in the pre-World War II regimes.[4]

The Gold Standard as a Rule

Many of my papers have dealt with the gold standard primarily as a rule or a commitment mechanism, thus shedding new light on gold standard history.[5] Adherence to a fixed price of domestic currency in terms of gold of course serves as a rule or commitment mechanism. It prevents monetary and fiscal authorities from following otherwise time-inconsistent policies.[6] The gold standard rule is also a contingent one: in the event of a well-understood emergency, such as a war, the authorities can temporarily suspend convertibility, issue fiat money to finance their expenditures, and sell debt. They understand that the debt will eventually be paid off in gold or in undepreciated paper. The public also understands that the suspension lasts only for the duration of the wartime emergency, plus some period of adjustment. Afterwards the government will adopt the deflationary policies necessary to resume convertibility at the original parity.

The gold standard contingent rule worked successfully for the core countries of the classical gold standard: the United Kingdom, France, and the United States. This was also true for the smaller countries of Western Europe and the British Dominions, but not for the peripheral nations of Southern and Eastern Europe and Latin America. Their experience was characterized by frequent suspensions of convertibility and devaluations.[7] Inflation rates, money growth rates, and fiscal deficits echo this difference in performance across countries.

Still, adherence to the gold standard rule was important to peripheral countries despite their lapses because it influenced the terms at which they could have access to the capital essential to their development from the financial centers of metropolitan Europe. The gold standard thus was a "Good Housekeeping Seal of Approval." Adherence was a signal to lenders that the borrowers followed the path of financial rectitude. Hugh Rockoff and I[8] found strong evidence for this hypothesis: we showed that peripheral countries were charged lower interest rates in London on gold-denominated bonds if they were faithful adherents to the gold standard. Moreover, we found a ranking from low to high of the risk premiums charged: countries that had never suspended convertibility were at the top; countries that never adhered were at the bottom; and countries that temporarily suspended but went back at the presuspension parity, followed by those that temporarily suspended but devalued, were in the middle.[9]

Credible adherence to as gold standard enabled the core countries of Western Europe to conduct monetary policy within the confines of the gold points, which served as a target zone within which the exchange rate was mean-reverting. These countries could violate the "rules of the game," which in the strictest sense proscribed the use of monetary policy for purposes other than defending convertibility.[10]

A case study of the wartime contingent rule in operation compares the wartime resumption experiences of the United States after the Civil War and the United Kingdom after World War I.[11] The U.S. return to gold lasted for six decades, while the U.K. return lasted for six years; further, output performance was strong in the U.S. case and anemic in the United Kingdom. The different outcomes do not reflect different strategies used to restore convertibility; rather, they describe the nature of the regimes after resumption. In the U.S. case, it was the credible classical gold standard; in the U.K. case, it was the flawed gold exchange standard.

A comparison of U.S. and Argentine inflation history in the nineteenth century suggests that the pattern of high and persistent inflation in Argentina from 1810 to 1867 versus the U.S. post-Revolutionary War pattern of a mean-reverting price level can be explained largely by the different constraints the two countries faced.[12] Argentina was subject to frequent wars and blockades; it faced a rising cost of external debt and high tax-collection costs and hence was unable to adhere to the gold standard rule. This constrained the country to use the inflation tax continually. In comparison, the United States, after instituting President Alexander Hamilton's package of fiscal and financial reforms in 1790, successfully adhered to the gold standard and orthodox fiscal policy.

Finally, the gold standard's good service may account for the growing use of gold as an international reserve asset in the nineteenth century. In the twentieth century, to economize on the use of ever-scarcer gold, the gold standard evolved into the gold exchange standard, which survived in different guises until 1971. So why do monetary authorities today persist in holding massive gold

reserves long after gold's official role in the international monetary system has been terminated? Evidence from equations describing the demand for international reserves explains this phenomenon by a combination of inertia, network externalities, remaining gold statutes, and high inflation in the 1970s.[13] However, the recent decline in inflation and the increasing international integration of financial markets augur the end of gold's importance in the international monetary system.

The Great Depression

The Great Depression is the "defining moment" in U.S. economic policy in the twentieth century.[14] The depression is seen today as a consequence of the Federal Reserve's adherence to the flawed real-bills doctrine and to gold standard orthodoxy. It led policymakers to shun expansionary monetary policy, and it transmitted the U.S. depression across the globe. My research focuses on several of these themes.

1. Causes of the Great Depression

Debate continues over whether the depression was caused primarily by monetary or nonmonetary forces.[15] One line of research, based on a standard vector autoregression (VAR) model, decomposes shocks to the economy into permanent (supply) and transitory (demand), with a further division of the transitory shocks into monetary and other shocks.[16] My paper with Caroline M. Betts and Angela Redish complements the findings of Stephen G. Cecchetti and Georgios Karras, who propose that the beginning of the downturn in both the United States and Canada is explained by contractionary U.S. monetary policy, but that after 1931 a common supply shock, possibly credit disintermediation, was the dominant source of shock.[17]

2. Propagation of the Depression

Debate also continues over whether the monetary shock impinged on the economy via nominal rigidities, the real interest rate, credit disintermediation, or debt deflation.[18] In my paper with Charles N. Evans and Christopher J. Erceg, evidence in favor of the sticky wage channel comes from simulations of a dynamic general equilibrium model of the U.S. economy which captures wage rigidity through Taylor overlapping-wage contracts.[19] The model does extremely well in capturing the main macroeconomic feature of the downturn. However, it predicts a much more rapid recovery than actually occurred. We explain this anomaly as the effect of the National Industrial Recovery Act of 1933. It imposed a fiat pattern of wage increases across the U.S. economy and prevented the normal adjustment mechanism of the labor market.

3. Counterfactual Policies

The explanation by Milton Friedman and Anna J. Schwartz[20] for the Great Depression centers on the failure of the Federal Reserve to offset the banking panics. Two of my recent papers consider alternative monetary policy counterfactuals. The first simulates counterfactual stable monetary policy embodied in variants of Friedman's constant growth rate rule. Simulations based on a three-variable structural VAR model of the U.S. economy—assuming that the Fed held money growth to the interwar average and reacted to offset monetary shocks with a one-quarter lag—show, as do earlier findings by Bennett T. McCallum, that the depression would have been greatly attenuated.[21] The second paper considers whether the gold standard constraint would have prevented the Fed from attempting to offset the banking panics, as argued by Barry Eichengreen.[22] With a model that determines gold flows for the United States as a large open economy with capital mobility and also accounts for the rest of the world, my paper with Ehsan U. Choudhri and Schwartz finds that Federal Reserve counterfactual expansionary monetary policy after the first banking panic in October 1930 hardly would have made a dent in U.S. gold reserves.[23] Had a similar policy been delayed until after the United Kingdom left the gold standard in September 1931, gold reserves would have declined markedly because of doubts that the United States would remain on gold, but the decline in reserves would not have breached the minimum statutory gold reserve ratio.

4. Legacy of the Great Depression for the International Monetary System

Eichengreen and I pose the counterfactual of a world in which the Great Depression had not happened but World War II and other political events did.[24] Simulations of a model of the international monetary system suggest that the interwar gold exchange standard with capital mobility would have survived into the mid-1950s and then would have collapsed into a managed float regime. Thus, the Great Depression had little impact on the evolution of the international monetary system.

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York: Oxford University Press, 1992.

[3] *Bordo and Schwartz, "Monetary Policy Regimes and Economic Performance."*

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[11] *See T. Bayoumi and Bordo, "Getting Pegged: Comparing the 1879 and 1928 Gold Resumptions,"* Oxford Economic Papers, *50 (January 1998), pp. 122–49, and NBER Reprint No. 2197, March 1999.*

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[23] *Bordo, Choudhri, and Schwartz, "Was Expansionary Monetary Policy Feasible during the Great Contraction? An Examination of the Gold Standard Constraint," NBER Working Paper No. 7125, June 1999.*

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Immigration

George J. Borjas*

About 140 million persons—roughly 2 percent of the world's population—live in a country where they were not born. Nearly 6 percent of Austria's population, 17 percent of Canada's, 11 percent of France's, and 17 percent of Switzerland's is foreign-born. The number of immigrants in the United States increased from 10 million to 26 million between 1970 and 1998, raising their share of the population from 5 to 10 percent during that period.

This resurgence in immigration has rekindled interest in the subject of the economics of immigration. Perhaps the key theme of the literature is that an assessment of the economic impact of immigration requires an understanding of the factors that motivate persons in the source countries to emigrate and of the economic consequences of pursuing particular immigration policies.[1] The most important lesson of the research is that the economic impact of immigration will vary by time and place, and that immigration can be either beneficial or harmful.

Trends in Immigrant Skills

Economic theory implies that the labor market impact of immigration depends on how the skills of immigrants compare with those of native-born citizens in the host country.[2] In fact, much of the research on immigration has sought to understand what determines the relative skills of the immigrant flow and to measure the relative skills of immigrants in the host country.

In 1960, the average immigrant man living in the United States earned about 4 percent more than the average native-born man. By 1998, the average immigrant earned about 23 percent less. The worsening economic performance of immigrants can be attributed partly to a decline in their relative skills across successive waves.[3] At the time of entry, the newest immigrants in 1960 earned 13 percent less than native-born citizens; by 1998, the newest immigrants earned 34 percent less.

History suggests that economic assimilation—the acquisition of skills, such as English-language proficiency, that American employers value—narrows the wage gap between immigrants and native-born citizens by about 10 percentage points in the first two decades after arrival.[4] Immigrants who entered the United States after 1980 had a 25 percent wage disadvantage at the time of entry. If these recent arrivals experience the same rate of economic assimilation as earlier waves, the wage gap between recent immigrants and native-born citizens will remain at about 15 percentage points throughout much of the immigrants' working lives. In other words, the most recent immigrant waves will probably suffer a substantial economic disadvantage for decades to come.

Economic performance differs significantly according to the immigrant group's country of origin, though.[5] Immigrants from El Salvador or Mexico earn 40 percent less than native-born workers, while immigrants from Australia or South Africa earn 30 to 40 percent more. To some extent, these differences mirror the dispersion in skills across the populations of the source countries. Immigrants from countries with abundant human capital and higher levels of per capita income tend to do better in the United States.

During the 1950s, more than two-thirds of the legal immigrants admitted to the United States came from Europe or Canada, 25 percent from Latin America, and only 6 percent from Asia. By the 1980s, only 13 percent of U.S. immigrants came from Europe or Canada, 47 percent from Latin America, and 37 percent from Asia. Given the sizable skill differentials across ethnic groups, it is not surprising that changes in the national origin mix of immigrants can explain the decline in the economic performance of successive immigrant waves.

Economic Consequences of Immigration

Immigrants tend to cluster geographically in a small number of cities and states. In 1998, almost three-quarters of U.S. immigrants lived in only six states: California, New York, Texas, Florida, New Jersey, and Illinois. In contrast, only one-third of native-born citizens lived in those states.

This geographic clustering suggests that one might be able to measure how immigration affects the labor market opportunities of native-born workers by comparing those who reside in immigrant cities (for instance, San Diego) with those who reside in cities where few immigrants live (for example, Pittsburgh). However, the evidence suggests that these "spatial correlations" may be close to zero.[6]

A weak spatial correlation may not indicate that immigrants have little impact on the well-being of native-born workers, though. For example, suppose that immigration into California substantially lowers the earnings of native-born workers there.

*Borjas is a Research Associate in the NBER's Programs on Labor Studies and Children. He also is a professor of public policy at Harvard University's Kennedy School of Government. His "Profile" appears later in this issue.

Native-born workers are not likely to stand idly by and watch their economic opportunities evaporate. Many will move from California to other states, and some people who were considering moving to California will now move elsewhere. These native-population flows effectively diffuse the adverse impact of immigration on California's labor market over the entire U.S. economy. Ultimately, *all* native-born workers are worse off because of immigration, not just those who live in the areas where immigrants have clustered.

It appears that the flows of native-born workers within the United States—as well as the flows of U.S. firms looking for cheap labor—indeed have responded to immigration. Because of these responses, the impact of immigration on the labor market must be measured at the *national*, rather than the local, level.[7]

Between 1980 and 1995, immigration increased the number of high school dropouts by 21 percent and the number of persons with at least a high school diploma by only 4 percent. During that time, the wage of high school dropouts relative to that of workers with more schooling fell by 11 percentage points. The disproportionate increase in the number of workers at the bottom end of the skill distribution probably caused a substantial decline in the relative wage of high school dropouts, accounting for perhaps half of the observed drop. Thus, immigration seems to have been an important contributor to the rise in income inequality in the United States, depressing the economic opportunities faced by the least skilled workers.

The fact that some native-born workers lose from immigration implies that U.S. firms gain because they can now hire workers at lower wages. Many native-born consumers also gain because the lower labor costs lead to cheaper goods and services. In fact, the labor market consequences of immigration generate a net benefit for the entire native-born population. The annual net gain from immigration is small (less than 0.1 percent of gross domestic product), amounting to less than $10 billion a year for the entire native-born population. However, immigration does more than just increase the total income accruing to native-born workers: it also induces a substantial redistribution of wealth away from workers who compete with immigrants and toward employers and other users of immigrant services. These wealth transfers may be in the tens of billions of dollars per year.

What about the controversial link between immigration and the welfare state?[8] In 1970, immigrants were slightly less likely to receive public assistance than U.S. natives. By 1998, immigrants had a much higher chance of receiving welfare: almost one-quarter of immigrant households were receiving some type of assistance, as compared with 15 percent of native-born households.

Two distinct factors account for the disproportionate increase in welfare use among immigrant households. First, because more recent immigrant waves are relatively less skilled than earlier waves, they are also more likely to use welfare than earlier waves. Further, the welfare use of a specific immigrant wave actually *increases* over time (both in absolute numbers and relative to native-born citizens). It seems that the assimilation process involves learning about not only labor market opportunities but also about the income opportunities provided by the welfare state.

The relatively generous safety net provided by the welfare state also may attract a different—and less skilled—type of immigrant. Generous welfare programs may influence the migration decisions of persons in the source countries, changing the type of person who wishes to emigrate and increasing the cost of maintaining the welfare state in the host country.

I recently looked at whether welfare programs indeed have influenced the geographic sorting of the immigrant population in the United States. Welfare benefits vary significantly across states, and immigrants—because they are a self-selected group who have chosen to move—may be particularly receptive to those differences.[9] In 1970, California's Aid to Families with Dependent Children benefits matched those of the median state. By 1990, California's benefits were (with the exception of Alaska) the most generous in the nation. In 1990, California was home to 10 percent of U.S. natives who did not receive public assistance and to 12 percent of those who did. However, among new immigrants, California was home to 29 percent of those who did not receive public assistance and to 45 percent of those who did.

Intergenerational Transmission of Ethnic Skill Differentials

In 1998, 11 percent of the U.S. population was "second-generation"—born in the United States but with at least one foreign-born parent. By the year 2050, the share of second-generation persons will increase to 14 percent, and an additional 9 percent will be the grandchildren of current immigrants. The experience of the children and grandchildren of the Great Migration—the immigrants who entered the country at the beginning of the twentieth century—provides important lessons about the long-run consequences of immigration.[10] That migration introduced substantial ethnic skill differentials into the United States: 97 percent of Irish immigrants knew how to read and write any language, as compared with 80 percent of Greek immigrants and with 45 percent of Mexican immigrants.

These differences helped to determine the skills and economic performance of their children and grandchildren. A 20 percent wage differential between two immigrant groups in 1910 implied a 12 percent wage differential in the second generation and a 5 percent wage differential in the third. In other words, about half of the average skill differential between any two groups in the first generation persists into the second, and half of the differential remaining in the second generation persists into the third.

To explain the intergenerational persistence of ethnic skill differentials, I have proposed that ethnicity has external effects. The characteristics of the ethnic environment, or ethnic capital, influence the skills and economic performance of the children in the ethnic group, above and beyond the influence of the parents.[11] These characteristics include the culture, attitudes, and economic opportunities that permeate the ethnic networks.

Exposure to an advantaged ethnic environment—in the sense that the environment has abundant human capital—has a positive influence on the children in the group, while exposure to a disadvantaged environment has a negative one. Ethnic capital leads to a type of stickiness in social mobility, making it difficult for persons in disadvantaged ethnic groups to move up. The skills of the children of immigrants probably are affected not only by the skills of their parents, but also by measures of the group's ethnic capital, such as the mean education or wage of the ethnic group in the parental generation. In fact, the impact of ethnic capital on social mobility may account for half of the intergenerational persistence in ethnic skill differentials.

Residential segregation clearly exists among ethnic groups in the United States. Persons of Mexican ancestry live near other persons of Mexican ancestry, just as persons of Irish ancestry live near other persons of Irish ancestry. Because few persons in disadvantaged ethnic groups can afford to escape the ethnic ghetto, these enclaves make it easy for ethnic capital to influence the social mobility of the persons who reside in those ghettoes, and they help to perpetuate the socio-economic differences observed across ethnic groups from generation to generation.[12]

Conclusion

Immigration has a far-reaching and long-lasting impact. We are only beginning to observe the economic consequences of the historic changes in the size, national origin mix, and skill composition of immigrants admitted to the United States during the past three decades. This "Second" Great Migration surely will alter the skill endowment of the labor force, the employment opportunities of native-born workers, and the costs of social insurance programs not only in our generation but also for our children and grandchildren.

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[1] *The policy implications are discussed in G. J. Borjas,* Heaven's Door: Immigration Policy and the American Economy. *Princeton, N.J.: Princeton University Press, 1999.*

[2] *Borjas, "The Economic Analysis of Immigration," in* Handbook of Labor Economics, *Vol. 3A, O. Ashenfelter and D. Card, eds. Amsterdam: North-Holland, 1999.*

[3] *Borjas, "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants,"* Journal of Labor Economics, *3, no. 4 (October 1985), pp. 463–89; and "Assimilation and Changes in Cohort Quality Revisited: What Happened to Immigrant Earnings in the 1980s?"* Journal of Labor Economics *(April 1995), pp. 201–45.*

[4] *Borjas, "The Economic Progress of Immigrants," NBER Working Paper No. 6506, April 1998, and forthcoming in* Issues in the Economics of Immigration. *Borjas, ed. Chicago: University of Chicago Press.*

[5] *Borjas, "Self-Selection and the Earnings of Immigrants,"* American Economic Review, *77, no. 4 (September 1987), pp. 531–53; and "National Origin and the Skills of Immigrants in the Postwar Period," in* Immigration and the Work Force: Economic Consequences for the United States and Source Areas, *Borjas and R. B. Freeman, eds. Chicago: University of Chicago Press, 1992.*

[6] *Borjas, "The Substitutability of Black, Hispanic, and White Labor,"* Economic Inquiry *(January 1983), pp. 93–106; and Borjas, "Immigrants, Minorities, and Labor Market Competition,"* Industrial and Labor Relations Review *40, no. 3 (April 1987), pp. 382–92.*

[7] *Borjas, Freeman, and L. F. Katz, "On the Labor Market Effects of Immigration and Trade," in* Immigration and the Work Force, *pp. 213–44; and "How Much Do Immigration and Trade Affect Labor Market Outcomes?,"* Brookings Papers on Economic Activity *(1997), pp. 1–67.*

[8] *Borjas and Stephen J. Trejo, "Immigrant Participation in the Welfare System,"* Industrial and Labor Relations Review *44, no. 2 (January 1991), pp. 195–211; and Borjas and Lynette Hilton, "Immigration and the Welfare State: Immigrant Participation in Means-Tested Entitlement Programs,"* Quarterly Journal of Economics *(May 1996), pp. 575–604.*

[9] *Borjas, "Immigration and Welfare Magnets," NBER Working Paper No. 6813, November 1998, and* Journal of Labor Economics *(October 1999).*

[10] *Borjas, "The Intergenerational Mobility of Immigrants,"* Journal of Labor Economics *(January 1993), pp. 113–35; and Borjas, "Long-Run Convergence of Ethnic Skill Differentials: The Children and Grandchildren of the Great Migration,"* Industrial and Labor Relations Review *(July 1994), pp. 553–73.*

[11] *Borjas, "Ethnic Capital and Intergenerational Mobility,"* Quarterly Journal of Economics *(February 1992), pp. 123–50.*

[12] *Borjas, "Ethnicity, Neighborhoods, and Human-Capital Externalities,"* American Economic Review *(June 1995), pp. 365–90; and "To Ghetto or Not to Ghetto: Ethnicity and Residential Segregation," NBER Working Paper No. 6176, September 1997, and* Journal of Urban Economics *(September 1998), pp. 228–53.*

Financial Crises in Emerging Markets

Andrés Velasco*

Recent events in Mexico, East Asia, Russia, and Brazil have confirmed that a satisfactory explanation of emerging market financial and currency crises remains elusive. Not long ago, the prevailing view was that such crises were the inevitable outcome of ongoing fiscal imbalances coupled with fixed exchange rates. But this "first generation" of models of crisis, pioneered by Paul R. Krugman,[1] has fallen out of fashion, because many actual crises seem to lack the crucial fiscal disequilibriums.

Maurice Obstfeld[2] proposed a "second-generation" view, in which central banks may decide to abandon the defense of an exchange rate peg when the social costs of doing so, in terms of unemployment and domestic recession, become too large. This change of perspective implied that crises may be driven by self-fulfilling expectations, since the costs of defending an exchange peg may depend on anticipation that the peg will be maintained. But Obstfeld's emphasis on mounting unemployment and recession, while appropriate for the Exchange Rate Mechanism 1992 crisis, was at odds with the crises of Mexico in 1994 and of East Asia in 1997. Asian countries, in particular, were growing quickly until shortly before the currency meltdown.

Instead of fiscal imbalances or weakness in real activity, recent crises in emerging markets have revealed financial sources of vulnerability. In the Southern Cone of the Americas in the early 1980s, Scandinavia in the early 1990s, Mexico in 1995, and Asia more recently, the currency crashed along with the financial system. Formal econometric work by Graciela Kaminsky and Carmen M. Reinhart[3] suggests that banking troubles are good predictors of currency crises.

Almost all of the countries affected by the recent turmoil also had large ratios of short-term debt, public or private, to international reserves. In Mexico in 1995, Russia in 1998, and Brazil in 1999, the debt was the government's; in Indonesia, Korea, and Thailand in 1997, the debt was primarily owed by private banks and firms. However, in each case, the combination of large short-term liabilities and relatively scarce internationally liquid assets resulted in extreme vulnerability to a confidence crisis. Furman and Stiglitz consider the ability of this variable alone to predict the crises of 1997 to be "remarkable."[4]

Weak banks and large stocks of short-term debt are manifestations of a more general phenomenon: international illiquidity, defined as a situation in which a country's consolidated financial system has potential short-term obligations in foreign currency that exceed the amount of foreign currency to which it has access on short notice. Illiquidity is a key problem for emerging market countries because of their limited access to world capital markets. If banks in mature economies face a liquidity problem, as long as they are solvent they are likely to get emergency funds from the world capital markets. This seldom occurs in emerging economies: a private bank in Bangkok or Mexico City will get many international loan offers when things go well, and none when the bank is being run on by depositors.

Illiquidity is certainly not necessary for currency crashes to occur. The European Monetary System troubles of the early 1990s, for instance, had more to do with governments' desire to fight unemployment than with any difficulties in servicing short-term obligations. Nevertheless, illiquidity comes close to being sufficient to trigger a crisis. The options left after creditors lose confidence, stop rolling over, and demand immediate payment on existing loans—whether to the private sector as in Asia or to the government as in Mexico and Brazil—are painfully few. The collapse of the currency or the financial system, or even of both, is the likely outcome.[5]

Take the case of Asia after it was hit by what Guillermo A. Calvo[6] terms the "sudden stop syndrome": a massive reversal of capital inflows in the second half of 1997 that amounted to 3.6 percent of gross domestic product.[7] Proliferating bankruptcies and payment moratoriums weakened bank balance sheets just as panicky domestic depositors were withdrawing their funds. Governments attempted to help by providing liquidity and moderating the rise in interest rates, but the additional domestic currency quickly found its way back to the central bank, causing a fall in reserves and an eventual collapse of the peg.

Several recent papers I co-authored with Roberto Chang of the Federal Reserve Bank of Atlanta and one written with Dani Rodrik of Harvard University[8] try to build a new class of crisis models that places financial fragility and illiquidity at the center of the story. We are not alone in trying to develop such a "third generation" of currency crisis models.[9]

The Basic Analytical Story

Any model in which financial institutions issue demandable debt as a liability, therefore placing themselves in a potentially illiquid position, is useful for studying crisis. Chang and I[10] start from a version of the cele-

*Velasco is a Research Associate in the NBER's Program on International Finance and Macroeconomics. He is also Director of the Center for Latin American and Caribbean Studies at New York University. His "Profile" appears later in this issue.

brated banking model by Bryant and by Diamond and Dybvig.[11] Banks are essentially transformers of maturity that take liquid deposits and invest part of the proceeds in illiquid assets. In doing so, they pool risk and enhance welfare, but they also create the possibility of self-fulfilling bank runs.

While the Diamond-Dybvig model focuses on the microeconomics of banking, our version embeds banks into a small, open economy. This extension brings three macroeconomic/international issues to the fore. First, in an open economy, the ability of governments to come to the rescue of banks under attack is severely limited by the availability of international reserves. With capital mobility, printing unbacked money can only cause the exchange rate to crash, as both standard theory and the experience of Asia suggest.

Second, domestic bank runs, understood as a panic by depositors in the banking system, may interact with panics by foreign creditors of the system. The nature of this interaction depends, in particular, on the structure of international debt and on how strongly banks can commit to repay their international obligations. For instance, Chang and I[12] identify situations in which a run by domestic depositors can occur in equilibrium if and only if foreign creditors run at the same time. Such results seem relevant to recent events.

Third, real exchange depreciation may both cause bank runs and multiply their deleterious real effects. The logic is circular: if bank runs cause the real exchange rate to depreciate, then producers of nontradable goods may go bankrupt if these firms had borrowed from local banks, the bank's liquidation value would have declined, and a run would have been even more possible.

Choosing Debt Maturity

Domestic banks and firms have a choice about the maturity of the loans they contract abroad. How do we understand the preponderance of short-term borrowing in most of the emerging economies that recently crashed? A common answer is that short-term debt "is cheaper" than long-term debt. But the term structure of interest rates is determined by the riskiness of different debt maturities, and these should in turn reflect the possibility of a crisis associated with illiquid portfolios. Consequently, the role of short-term debt in generating a crisis can only be analyzed in a model of the simultaneous determination of debt maturity and the term structure of interest rates.

In my papers with Chang and with Rodrik, we build such a model.[13] We find that the share of short-term debt that is optimal ex ante depends on various factors, such as the extent to which early investment liquidation is costly; the probability that a run on short-term debt will take place if one is possible (something that depends, among other things, on the borrowing country's previous credit record); and the likelihood and costliness of attempted debt defaults.

This work focuses on the undistorted optimal choice of maturity. However, many plausible distortions could lead local borrowers to prefer short-term loans beyond the level that is socially desirable, including biases in the local tax and regulatory structure, informational limitations that prevent foreign lenders from distinguishing across borrowers from the same country, and the moral hazard caused by the expectations of government bailouts. In that last case, we argue, Chilean-style taxes on short-term capital movements may be desirable.

The Role of the Exchange Rate Regime

Chang and I show that the macroeconomic effects of creditor runs depend crucially on the monetary and exchange rate policy in place.[14] The combination of fixed rates and a central bank that stands ready to act as a lender of last resort is predictably troublesome: bank runs are avoided only at the cost of causing currency runs.

Currency boards that fix the exchange rate and prevent central banks from issuing domestic credit indeed can prevent bank crises from expressing themselves in the currency market. Yet, precisely because a currency board prevents the central bank from acting as a lender of last resort, it may render fractional reserve banks endemically unstable. Creating a "fiscal war chest" to be used at times of bank trouble is an alternative, but one that has efficiency costs.

Greater exchange rate flexibility may be a better alternative. For example, a regime in which bank deposits are denominated in domestic currency, the central bank stands ready to act as a lender of last resort, and exchange rates are flexible, may help to forestall some types of self-fulfilling bank crises. The intuition for this is simple. An equilibrium bank run occurs if each bank depositor expects that others will run and exhaust the available resources. Under fixed rates, those who run to the bank withdraw domestic currency, which they in turn use to buy hard currency at the central bank. If depositors expect this sequence of actions to cause the central bank to run out of dollars or yen, then it is a best response for them to run as well, and the pessimistic expectations become self-fulfilling. On the other hand, under a flexible-rates regime with a lender of last resort, there is always enough domestic currency at the commercial bank to satisfy those who run. Since the central bank is no longer compelled to sell all the available reserves, those who run will face a depreciation, while those who do not run know that there will still be dollars available when they want

to withdraw them at a later date. Hence, running to the bank is no longer a best response; pessimistic expectations are not self-fulfilling; and a depreciation need not happen in equilibrium.

This makes a strong case for flexible exchange rates, but there are caveats. One is that such a mechanism can protect banks against self-fulfilling pessimism on the part of domestic depositors (whose claims are in local currency), but not against panic by external creditors who hold short-term IOUs denominated in dollars. To the extent that this was the case in Asia, a flexible exchange rate system would have provided only limited protection.[15] In addition, proper implementation is subtle. If flexible exchange rates are to be stabilizing, they must be part of a regime in which agents take into account the regime's operation when forming expectations. Suddenly adopting a float because reserves are dwindling, as Mexico did in 1994 or as several Asian countries have done recently, may have the opposite effect by further frightening concerned investors.

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[1] *P. R. Krugman, "A Model of Balance of Payments Crises,"* Journal of Money, Credit, and Banking *(1979).*

[2] *M. Obstfeld, "The Logic of Currency Crises,"* Cahiers Economiques et Monetaires, *no. 43 (Paris: Banque de France, 1994), pp. 189–213.*

[3] *G. L. Kaminsky and C. M. Reinhart, "The Twin Crises: The Causes of Banking and Balance of Payments Problems,"* International Finance Discussion Paper *No. 544, Board of Governors of the Federal Reserve System, March 1996.*

[4] *J. Furman and J. E. Stiglitz, "Economic Crises: Evidence and Insights from East Asia,"* Brookings Papers on Economic Activity, *1998.*

[5] *I say "close to sufficient" because, as Obstfeld and Rogoff* (Journal of Economic Perspectives, *9, no. 4, Fall 1995, pp. 73–96) have stressed, any central bank that has enough resources to buy back the monetary base is capable, in a technical sense, of maintaining an exchange rate peg. But, as the authors recognize, in situations of financial distress, the de facto claims on central bank reserves may be as large as or larger than M2. In those cases, as we later study in detail, maintaining the peg becomes a more treacherous task.*

[6] *G. Calvo, "Balance of Payments Crises in Emerging Markets: Large Capital Inflows and Sovereign Governments," University of Maryland, Discussion Paper, March 1998.*

[7] *The figure is from S. Radelet and J. Sachs, "The Onset of the Asian Financial Crisis," NBER Working Paper No. 6689, August 1998.*

[8] *R. Chang and A. Velasco, "Financial Fragility and the Exchange Rate Regime," NBER Working Paper No. 6469, March 1998; "Financial Crises in Emerging Markets: A Canonical Model," NBER Working Paper No. 6606, June 1998; "Banks, Debt Maturity, and Financial Crises," forthcoming,* Journal of International Economics; *"Liquidity Crises in Emerging Markets: Theory and Policy," NBER Working Paper No. 7272, July 1999; and D. Rodrik and Velasco, "Short-Term Capital Flows," paper presented at Annual Bank Conference on Development Economics, World Bank, 1999.*

[9] *Other papers in the same line of research include: E. Detragiache, "Rational Liquidity Crises in the Sovereign Debt Market: In Search of a Theory,"* IMF Staff Papers, *43, no. 3 (1996); I. Goldfajn. and R. Valdes, "Capital Flows and the Twin Crises: The Role of Liquidity," Working Paper 97–87, International Monetary Fund, July 1997; Calvo, "Balance of Payments Crises in Emerging Markets" and "Varieties of Capital Market Crises," Working Paper No. 15, Center for International Economics, University of Maryland, 1995; O. Jeanne, "International Liquidity and the New Architecture," International Monetary Fund, mimeo, 1998; P. Aghion, P. Bacchetta, and A. Banerjee, "Capital Markets and the Instability of Open Economies," Working Paper No. 9901, Studienzentrum Gerzensee, 1999; and Krugman, "Balance Sheets, the Transfer Problem, and Financial Crises," paper presented at MIT, 1999. The policy implications of the liquidity approach are stressed by M. S. Feldstein, "A Self-Help Guide for Emerging Markets,"* Foreign Affairs *(March–April 1999); and Chang and Velasco, "Liquidity Crises in Emerging Markets."*

[10] *Chang and Velasco, "Financial Crises in Emerging Markets."*

[11] *J. Bryant, "A Model of Reserves, Bank Runs, and Deposit Insurance,"* Journal of Banking and Finance, *no. 4 (December 1980); D. Diamond and P. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity,"* Journal of Political Economy, *91 (1983), pp. 401–19.*

[12] *Chang and Velasco, "Financial Crises in Emerging Markets."*

[13] *Chang and Velasco (forthcoming,* Journal of International Economics*) analyze a domestic bank's choice of foreign debt maturity; Rodrik and Velasco, "Short-Term Capital Flows," focus on the choice faced by domestic nonfinancial firms.*

[14] *Chang and Velasco, "Financial Fragility and the Exchange Rate Regime."*

[15] *Floating is not totally useless in this case, for panic by foreign creditors could perfectly well be triggered by a run by domestic depositors, with the outcome self-fulfilling. For details on this line of argument, see Chang and Velasco, "Financial Crises in Emerging Markets."*

NBER Profile: *Michael D. Bordo*

Michael D. Bordo has been a Research Associate in the NBER's Programs on Monetary Economics and Development of the American Economy since 1982. He is also Professor of Economics and Director of the Center for Monetary and Financial History at Rutgers University. He received his B.A. from McGill University, his M.Sc. from the London School of Economics, and his Ph.D. from the University of Chicago.

Bordo has held academic positions at the University of South Carolina and Carleton University in Ottawa. He has also been a visiting professor at the University of California, Los Angeles, Carnegie-Mellon University, and Princeton University and was a visiting scholar at the Internal Monetary Fund, the Federal Reserve Banks of St. Louis and Richmond, and the Federal Reserve Board of Governors.

Bordo is editor of the *Studies in Macroeconomic History* series for Cambridge University Press. His recent publications include (with Claudia Goldin and Eugene White) *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century* (University of Chicago Press for the NBER, 1998) and *Essays on the Gold Standard and Related Regimes* (Cambridge University Press, 1999). His previous NBER books include (with Barry Eichengreen) *A Retrospective on the Bretton Woods System* (University of Chicago Press for the NBER, 1993).

Bordo lives in Highland Park, New Jersey, with his wife, Ruth; his daughter, Jenny, 16; and his son, Matthew, 13. They have a keeshond named Phoenix, two cats, and a guinea pig. In his leisure time, Bordo enjoys skiing, canoeing, playing tennis, and swimming.

NBER Profile: *George J. Borjas*

George J. Borjas is a Research Associate in the NBER's Programs on Labor Studies and Children. He is also the Pforzheimer Professor of Public Policy at Harvard University's John F. Kennedy School of Government.

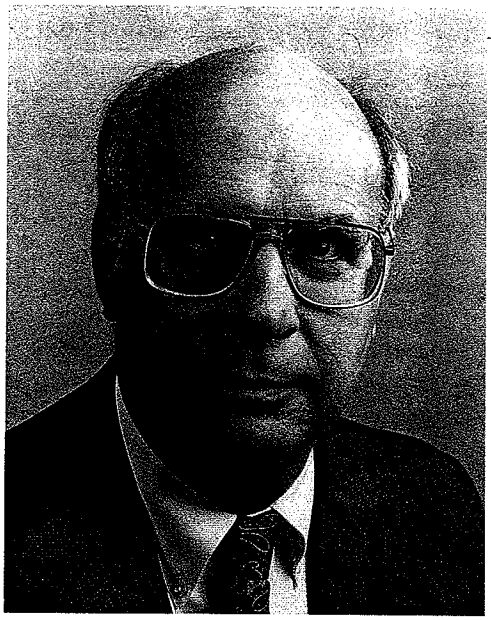
He received his Ph.D. in economics from Columbia University in 1975. Prior to taking his position at Harvard in 1995, he was a professor of economics at the University of California, San Diego.

Borjas is an editor of the *Review of Economics and Statistics* and has been on the editorial boards of the *Quarterly Journal of Economics* and the *International Migration Review*. He is the author of *Wage Policy in the Federal Bureaucracy*, *Friends or Strangers: The Impact of Immigrants on the U.S. Economy*, and the textbook *Labor Economics*. His latest book, *Heaven's Door: Immigration Policy and the American Economy*, has just been published by Princeton University Press.

Borjas recently led a multiyear NBER project on immigration. The project resulted in a 1998 conference; the papers presented there will be published by the University of Chicago Press in February in an NBER Conference Volume titled *Issues in the Economics of Immigration*.

Borjas is married, has three children, and lives in Lexington, Massachusetts. He spends much of his free time driving his kids to all kinds of games and events. His best classroom experience involved teaching a group of Cub Scouts the intricacies of tying knots. He also enjoys going to the movies.

See **www.borjas.com** for more information.



NBER Profile: *John J. Siegfried*

John J. Siegfried has represented the American Economic Association (AEA) on the NBER's Board of Directors since 1997. He is also a professor of economics at Vanderbilt University.

Siegfried received a B.S. from Rensselaer Polytechnic Institute, an M.A. from Pennsylvania State University, and a Ph.D. from the University of Wisconsin, Madison, all in economics. He has been at Vanderbilt since 1972, attaining the rank of full professor in 1981. In recent years, he has taught microeconomics, antitrust economics, and the economics of sports, among other subjects. Siegfried has also been a visiting professor at the University of Adelaide in South Australia, the University of Leeds (England), and Simon Fraser University (British Columbia).

Siegfried was appointed Secretary of the AEA in 1997, and has been a member of the Board of Directors of the National Council on Economic Education since 1998. He is also a past president of the Southern Economic Association.

Siegfried is married and has four children. He plays golf, and roots for Vanderbilt's "hopeless" football team in his spare time.

NBER Profile: *Andrés Velasco*

Andrés Velasco is a Research Associate in the NBER's Program on International Finance and Macroeconomics and Director of the Center for Latin American and Caribbean Studies at New York University, where he has been a tenured associate professor of economics since 1995.

He received his B.A. in economics and philosophy from Yale University in 1982, his M.A. in international affairs from Yale in 1984, and his Ph.D. in economics from Columbia University in 1989. After a one-year appointment at Columbia, he joined the economics faculty at New York University, where he has taught since 1989. He has also been a Visiting Professor or Scholar at Harvard's Kennedy School of Government, the University of Chile, the World Bank, the International Monetary Fund, the InterAmerican Development Bank, and other organizations.

In 1998–9, Velasco did advisory work for the government of Ecuador through the Harvard Institute for International Development; in 1996–7, he advised El Salvador's government through the U.S. Agency for International Development. He was also Chief Economist and Deputy Lead Negotiator in Chile's NAFTA Accession Team in 1995 and Chief of Staff to Chile's Minister of Finance in 1990–2.

This year, Velasco was selected by Time magazine as one of 50 Latin American Leaders for the Next Millennium. From 1995 to 1999, he was co-editor of the *Journal of International Economics*. He is also editor in chief of *Latin American Economic Policy Review*, a journal of the Latin American and Caribbean Economic Association to be launched in 2000.

Conferences

Commemoration of Zvi Griliches's 20 Years as Director of the NBER's Program on Productivity and Technological Change

Members and guests of the NBER's Program on Productivity and Technological Change met on March 5 and 6 in Cambridge to honor Zvi Griliches, who served as director of the program for 20 years. Ernst R. Berndt, NBER and MIT, and Ariel Pakes, NBER and Yale University, organized the commemoration. The presentations were:

Robert E. Evenson, Yale University, and **Yoav Kislev,** Hebrew University, "Research for Agriculture: Economic Evaluations"
Discussant: Vernon Ruttan, University of Minnesota

Ernst R. Berndt, Robert S. Pindyck, and **Pierre Azoulay,** NBER and MIT, "Network Effects and Diffusion in Pharmaceutical Markets: Anti-Ulcer Drugs" (NBER Working Paper No. 7024)
Discussant: Iain M. Cockburn, NBER and University of British Columbia

W. Erwin Diewert, NBER and University of British Columbia, "Progress in Measuring the Price and Quantity of Capital"
Discussant: Charles R. Hulten, NBER and University of Maryland

Bruno Crépon, INSEE, and **Jacques Mairesse,** NBER and INSEE, "Estimating Production Functions with Correlated Measurement Errors: Some Simulation Results"
Discussant: Tor Jacob Klette, University of Oslo

Jean O. Lanjouw, NBER and Yale University, and **Mark Schankerman,** London School of Economics, "Patent Suits: Do They Distort Research Initiatives?"
Discussant: Adam B. Jaffe, NBER and Brandeis University

Adam B. Jaffe; Bronwyn H. Hall, NBER and University of California, Berkeley, and **Manuel Trajtenberg,** NBER and Tel Aviv University, "Citations and the Diffusion of Knowledge"
Discussant: Samuel S. Kortum, NBER and Boston University

Finis Welch, Texas A&M University, "Industrial Change and the Demand for Skills"
Discussant: James Heckman, NBER and University of Chicago

Dale W. Jorgenson, Harvard University, "Progress in Productivity: An Overview"
Discussant: Melvin A. Fuss, NBER and University of Toronto

Steven T. Berry, NBER and Yale University, and **Ariel Pakes,** "Estimating the Pure Hedonistic Discrete Choice Model"
Discussant: Timothy F. Bresnahan, NBER and Stanford University

Evenson and **Kislev** review Griliches's pioneering 1957 study of the economics of hybrid corn development. The Griliches study has had tremendous influence on policymakers as they address the population-influenced increases in demand in developing countries. All of the more than 200 studies of investment in agriculture research and its economic impact were influenced by the original Griliches work. Further, the research on methodology and inventions has contributed to productivity gains, enabling countries to better meet their populations' needs of the past half century.

Berndt, Pindyck, and **Azoulay** examine the role of network effects on the demand for pharmaceuticals, both at the brand level and for a therapeutic class of drugs. When individuals' use of a drug conveys information about its efficacy and safety to patients and physicians, it can lead to herd behavior: a particular drug—not necessarily the most efficacious or safest—can come to dominate the market despite the availability of close substitutes. Using data for H2-antagonist anti-ulcer drugs, the authors attempt to estimate how the aggregate use of a drug affects brand valuation and to measure the impact on rates of diffusion and market saturation.

Diewert analyzes the work of Griliches, Jorgenson, and Hulten on constructing age-specific user costs of capital or vintage rental prices that depended on the particular form of depreciation that was assumed. After developing different depreciation models, Griliches and his co-authors asked how the models would affect estimates of Canadian capital services and productivity for 1962–6. Put differently, they asked whether the use of these alternative capital measures mattered empirically for productivity measurement. For Canadian data, the answer was "No, not much."

Crépon and **Mairesse** note that Griliches has made important contributions to the econometric analysis of production functions. Yet problems of identification and estimation of production, already stressed in the 1940s, still exist. The authors try to analyze some of the sources of these problems. In particular, they try to address the finite sample properties of the appropriate estimates under various assumptions about specification errors. They find that even the newest methods that they use perform poorly.

Lanjouw and **Schankerman** show that the process of enforcing patent rights both dilutes and distorts R and D incentives. They examine the characteristics of litigated patents by combining, for the first time, information about patent case filings from the U.S. district courts with detailed data from the U.S. Patent and Trademark Office. By comparing filed cases to a random sample of U.S. patents from the same cohorts and technology areas, the authors show that case filings are much more common in some technology areas than in others. Case filings are also more common when innovations are more valuable; appear to form the basis of a sequence of technologically linked innovations held by the patentee; are domestically owned; and are owned by individuals, except in cases where others are active in the same technology area, thus making reputation important.

As patent data become more available in machine-readable form, an increasing number of researchers have begun to use measures based on patents and their citations as indicators of technological output and information flow. **Jaffe, Hall,** and **Trajtenberg** explore the economic meaning of these citation-based patent measures using the financial market valuation of the firms that own the patents. With data on more than 4,800 U.S. manufacturing firms and their patenting activity for the past 30 years, they explore the contributions of R and D spending, patents, and citation-weighted patents to measures of Tobin's Q for the firms. They find that citation-weighted patent stocks are more highly correlated with market value than patent stocks themselves. This is attributable mainly to the high valuation placed on firms holding very highly cited patents.

In analyzing the sources of growth in the demand for labor market skills —including education and work experience—many have dismissed as unimportant the shifts in industrial employment caused by increased international trade and growth in services. **Welch** suggests that we have been too quick to dismiss the effects of shifts in the industrial composition of employment on the increasing demand for skills. He points out that, in 1967, high school dropouts accounted for 26.9 percent of hours worked nationally, while college graduates accounted for 23.9 percent. In 1997, high school dropouts accounted for only 5.6 percent of hours worked nationally, while the college graduate share had increased to 43.1 percent. Given these changes, he asks, would you need to know how the wage of college graduates moved relative to the wage of high school dropouts before you would guess about 1967 to 1997 changes in employment shares in agriculture or manufacturing?

Between 1960 and 1973, productivity growth accounted for more than half of the growth of output per capita in France, Germany, Italy, Japan, and the United Kingdom, and somewhat less than half of the output growth in Canada and the United States. After 1973, the relative importance of productivity declined substantially, accounting for a predominant share of growth only for France between 1973 and 1989. Since 1989, productivity growth has almost disappeared as a source of economic growth in the G7 countries. **Jorgenson** notes that current thinking on this subject greatly reduces the relative importance of productivity growth and assigns a more prominent role to investment in tangible assets and human capital. This poses a serious challenge to theories of growth based on spillovers from investment in research and development, he concludes.

Berry and **Pakes** follow in the tradition of Griliches's work on "hedonic" price functions, which led to a long line of empirical work modeling a "product space" defined by the characteristics of products. Recently, researchers have used hedonic-style discrete-choice models to answer important questions about the value of new products, the nature of competition, and the correct methods for calculating price indexes. However, many of these models impose the odd restriction that the dimension of the product space increases with the number of products. Berry and Pakes consider how to estimate alternative models with a fixed dimensional product space. They provide some preliminary solutions to the practical difficulties of estimating such models. While more complicated, the proposed alternatives may give more realistic answers to some questions that involve a change in the number of products.

Conference on the Economics of Aging

As a culmination of NBER research efforts in the economics of aging, another in a series of NBER Conferences on Aging took place last May. David A. Wise, Director of the NBER's Program on Aging, also of Harvard University, organized the two-day gathering. The following papers were discussed:

Jeffrey Geppert, NBER, and **Mark B. McClellan,** NBER and Stanford University, "Causes and Consequences of Medical Spending Growth: The Big Picture"

Discussant: David M. Cutler, NBER and Harvard University

Matthew J. Eichner, NBER and Columbia University; **Mark B. McClellan;** and **David A. Wise,** "The Sources of Cost Differences in Employer-Provided Health Insurance: A Decomposition Analysis"

Discussant: Joseph P. Newhouse, NBER and Harvard University

David M. Cutler, and **Ellen Meara,** Harvard University, "The Concentration of Medical Spending: An Update" (NBER Working Paper No. 7279)

Discussant: Joseph P. Newhouse

Axel Börsch-Supan, NBER and University of Mannheim, "Incentive Effects of Social Security under an Uncertain Disability Option" (NBER Working Paper No. 7339)

Discussant: Daniel L. McFadden, NBER and University of California, Berkeley

Courtney Coile, MIT, and **Jonathan Gruber,** NBER and MIT, "Social Security Retirement Incentives"

Discussant: Andrew A. Samwick, NBER and Dartmouth College

James M. Poterba, NBER and MIT; **Steven F. Venti,** NBER and Dartmouth College; and **David A. Wise,** "Pre-Retirement Cashouts and Foregone Retirement Saving: Implications for 401(k) Asset Accumulation" (NBER Working Paper No. 7314)

Discussant: John B. Shoven, NBER and Stanford University

Jeffrey R. Brown, NBER and Harvard University, "Are the Elderly Really Over-Annuitized? New Evidence on Life Insurance and Bequests" (NBER Working Paper No. 7193)

Discussant: Anne Case, NBER and Princeton University

Sylvester J. Schieber, Watson, Wyatt & Co.; and **John B. Shoven,** "The Personal Security Account 2000 Plan, Market Outcomes, and Risk"

Discussant: Steven F. Venti

Michael D. Hurd, NBER and State University of New York at Stony Brook; and **James P. Smith,** Rand Corp., "Anticipated and Actual Bequests" (NBER Working Paper No. 7380)

Discussant: David I. Laibson, NBER and Harvard University

Michael D. Hurd, Daniel L. McFadden, and **Angela Merrill,** University of California, Berkeley, "Predictors of Mortality among the Elderly"

Discussant: Finis Welch, Texas A&M University

Angus S. Deaton and **Christina Paxson,** NBER and Princeton University, "Mortality, Education, Income, and Inequality among American Cohorts" (NBER Working Paper No. 7140)

Discussant: James P. Smith

Geppert and **McClellan** show that, although mortality has continued to fall, the share of Medicare program payments accounted for by persons in the last year of life remained relatively constant over the past two decades. Improved survival was swamped by the much larger increases in expenditures. Without improvements in survival, the authors conclude, Medicare spending would have grown only 4 percent more than it did. Further, recent growth in spending for non-acute services explains half of the overall spending growth, not the increasing use of "heroic" intensive measures near the end of life. Growth rates for non-acute services were even greater for older survivors than for decedents, the authors observe.

Eichner, McClellan, and **Wise** seek to explain differences in health care expenditures among employer-provided heath insurance programs. They find that the demographic mix of plan enrollees accounts for wide differences in cost ($649 per enrollee per year). But even after adjusting for demographic mix, the difference in expenditures explained by the treatment costs for a given diagnosis ($807 per enrollee per year) is almost as wide as the unadjusted range in expenditures ($838). Differences in cost attributable to the different mixes of illness treated, after adjusting for demographic mix, also account for large differences in cost ($626). The authors conclude that variations in high-cost inpatient treatments are a principal cause of the substantial cost variation across firms. The most important component, the diagnosis rate (the proportion of enrollees with a particular illness), accounts for about 52 percent of variation across firms.

Cutler and **Meara** seek to reconcile the decline in disability rates among the elderly with the rapid increases in Medicare spending for that group. They find that the trend of disproportionate spending growth among the oldest old—those over

age 85—has continued between 1985 and 1995, rising by 4 percent. Spending among the younger elderly—those ages 65 to 69—rose by only 2 percent annually in real per-person terms. The reason for the large increase in spending on the oldest elderly relative to the younger elderly is the rapid increase in the use of post-acute services such as home health care and skilled nursing care: spending on post-acute care for the very old has risen 20 percent per year in the past decade.

Many countries provide competing "pathways" to retirement that may include several early retirement options in addition to normal retirement. Further, early retirement options often include special provisions for disabled and unemployed workers, while ultimate eligibility for such provisions is uncertain. **Börsch-Supan** shows that ignoring these differences in the relevant institutional setting can severely bias estimates of the incentive effects of pensions on retirement. He proposes several ways to estimate the true incentive effects of social security on early retirement and then applies them to the German public pension system.

Coile and **Gruber** analyze the incentives that Social Security provides for continued work at older ages. Using information on older males from the Health and Retirement Study for 1980–95, they find that the median male worker faces a small tax on work at ages 55 to 61, a small subsidy at ages 62 to 64, and a large tax at ages 65 to 69. However, one-third of workers would face a tax rather than a subsidy at age 62. A more appropriate measure of incentive effects, they suggest, would consider accruals over not just the next year but future years as well.

Poterba, Venti, and **Wise** find that, for households reaching retirement age between 2025 and 2035, 401(k) balances are likely to be a much more important factor in financial preparation for retirement than they are today. Average 401(k) balances in 2025 will be between five and ten times as large as they are today, and would represent one-half to twice Social Security wealth (depending on investment allocation and based on current Social Security provisions). For persons retiring in 2035, 401(k) balances will be three-quarters to two and a half times Social Security wealth. Further, the authors find that preretirement withdrawals have only a small effect on the balance in 401(k) accounts: these withdrawals typically reduce average 401(k) assets at age 65 by about 5 percent. Most people eligible for a lump-sum distribution when they change jobs choose either to leave their assets in their previous employer's 401(k) plan or to roll them over to another retirement savings account. Those who do withdraw assets tend to have very small accumulated balances. In fact, the expense ratio charged by the financial institutions administering 401(k) accounts has a larger effect on retirement resources than the possibility of preretirement withdrawal.

Brown asks whether term insurance is purchased in order to undo excessive government annuitization in the form of Social Security. He finds that many households choose to hold both privately purchased annuities and term life insurance, which is inconsistent with the notion that these individuals are overannuitized. Also, the hypothesized positive relationship between term insurance ownership and Social Security benefits does not hold when term insurance is analyzed separately from cash value policies. These findings suggest that households are not seeking to undo Social Security for bequest reasons. Thus, these results have implications for the current debate over annuitization options in an individual accounts retirement system.

Schieber and **Shoven** assess the riskiness and actuarial soundness of the Personal Security Account (PSA) 2000 proposal, a privatization plan for Social Security. They show the base plan to be in 75-year balance even without transfers from the projected government surpluses of the next 15 years. If a significant fraction of the surpluses was dedicated to Social Security, then the PSA 2000 plan could reduce payroll tax rates, allocate more money to the disability program, or both. They also show that participants who invest their individual accounts exclusively in inflation-indexed bonds will end up with benefits greater than or equal to those under current law. The "lifetime poor" do particularly well relative to their current treatment. Participants who invest in a diversified portfolio of stocks have a small chance of experiencing smaller-than-current law benefits.

Hurd and **Smith** use data on anticipated bequests from two waves of the Health and Retirement Study and the Asset and Health Dynamics of the Oldest Old (AHEAD) survey, and on actual bequests from AHEAD. Between Waves 1 and 2, increases in bequest probabilities were associated with increases in the subjective probability of surviving, increments in household wealth, and becoming a widow; out-of-pocket medical expenses reduced the likelihood of a bequest. By comparing bequest probabilities with baseline wealth, the authors can test a primary prediction of the lifecycle model: that individuals will dissave at advanced old age. The AHEAD respondents anticipate substantial dissaving before they die.

Hurd, McFadden, and **Merrill** look at certain predictors of mortality among Americans age 70 and over: income, wealth, and education; 13 health indicators, including a history of heart attack or cancer; and subjective probabilities of survival. They find that the relationship between the socioeconomic indicators and mortality declines with age. The 13 health indicators are consistently strong predictors of mortality. The subjective survival probabilities also predict

mortality, even after one controls for socioeconomic indicators and health conditions.

People whose incomes were less than $5,000 in 1980 could expect to live about 25 percent fewer years than people whose family incomes were greater than $50,000. **Deaton** and **Paxson** explore this finding using both individual data and a panel of aggregate birth cohorts from 1975 to 1995. Their results on individuals show that income reduces the risk of death, even after controlling for differences in education. Only some of the effect of income can plausibly be attributed to the reduction in earnings of those about to die. The aggregate data also show a strongly protective effect of income, but cyclical increases in income may actually increase mortality, even when the long-run effects of income point in the opposite direction.

These papers and their discussion will be published by the University of Chicago Press in an NBER Conference Volume. In advance of its publication, most of these papers will be available at "Books in Progress" on the NBER's Web site, **www.nber.org.**

1999 International Seminar on International Trade

The biennial International Seminar on International Trade, organized jointly by the NBER and the Centre for Economic Policy Research (CEPR) in London, was held on June 4 and 5 in Cambridge. As part of ISIT's objective of promoting research in North America and Europe on new trade and trade-related topics, Robert E. Baldwin, NBER and University of Wisconsin; Richard Baldwin, NBER and University of Geneva; and André Sapir, CEPR and Free University of Brussels, chose the following papers for discussion this year:

Thomas J. Prusa, NBER and Rutgers University, "Will Competition Policy Make Markets More Competitive? Lessons from U.S. Antidumping Policy"
Discussant: Ian Wooton, CEPR and University of Glasgow

Hylke Vandenbussche and **Jozef Konings**, CEPR and University of Leuven, and **Linda Springael**, University of Antwerp, "Import Division under European Antidumping Policy" (NBER Working Paper No. 7340)
Discussant: James E. Anderson, NBER and Boston College

Anne O. Krueger, NBER and Stanford University, "Trade Creation and Trade Diversion under NAFTA"
Discussant: Dani Rodrik, NBER and Harvard University

André Sapir and **L. Alan Winters**, CEPR and University of Sussex, "Regionalism and the World Trade Organization"
Discussant: Robert Z. Lawrence, President's Council of Economic Advisers

Henrik Horn, CEPR and World Trade Organization, and **Petros Mavroidis**, University of Neuchatel, "Equity in the World Trade Organization Dispute Settlement System"
Discussant: Jeffrey Schott, Institute for International Economics

Wolfgang Keller, NBER and University of Texas, and **Arik Levinson**, NBER and University of Wisconsin, "Environmental Compliance Costs and Foreign Direct Investment Inflows to U.S. States" (NBER Working Paper No. 7369)
Discussant: Wayne Gray, NBER and Clark University

Damien Neven, CEPR and the University of Lausanne, "International Antitrust"
Discussant: Rachel McCulloch, Brandeis University

Gordon H. Hanson, NBER and University of Michigan, and **Antonio Spilimbergo**, International Monetary Fund, "Political Economy, Sectoral Shocks, and Border Enforcement" (NBER Working Paper No. 7315)
Discussant: André Sapir

Joseph François, CEPR and Tinbergen Institute, and **Ian Wooton**, "Trade in International Transport Services: The Role of Competition"
Discussant: Drusilla Brown, Tufts University

Yongmin Chen and **Keith E. Maskus**, University of Colorado, Boulder, "Vertical Price Control and Parallel Imports"
Discussant: Damien Neven

In theory, antidumping measures can either complement and enhance competition policies or stifle and reduce the competitors' ability to price imports aggressively. With a few exceptions, recent experience strongly favors the latter view. Using U.S. data, **Prusa** estimates the effect of antidumping actions on import trade, quantities, and prices. He finds that named imports fall around 50 percent during the years following the imposition of antidumping duties. In conjunction with the sharp growth in countries instituting antidumping policies, this suggests that antidumping measures are likely to emerge as the pre-eminent threat to free trade

over the next decade.

Vandenbussche, Konings, and **Springael** study the effects of antidumping actions on import diversion from European Union (EU) importers "named" in an antidumping investigation, and potentially subject to protectionist measures, to countries "not named" in the investigation. The amount of import diversion is one indication of the *effectiveness* of antidumping policy, which is used to protect the home industry from foreign imports. The authors find that: 1) trade diversion in the EU caused by antidumping actions is limited and much lower than that in the United States; 2) price undertakings are more effective instruments than antidumping duties; 3) trade diversion in highly concentrated European industries is strong enough to mitigate the effects of antidumping protection; 4) overall imports are reduced most in vertically differentiated industries; and 5) there is a strong investigation effect for named countries.

Krueger uses aggregate and microdata on trade between the United States, Canada, and Mexico to assess the early effects of Mexico's entry into the North American Free Trade Agreement (NAFTA). She finds that a number of factors have contributed to the sharp rise of Mexican trade with the United States and Canada, among them Mexico's reduction of tariffs and quantitative restrictions and changes in its exchange rate policy at the end of 1994. Krueger concludes that, over its first three years, NAFTA does not appear to have had a large impact relative to these other events.

Sapir and **Winters** address regional trading arrangement (RTA) issues that were not resolved during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) talks and will thus be potential negotiation issues during the Millennium Round of talks. The authors focus on the application of "other restrictive regulations on commerce" and the effects of RTAs on excluded countries, finding that some partners benefit from their RTAs with the EU by charging higher (pretariff) prices, and that some are more closely integrated (that is, they face lower barriers) than others. The authors also show that partner firms pass on to consumers some of the tariff concessions they receive, and so put competitive pressure on firms from countries without RTAs; these firms typically respond by lowering their pre- and post-tariff prices.

There is a growing concern among developing countries that they are disfavored by the Dispute Settlement (DS) system of the World Trade Organization (WTO). Allegedly, the system is too concentrated on the interests of "stronger" member countries. **Horn** and **Mavroidis** explore whether, during its first four years in existence, the DS system has provided equality before the law. They focus on whether *participation* in the process seems to reflect what one might expect from an "equitable" system, and if not, what might explain any measured deviation. Their theoretical benchmark distribution predicts the actual pattern of complaints across countries, although some significant discrepancies are not explained.

Keller and **Levinson** estimate the extent to which changing environmental standards have altered patterns of international investment. They use data on inward foreign direct investment (FDI) to the United States and on differences in the regulatory stringency of U.S. states. With a panel of annual measures of relative regulatory stringency from 1977 to 1994, which allows them to control for unobserved state characteristics that may be correlated with both FDI and compliance costs, they find that environmental regulations have small deterrent effects in particularly pollution-intensive industries, but no large or widespread effects.

Neven highlights two dimensions of the design of international antitrust rules that have been relatively neglected in the past: the role of external effects across jurisdictions with decentralized decisionmaking and the risk of capture in a centralized agency. He finds that, even in the absence of any political economy interactions, the decision taken by a supranational authority is not unambiguously superior to alternatives. This is the case when market definition is inherently ambiguous. He also finds that the allocation of jurisdiction matters surprisingly little. After evaluating the risks of capture in a political economy model of merger control, Neven finds that, in some instances, the accountability brought about by consumers will not be effective in preventing very damaging mergers (even though relatively innocuous mergers will be prevented). He also finds that the political economy of takeovers could be substantially worse than that arising for friendly mergers.

Hanson and **Spilimbergo** examine the correlation between sectoral shocks and border enforcement in the United States. Enforcement of national borders is the main policy instrument used by the U.S. government to combat illegal immigration. The authors find that border enforcement is negatively correlated with lagged relative price changes in the apparel, fruits and vegetables, and slaughtered livestock industries and with housing starts in the western United States. This suggests that the authorities relax border enforcement when the demand for undocumented workers is high.

François and **Wooton** examine the implications of liberalization in transport services (international shipping, transport, and related logistical services) for profits, trade, and national gains from trade. Although past GATT maritime negotiations involved the maritime nations, the authors also consider the interests of consuming nations, particularly poorer developing countries. With a computational example, they provide a rough sense of the magnitude and importance of the issues raised for basic gains from improved market access.

Chen and **Maskus** survey the international policy debate concerning parallel imports, which are goods traded without the authorization of an original trademark or copyright owner. Parallel imports are likely to have multiple causes, including vertical price control. A manufacturer selling its product through an independent agent needs to set the wholesale price low enough to induce a desired retail price in a certain country. This creates an opportunity for the agent to sell the product profitably, outside authorized distribution channels, in another country. The authors show that the combined social surplus in two countries first decreases and then increases in the private cost of parallel trade. Restricting parallel imports always benefits the manufacturer, but it may either raise or reduce global surplus. Some empirical evidence indicates that the authors' vertical-control explanation of parallel imports is important.

These papers will be published in a special edition of the *European Economic Review*. In advance of the publication of the journal, most of these papers will be available at "Books in Progress" on the NBER's Web site, **www.nber.org.**

Tenth Annual East Asian Seminar on Economics

The NBER's Tenth Annual East Asian Seminar, "Regional and Global Capital Flows: Causes and Consequences," took place in Hawaii on June 10–12. Takatoshi Ito, NBER and Hitotsubashi University, and Anne O. Krueger, NBER and Stanford University, organized the conference and chose these papers for discussion:

Taro Esaka and **Shinji Takagi,** Osaka University, "Sterilization and the Capital Inflow Problem in East Asia, 1987–97"
Discussants: Leonard K. Cheng, Hong Kong University of Science and Technology, and Mahani Zainal-Abidin, University of Malaya

Aaron Tornell, NBER and Harvard University, "Lending Booms and Currency Crises: Empirical Link"
Discussants: Shinji Takagi and Chi-Wa Yuen, University of Hong Kong

Giancarlo Corsetti, Yale University; **Paolo Pesenti,** Federal Reserve Bank of New York; and **Nouriel Roubini,** the President's Council of Economic Advisers, "Fundamental Determinants of the Asian Crisis: The Role of Financial Fragility and External Imbalances"
Discussants: Pranee Tinakorn, Thailand Development Research Institute, and Aaron Tornell

Leonard K. Cheng; Francis T. Lui, Hong Kong University of Science and Technology; and **Yum-Keung Kwan,** City University of Hong Kong, "Credibility of Hong Kong's Currency Board: The Role of International Arrangements"
Discussants: Shin-Ichi Fukuda, University of Tokyo, and Takatoshi Ito

Eiji Ogawa and **Lijian Sun,** Hitotsubashi University, "How Were Capital Inflows Stimulated under the Dollar Peg System?"
Discussants: Francis T. Lui and Pranee Tinakorn

Shin-Ichi Fukuda, "The Impacts of Bank Loans on Economic Development: An Implication for East Asia from an Equilibrium Contract Theory"
Discussants: Carmen Reinhart, NBER and University of Maryland, and Yukiko Fukagawa, Aoyama Gakuin University

Graciela L. Kaminsky, George Washington University; and **Carmen Reinhart,** "On Crises, Contagion, and Confusion"
Discussants: Eiji Ogawa and Mahani Zainal-Abidin

Wen-Thuen Wang, Chung-Hua Institution for Research, "The Spillover Effect of FDI on Technical Efficiency in China"
Discussants: Kyoji Fukao, Hitotsubashi University, and Ponciano Intal, De La Salle University

Assaf Razin, NBER and Tel Aviv University; **Efraim Sadka,** Tel Aviv University; and **Chi-Wa Yuen,** "Host Country Benefits from FDI: Two Nontraditional Views on Gains from Trade"
Discussants: Wen-Thuen Wang and Mario Lamberte, Philippine Institute for Development Studies

Kyoji Fukao, "How Japanese Subsidiaries in Asia Responded to the Crisis: An Empirical Analysis Based on the MITI Survey"
Discussants: Mario Lamberte and Assaf Razin

Dongchul Cho and **Kiseok Hong,** Korea Development Institute, "Currency Crisis of Korea: Internal Weakness or External Interdependence?"
Discussants: Nouriel Roubini and Ponciano Intal

Yukiko Fukagawa, "The Economic Crisis and Foreign Capital Management in Korea: The Rise and Fall of the Strategic Development"
Discussants: Dongchul Cho and Anne O. Krueger

During 1987–97, the East Asian monetary authorities took various measures to sterilize the expansionary effect of reserve inflows on the growth of monetary aggregates. **Esaka** and **Takagi** look at quarterly

data and find that these sterilization measures were effective in limiting monetary growth. This in turn may have promoted additional capital inflows by keeping the level of domestic interest rates high, or may have caused disintermediation and expanded the volume of assets in the poorly supervised nonbank financial sector. In either case, the sterilization policies likely magnified the potential risk of capital inflows in East Asia.

Tornell finds that the cross-country variation in the severity of the Mexican currency crisis in 1995 and the Asian crisis in 1997 was determined largely by three fundamentals: the strength of the country's banking system, the level of appreciation of the real exchange rate, and the country's liquidity. He also finds that the rule that links fundamentals to the severity of the crises was the same in both countries.

Corsetti, Pesenti, and **Roubini** analyze the causes of the 1997–8 Asian crisis. In their model, government guarantees to bail out the banking system lead to: 1) a distorted boom in domestic investment, which increases current account deficits; 2) an increase in nonperforming loans; and 3) a surge in implicit government bailout guarantees. The authors find that both external balance weaknesses (proxied by a large current account deficit and real exchange rate appreciation) and financial sector fragility (proxied by measures of lending power, nonperforming loans, and the fiscal costs of a bank bailout) explain which countries experienced a crisis in 1997. The effects of external and financial vulnerability are even stronger, the authors find, when a country's liquidity (foreign reserves) is low relative to the money supply or external debt service, and when fundamentals are weak. These results are consistent with the theory that fundamentals, rather than panic or self-fulfilling equilibriums, were an important determinant of the Asian crisis.

Cheng, Lui, and **Kwan** show that in recent years Hong Kong's currency board has gone through three stages: a rule-bound regime, a regime based on discretion, and a return to fixed rules. The currency board was most credible when the monetary authority adhered to fixed rules. Reliance on discretion not only contributed to the market's eroding confidence in the system, but also made speculative currency attacks easier during the Asian financial turmoil.

Ogawa and **Sun** analyze how the de facto dollar peg system affected capital inflows to the Asian countries that suffered financial and currency crises. They show that a de facto dollar peg system would have had a stimulating effect on capital inflows to Indonesia from 1985 to 1996. The same de facto dollar peg system would have had a slightly stimulating effect on capital inflows to Thailand and Korea around 1995.

Fukuda presents a model in which efficient monitoring activities by competitive private banks might result in a vulnerable financial structure in developing countries. Assuming asymmetric information, there is a role for a short-term lender in monitoring borrowers' performance. However, since short-term debt can be a source of liquidity problems, the overall effects of efficient monitoring on economic welfare might be greatly reduced if monitoring increases the possibility of a liquidity shortfall.

Since the Mexican crisis of 1994–5, the Asian crisis of 1997, and the Russian crisis of 1998, economists have been busy studying contagion. Yet few studies have considered the channels through which disturbances are transmitted—that is, whether there are fundamental reasons to observe spillovers. **Kaminsky** and **Reinhart** attempt to fill this gap by analyzing how both trade links and the largely ignored financial-sector links influence the pattern of fundamentals-based contagion. They examine the role of international bank lending, the potential for cross-market hedging, and bilateral and third-party trade in the propagation of crises.

China has been one of the largest recipients of foreign direct investment (FDI) inflows in the 1990s. The impact of FDI in China has been discussed extensively in terms of its positive contribution to capital formation, job creation, and trade development. However, no studies have focused on the spillover effect of FDI on the Chinese economy, even though this effect is widely recognized as the most important and significant aspect of FDI for the host economy. For this paper, **Wang** studies the spillover effect of FDI on technical efficiency in the Chinese economy. He applies the random-coefficient frontier production function approach to measure technical efficiency in three-digit industries in China. Wang turns up much stronger evidence than previous studies had of spillover efficiency in the presence of FDI.

The traditional role of FDI lies in the blending of foreign savings with domestic savings to finance domestic investment. **Razin, Sadka,** and **Yuen** propose two nontraditional views of FDI. The first focuses on the effects of FDI in facilitating technology transfer through the importation of new varieties of factor inputs and in promoting competition in the input market. The second focuses on the possibility of perverse interactions between FDI and the domestic capital market in the presence of asymmetric information and adverse selection problems involved in investment financing. The authors then reassess the possible welfare gains/losses that FDI may generate for the host country relative to the traditional gains.

Using 1996 and 1997 survey data, **Fukao** asks how Japan's manufacturing subsidiaries in the ASEAN-4

countries and Korea responded to the Asian financial crises. Japanese firms increased their FDI flows to the ASEAN-4 countries and Korea mainly to support their troubled subsidiaries. In Korea, Thailand, and Indonesia, export-oriented subsidiaries increased their sales by 17 percent and almost doubled their profits, but they expanded their average employment by less than 1 percent. Parent firms supported their affiliates by raising their paid-up capital. Fukao finds that a subsidiary owned by either a large parent firm or a parent with a high profit rate tends to maintain its employment levels. This implies that parent firms' support is important for subsidiaries. Also, if a subsidiary is relatively new or has a high value added per worker, it tends to keep its employment level stable.

Examining Korea's currency crisis in the context of turmoil in the international capital market, **Cho** and **Hong** attempt to distinguish the effects of weaknesses in domestic fundamentals from the effects of external interdependence (called "contagion" effects). The authors conclude that the outbreak of the Korean crisis may not be completely attributable to the contagion effects alone, although other countries' crises substantially worsened the situation. Korea's fundamentals before the crisis were not so strong that economists would have been astonished with the outbreak of the crisis, nor were they weak enough for investors to have been able to anticipate the crisis. Finally, if one considered the structural vulnerability of Korea's financial market in addition to the conventional macroeconomic fundamentals, and if one could have foreseen the government's stubbornness in coping with the financial turmoil, then the Korean crisis might have been easier to anticipate.

Fukagawa looks for country-specific explanations for the Korean economic crisis. Among the factors that led to the crisis in Korea were financial institutions inexperienced in international transactions, the hypertrophic chaebols, and economic management during democratic transition. Finally, he discusses one of the fundamentals—Korea's traditional foreign capital management, which relies heavily on borrowing while sacrificing the potential contribution of FDI—and questions the "independence" valued by emerging countries in today's economic integration.

These papers and their discussion will be published by the University of Chicago Press in an NBER Conference Volume. Some of them are also available at "Books in Progress" on the NBER's Web site, **www.nber.org.** Others will be available there in the future.

The Distributional and Behavioral Effects of Environmental Policy

The NBER and the Fondazione Eni Enrico Mattei in Milan jointly sponsored a conference on "Distributional and Behavioral Effects of Environmental Policy" in Italy on June 11 and 12. Carlo Carraro of the Fondazione and Gilbert E. Metcalf, NBER and Tufts University, were the conference organizers. The following papers were discussed:

Anastasios Xepapadeas, University of Crete, "Environmental Policy and Firm Behavior: Abatement Investment and Location Decisions under Uncertainty and Irreversibility" (NBER Technical Working Paper No. 243)

Discussant: Charles Kolstad, University of California, Santa Barbara

A. Lans Bovenberg, Tilburg University, and **Lawrence H. Goulder,** NBER and Stanford University, "Neutralizing the Adverse Industry Impacts of Carbon Dioxide Abatement Policies: What Does It Cost?"

Discussant: R. A. de Mooij, CPB Netherlands Bureau for Economic Policy Analysis

Sjak Smulders, Tilburg University, and **Herman R. J. Vollebergh,** Erasmus University, "Green Taxes and Administrative Costs: The Case of Carbon Taxation" (NBER Working Paper No. 7298)

Discussant: Dallas Burtraw, Resources for the Future

Arik Levinson, NBER and University of Wisconsin, "An Industry-Adjusted Index of State Environmental Compliance Costs" (NBER Working Paper No. 7297)

Discussant: Domenico Siniscalco, Fondazione Eni Enrico Mattei

Don Fullerton, NBER and University of Texas; **Inkee Hong,** University of Texas; and **Gilbert E. Metcalf,** NBER and Tufts University, "A Tax on Output of the Polluting Industry Is Not a Tax on Pollution: The Importance of Hitting the Target" (NBER Working Paper No. 7259)

Discussant: Gilbert von Hagen, Tilburg University

Stefania Borghini, Marcella Fantini, and **Domenico Siniscalco,** Fondazione Eni Enrico Mattei, "Information-Based Environmental Policies and Company Behavior"

Discussant: Kevin Hassett, American Enterprise Institute

Randy A. Becker, U.S. Bureau of the Census, and **J. Vernon Henderson,** NBER and Brown University, "Costs of Air-Quality Regulation" (NBER Working Paper No. 7308)

Discussant: Aart De Zeeuw, Tilburg University

Yannis Katsoulacos, Athens University of Economics and Business; **Alistair Ulph,** University of Southampton; and **David Ulph,** University College, London, "The Effects of Environmental Policy on the Performance of Environmental RJVs" (NBER Working Paper No. 7301)

Discussant: Jerome Rothenberg, MIT

Michael Rauscher, Rostock University, "International Factor Movements, Environmental Policy, and Double Dividends"

Discussant: David Bradford, NBER and Princeton University

Raghbendra Jha, Indira Gandhi Institute of Development Research, and **John Whalley,** NBER and University of Western Ontario, "The Environmental Regime in Developing Countries" (NBER Working Paper No. 7305)

Discussant: Edward Barbier, University of York

Xepapadeas explores abatement investment and location responses to environmental policy—for example, emission taxes or tradable emission permits and subsidies against the costs of abatement investment—under uncertainty and irreversibility. There may be uncertainty about output price, environmental policy, or technology. Irreversibility is a product of abatement expenses and movement to a new location. During certain times, firms do not engage in abatement investment or relocate, and during other periods they do. In this analysis, an optimal environmental policy would combine policy parameters that take into account both profit maximization and social optimization.

Bovenberg and **Goulder** find that the U.S. government could simultaneously implement carbon abatement policies and protect profits and equity values in key industries without substantial costs to the overall economy. They conclude that carbon dioxide abatement policies could generate large rents to firms, but to generate enough rents to maintain profits and equity values, the government would need to "grandfather" a small fraction of the emissions permits and to exempt a small fraction of emissions from the base of a carbon tax. The authors also find that allowing firms a dollar-for-dollar offset to their payment of carbon taxes (through industry-specific cuts in corporate tax rates, for example) vastly overcompensates them because it leads to substantial increases in profits and equity values. This reflects the fact that much of the carbon tax is shifted onto consumers. To maintain

firms' profits, the government only needs to offer tax relief for a small fraction of carbon tax payments.

Smulders and **Vollebergh** explore the trade-off between the incentive effects and the administrative costs associated with the implementation of various environmental tax instruments, particularly carbon taxes. If emissions are closely linked to inputs, abatement possibilities are costly, and the administrative costs of emission taxes are high, then emission taxes probably should not be introduced. These conditions exist in several European countries. In these countries, broadening the carbon tax base by removing certain widely used exemptions for energy production (and possibly by adding emission taxes or abatement subsidies for selected industries) is likely to increase the incentives for carbon reduction without significant additional administrative costs.

Levinson describes a new, industry-adjusted index of state environmental compliance costs from 1977 to 1994. This index controls for states' industrial compositions and can be calculated for the entire 17 years, thus facilitating comparisons both among states and within states over time. Looking at this data, Levinson finds that: 1) differences in states' industrial compositions play a large role in determining their environmental compliance costs; 2) after controlling for industrial composition, the variance across states in compliance costs declined steadily between 1977 and 1994; and 3) this new cost index is negatively correlated with subjective indexes of state environmental efforts compiled by various environmental organizations. Overall, the index provides some new data on historical trends in state regulatory differences and differs from the conventional wisdom on states' relative environmental efforts.

Fullerton, Hong, and **Metcalf** analyze the effects of environmental taxes that target pollution imprecisely. A review of actual policies indicates few (if any) examples of a true tax on pollution. More typically, environmental taxes target an input or output that is correlated with pollution. Using a utility-based, money-metric measure of welfare, the authors examine the losses that arise from not taxing pollution directly. Under their plausible parameters, moving from no tax on pollution, the welfare gain from a tax on output is less that half the gain from a tax on emissions.

Borghini, Fantini, and **Siniscalco** create a unique new dataset on voluntary environmental reporting activities based on 41 large companies in 16 countries in three polluting industries (oil and gas, chemicals, and power generation) between 1993 and 1997. All the companies regularly produce and publish corporate environmental reports. Only a subset adopt environmental certification, environmental audit, and compensation schemes related to environmental performance. The authors describe the dataset in detail. In their sample, the audit and compensation programs are positively related to operating income and negatively related to pollution. This is consistent with a class of models on environmental information, compensation schemes, and company behavior.

Becker and **Henderson** explore some of the costs associated with air-quality regulation, particularly regulation of ground-level ozone and its effects on two manufacturing industries that are sensitive to such regulation: industrial organic chemicals and miscellaneous plastic products. Both industries are major emitters of volatile organic compounds and nitrogen oxides, the chemical precursors to ozone. Using plant-level data from the U.S. Census Bureau's Longitudinal Research Database, the authors examine how regulation affects the timing and magnitude of firms' investments and their operating costs. In at least one of these industries, the authors find, new plants in (heavily regulated) ozone nonattainment areas start out much larger than their counterparts in (less regulated) attainment areas but then do not invest as much. As a result, after ten years, the capital stocks of regulated plants are actually smaller. Among other things, this highlights the substantial fixed costs involved in obtaining expansion permits. Estimates of average total cost functions reveal that operating costs are indeed higher for heavily regulated plants than for their less regulated counterparts. This is particularly the case for younger plants, and is consistent with the notion that regulation is most burdensome for new (rather than existing) plants.

Katsoulacos, Ulph, and **Ulph** analyze the impact of environmental policy on the performance of environmental research joint ventures (RJVs) and compare this performance with that of a noncooperative equilibrium. The authors identify three stages in the innovative process (research design, R and D, and information sharing) and consider each of these interrelated decisions in both the cooperative and noncooperative settings. They show that RJVs enhance welfare when the level of environmental damage caused by pollution is low. When the level of damage is high, though, firms anticipate tougher environmental policy when they share information than when they do not. Thus, they avoid sharing information, which distorts the RJV's R and D decisions in ways that make the noncooperative equilibrium better for welfare.

Rauscher investigates how the design of environmental policies affects unemployment and welfare when sticky wages are causing unemployment. Environmental policy can lead to scarcity rents that accrue to those who use capital as a factor of production. Toughening environmental policy raises the scarcity rents, which in turn makes capital more desirable (because the rents are associated with the use of capital). As the demand for capital rises, labor is

more productive, and firms respond by hiring more workers, thus lowering unemployment. Rauscher finds that this rents-unemployment connection persists, and that tighter environmental policy may in fact attract mobile capital from outside the country and thus lower unemployment. On the other hand, a shift from command-and-control regulation that creates scarcity rents to a tax regime that allows the government to appropriate those rents could lead to capital flight.

Jha and **Whalley** discuss the environmental conditions common to the developing world and the policy responses, if any, used to deal with them. The authors consider the effects of industrial emissions; the impacts of untreated waste (industrial and human) on air and water quality; the congestion effects of traffic; soil erosion; and open-access resource problems (including what happens to forests). The recent literature tends to equate environmental problems in developing countries with pollutants (or emissions), but the authors argue that to discuss adequately environmental problems in developing countries (or to compare them with the problems of developed countries), one must refer to degradation as well as pollutants. The effects of degradation are large and pervasive, and their severity and interaction with the economic process often differs sharply from that of pollutants.

These papers and their discussion will be published by the University of Chicago Press in an NBER Conference Volume. Certain of them are also available now at "Books in Progress" at the NBER's Web site, **www.nber.org.** Others will be available there in the future.

Frontiers in Health Policy Research

The NBER's third annual conference on "Frontiers in Health Policy Research" took place in Washington on June 17. Alan M. Garber, director of the NBER's Program on Health Care, chose the following papers for discussion:

Jonathan S. Skinner, NBER and Dartmouth University, and **John Wennberg,** Dartmouth College, "How Efficient Is Medicare?"

David M. Cutler, NBER and Harvard University, and **Ellen Meara,** Harvard University, "The Technology of Birth: Is It Worth It?"

Douglas O. Staiger, NBER and Dartmouth College, and **Mark B. McClellan,** NBER and Stanford University, "Comparing the Quality of Health Care Providers" (NBER Working Paper No. 7327)

Matthew J. Eichner, NBER and Columbia University, **Mark B. McClellan,** and **David A. Wise,** "Why Do Some Firms Spend So Much Money on Medical Care? Accounting for Variation" (See "Conference on the Economics of Aging" earlier in this section of the *NBER Reporter* for a description of this paper.)

Laurence C. Baker, NBER and Stanford University, "What Does HMO Market Share Measure?"

Skinner and **Wennberg** argue that regional variations in per capita Medicare spending are key to any reform of the Medicare system. These variations are attributable in large part to what the authors call "differences in the intensity of care," measured for example by how people are treated in their last six months of life. In some areas of the country, elderly people receive fewer than five visits from specialist physicians in their last six months; fewer than 15 percent of these patients are admitted to an intensive care unit (ICU). In other regions, the elderly in their final six months receive more than 25 specialist visits; nearly half are admitted to an ICU. Although total Medicare spending is strongly correlated with these measures of health care intensity, it does not appear to be correlated with regional mortality rates or with the quality of care, as measured by the use of preventive services. Thus, reducing geographical variation in the intensity of treatment will have little or no adverse impact on the quality of care. Additionally, any money saved could be used to extend the life of the Medicare Part A trust fund by more than ten years, or could fund expanded benefits such as coverage for pharmaceuticals.

Cutler and **Meara** evaluate the costs and benefits of increased medical spending for low birthweight infants. Lifetime spending on low birthweight babies increased by roughly $40,000 per birth between 1950 and 1990. Infant mortality rates fell by 72 percent over this period, largely because of improved care for premature infants. Considering both length and quality of life, the authors estimate the rate of return on care for low birthweight infants to be more than 500 percent. Although prenatal care and influenza shots are more cost-effective than neonatal care, it is significantly more cost-effective than other recent innovations, such as coronary artery bypass surgery, treat-

ment of severe hypertension, or routine pap smears for women aged 20 to 74.

Staiger and **McClellan** introduce an approach for evaluating the quality of health care providers that solves a number of problems associated with available evaluation methods: they combine information from all the quality indicators available for a given provider (data from various years, patients, or on several other health indicators for the same patients). Using hospital care for elderly heart attack patients as an example, the authors demonstrate that their method can be used to create reliable, precise predictions about provider quality. Thus, comparing quality of care across providers may be far more feasible than many now believe.

Baker asks whether areas with high HMO market shares and advanced stages of managed care also have high proportions of the population who say that they had to choose providers from a list; they have a gatekeeper; they have to sign up with a primary care provider; and their plan will not pay for out-of-network care. He finds that high HMO market shares are strongly associated with the presence of strict controls on the choice of provider but not with the use of capitation in the market. He also finds that data on market stage do not reflect either controls on provider choice or use of capitation.

These papers will be published by the MIT Press in an annual volume. Some of them can also be found at "Books in Progress" on the NBER's Web site, **www.nber.org.**

Twenty-Second Annual International Seminar on Macroeconomics

The NBER held its 22nd Annual International Seminar on Macroeconomics in France on June 18 and 19. Organizers Torsten Persson, NBER and Institute for International Economic Studies, and James H. Stock, NBER and Harvard University, put together this program:

Francesco Giavazzi, NBER and Bocconi University, and **Tullio Jappelli** and **Marco Pagano,** University of Salerno, "Searching for Non-Keynesian Effects of Fiscal Policy: Evidence from Industrial and Developing Countries"

Discussants: Alberto F. Alesina, NBER and Harvard University, and Zvi Eckstein, Tel-Aviv University

Helene Rey, London School of Economics, and **Phillippe Martin,** ENPC, "Financial Integration and Asset Returns"

Discussants: Marco Pagano, and Kenneth S. Rogoff, NBER and Princeton University

Orazio P. Attanasio, NBER and University College, London, and **José-Victor Ríos-Rull,** NBER and University of Pennsylvania, "Partial Idiosyncratic Insurance, Extended Families, and the Optimal Provision of Aggregate Insurance"

Discussants: Ramon Marimon, NBER and European University Institute, and Kjetil Storesletten, Stockholm University

Daron Acemoglu, NBER and MIT, and **Robert Shimer,** Princeton University, "Productivity Gains from Unemployment Insurance" (NBER Working Paper No. 7352)

Discussants: Charles Bean, London School of Economics, and Robert J. Gordon, NBER and Northwestern University

Ramon Marimon and **Fabrizio Zilibotti,** Stockholm University, "Employment and Distributional Effects of Restricting Work Time"

Discussants: Giuseppe Bertola, NBER and European University Institute, and Emmanuel Saez, MIT

Stephen G. Cecchetti, Margaret McConnell, and **Gabriel Perez-Quiros,** Federal Reserve Bank of New York, "Policymakers' Revealed Preferences and the Output-Inflation Variability Trade-off: Implications for the European Central Bank"

Discussants: Frank Smets, European Central Bank, and James H. Stock

Athanasios Orphanides and **Volker Wieland,** Federal Reserve Board, "Inflation Zone Targeting"

Discussants: Harald Uhlig, Tilburg University, and Kenneth D. West, NBER and University of Wisconsin

Giavazzi, Jappelli, and **Pagano** analyze instances of sharp fiscal retrenchment, such as in Denmark and Ireland in the 1980s, that appear to contradict the Keynesian view that an increase in the government surplus is contractionary. The authors ask whether one can identify the circumstances under which fiscal policy is likely to have such non-Keynesian effects. That is, under which conditions does a fiscal consolidation induce an expansion or, conversely, does a fiscal expansion bring about a contraction? Using data from OECD countries over the past 30 years and from the World Bank on both developing and industrialized countries, the authors seek to determine which factors are more likely associated with non-Keynesian effects.

Rey and **Martin** investigate the impact of financial integration on asset return, risk diversification, and the breadth of financial markets. They find that lower transaction costs between two financial markets translate into higher demand for assets issued on those markets, higher asset price, and larger diversification. For the country left outside the integrated area, the welfare impact is ambiguous: the country enjoys better risk diversification but faces an adverse movement in its financial terms of trade. The authors also analyze how financial integration affects the localization and the relative importance of financial centers. Finally, they provide some empirical evidence on equity flows and international cross-listings which supports their modeling approach.

Attanasio and **Ríos-Rull** study how certain types of public compulsory insurance arrangements for aggregate shocks affect private allocations in environments with limited commitment. They show that this type of insurance can improve but also deteriorate the well-being of private situations. They also describe how different environmental characteristics affect the role of public insurance. Using data on the Mexican Progresa program, they document the impact that some government programs have in crowding out private transfers.

Acemoglu and **Shimer** analyze an economy in which there are both potential productivity gains and traditional costs—in terms of search effort—of unemployment insurance. They then analyze the impact of changing the generosity and the potential duration of unemployment insurance programs. Their results suggest that reducing unemployment benefits from the current U.S. levels would generate significant costs in terms of productivity, output, and welfare. Their results also suggest that the United States might gain from increasing the duration of its unemployment insurance programs so that they are closer to those of Europe.

Marimon and **Zilibotti** characterize an equilibrium in a deregulated economy in which large firms and individual workers freely negotiate wages and hours. They then consider the effects of legislation that restricts the maximum working time, while they let wages respond accordingly. In general, this regulation benefits workers, both unemployed and employed (even if wages decrease), but it reduces profits and output. In the authors' benchmark case, small reductions in working time always increase employment, while larger ever, the employment gains from reducing working time are relatively small.

The ability of the countries participating in the first wave of the European Monetary Union to implement an effective common monetary policy depends crucially on the ability of a group of previously autonomous national central banks to reach a consensus. **Cecchetti, McConnell,** and **Perez** explore this issue by estimating the objective function that each of the national central banks has been implicitly maximizing over the past 15 or so years. The authors' estimates allow them to infer the relative weight that national central banks have been placing on output and inflation variability in the formulation of their policies, and to estimate the slope of the inflation-output variability trade-off implicit in the economic structure of each of these countries. The results suggest that while the slopes of the variability trade-offs vary quite dramatically across countries, the objective functions are surprisingly similar. The authors estimate that most of the countries have weights in excess of three-quarters on inflation variability and less than one-quarter on output variability, with Belgium and France having the highest weights on inflation variability and Spain and Portugal the lowest.

Orphanides and **Wieland** study the optimal design of monetary policy. They calibrate their model based on parameters for the United States and the area where the Euro is used, examining the role of uncertainty, the structure of the model, and the relative preference toward economic stability in determining the width of the implied targeted inflation zone.

These papers and discussions will be published in a special edition of the *European Economic Review,* probably in June 2000. In advance of the publication of the journal, most of the papers will be available at "Books in Progress" on the NBER's Web site, **www.nber.org.**

NBER Conference in Beijing

The second annual NBER-CCER Conference, jointly sponsored by the National Bureau of Economic Research and the China Center for Economic Research at Peking University, took place in Beijing this past June. This was a two-part conference, the first part of which was a general discussion of economic topics and the second a special session on social security reform in China.

In the first session, Research Associate Andrei Shleifer of Harvard University discussed investor protection and corporate governance; David A.

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Alan B. Krueger
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Josef Lakonishok
Robert J. LaLonde
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†Robert Z. Lawrence
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M. Ishaq Nadiri
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David Neumark
Joseph P. Newhouse
William D. Nordhaus
Maurice Obstfeld
Ariel Pakes

*On leave for non-government service
†On leave for government service

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Stanley E. Zin
Luigi Zingales
Lynne Zucker

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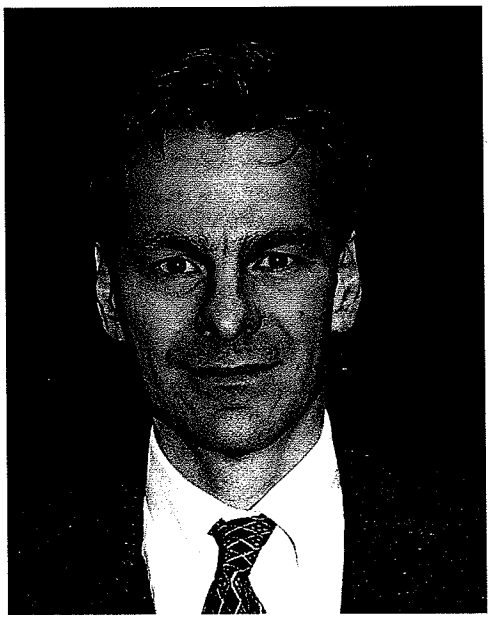
†On leave for government service

Cochrane is New Director of Asset Pricing Program

NBER Research Associate John H. Cochrane, an economics professor at the University of Chicago's Graduate School of Business, is the new director of the NBER's Program on Asset Pricing. The Asset Pricing Program examines the sources and nature of fluctuations in the prices of financial assets, including stocks, bonds, and foreign currency. As director, Cochrane succeeds John Y. Campbell of NBER and Harvard University, who has headed the Program since its creation in 1991.



NBER Summer Institute Marks Twentieth Anniversary

The summer of 1999 marked the twentieth anniversary of the NBER's Summer Institute. Nearly 1000 economists from universities and organizations throughout the world attended in 1999. By contrast in 1979, the first year of the NBER's Summer Institute, there were 65 participants, and only two topics were discussed: macroeconomic fluctuations and exchange rate policy.

This year's program was funded primarily by a grant from the Lynde and Harry Bradley Foundation, with additional support from the National Science Foundation and the National Institute on Aging. The papers presented at dozens of different sessions during the four-week summer institute covered a wide variety of topics. A list of all papers and work in progress can be obtained by writing to: Summer Institute Catalogue, NBER, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398. This list is also available on the NBER's web site at **nber.org/summer-institute.**

Rosen Will Lead AEA in 2001

NBER Research Associate Sherwin Rosen, also of the University of Chicago, has been nominated President-Elect of the American Economic Association (AEA). The AEA's election of officers was held on October 1; Rosen will serve for one year before becoming the organization's president. He was Vice President of the AEA in 1994, and was President of the Midwest Economic Association in 1996–7.

Rosen is a member of the NBER's Program on Labor Studies. He received his Ph.D. from the University of Chicago, where he has taught since 1977 and been the Edwin A. and Betty L. Bergman Distinguished Service Professor (of economics) since 1992. Prior to joining the University of Chicago's economics department, Rosen taught at the University of Rochester for a decade.

Ito Heads to Japanese Ministry of Finance

NBER Research Associate Takatoshi Ito, a member of the NBER's Program on International Finance and Macroeconomics since 1982, was recently appointed Deputy Vice Minister for International Affairs, Ministry of Finance, Japan. In this position, Ito will assist Vice Minister Yoshimi Kuroda on various international financial issues. He will be on leave from the NBER and from his teaching and research duties at Hitotsubashi University in Tokyo.

From August 1994 until March 1997, Ito was a Senior Advisor in the Research Department of the International Monetary Fund. He has also been the co-director, with Anne O. Krueger, of the NBER's East Asia Seminar on Economics, and is one of the directors of the NBER-TCER-CEPR Seminar on Japanese economic affairs.

Economic Fluctuations and Growth

The summer research meeting of the NBER's Program on Economic Fluctuations and Growth took place in Cambridge on July 17. Organizers Andrew B. Abel, NBER and the University of Pennsylvania, and John C. Haltiwanger, NBER and the University of Maryland, chose these papers for discussion:

Susanto Basu and **Miles S. Kimball,** NBER and University of Michigan, and **John Fernald,** Federal Reserve Board, "Are Technology Improvements Contractionary?"
Discussant: Russell Cooper, NBER and Boston University

Michael T. K. Horvath, Stanford University, "Business Cycles and the Failure of Marginal Firms"
Discussant: Valerie A. Ramey, NBER and University of California, San Diego

Eduardo M. R. A. Engel, NBER and Stanford University, and **James R. Hines,** NBER and University of Michigan, "Understanding Tax Evasion Dynamics" (NBER Working Paper No. 6903)
Discussant: Nicholas Souleles, University of Pennsylvania

Craig Burnside, Stanford University; **Martin Eichenbaum,** NBER and Northwestern University; and **Jonas D. M. Fisher,** Federal Reserve Bank of Chicago, "Assessing the Effects of Fiscal Shocks"
Discussant: Matthew D. Shapiro, NBER and University of Michigan

Fernando Alvarez, NBER University of Chicago; **Andrew Atkeson,** NBER and University of Minnesota; and **Patrick J. Kehoe,** Federal Reserve Bank of Minneapolis, "Volatile Exchange Rates and the Forward Premium Anomaly: A Segmented Asset Market View"
Discussant: Julio J. Rotemberg, NBER and Harvard University

Robert E. Hall, NBER and Stanford University, "The Stock Market and Capital Accumulation" (NBER Working Paper No. 7180)
Discussant: John H. Cochrane, NBER and University of Chicago

Basu and **Kimball** provide evidence that shocks that improve productivity actually lower output slightly and lower employment more substantially. This finding challenges explanations of booms and recessions based on technology shocks—these explanations generally predict a positive rather than a negative relation between productivity and output.

The key events of the business cycle appear to involve the closing of productive units. The sharp contraction that usually begins a recession is a time of rapid job destruction and rising unemployment. **Horvath** builds a complete model of the shutdown decision, emphasizing events that occur when uncertainty about future productivity is resolved.

Recent thinking about the differences between high- and low-income countries has emphasized the effectiveness of government. The ability to collect taxes to finance government activities is central to effective government. **Engel** and **Hines** show that tax enforcement is much more effective if, upon discovering tax evasion in a given year, tax officials examine the returns of the evader for earlier years. The authors present evidence that American taxpayers behave according to the assumption that the IRS uses this principle.

Burnside, Eichenbaum, and **Fisher** consider a fiscal shock that involves an increase in government purchases of goods and services—as in a military buildup—and a corresponding increase in tax rates. They show that, in the U.S. economy, such shocks result in increased work effort and decreased real wages, and that both these effects are persistent. These findings are puzzling within existing theoretical models, which imply that the volume of work effort declines when taxes are high and that this effect overcomes the other forces that would cause work effort to rise during buildups.

Alvarez, Atkeson, and **Kehoe** study the connection between money and exchange rates under the assumption that agents must pay a fixed cost to transfer money between the goods market and the asset market. In equilibrium, some agents choose to pay that cost and, at the margin, freely exchange bonds and money, while other agents choose not to pay that cost. Thus, the asset market is segmented; when the government injects money through an open-market operation, only a fraction of the agents in the economy are on the other side of the transaction. The authors identify three ways that market segmentation affects exchange rate behavior: 1) nominal and real exchange rates are volatile and persistent; 2) in moderate-inflation countries, real exchange rates have roughly the same volatility as nominal exchange rates, while in high-inflation countries real exchange rates are markedly less volatile than nominal exchange rates; 3) the forward premium is negatively correlated with subsequent changes in spot exchange rates.

If corporations install new plant, equipment, and intangible capital according to the principle of maximum value, then the value of their outstanding stocks and bonds mea-

sures the amount of that capital. Because we have no direct measures of intangible capital, this hypothesis provides a way to measure capital indirectly through securities markets. **Hall** applies this approach to data for all nonfinancial U.S. corporations. The results show two major events: a large loss in the capital stock around 1974, and a huge increase in the capital stock in the 1990s. So far, according to the data, the extra output from that enlarged stock has been plowed back into more capital formation, but the benefits of the capital could begin to show up in recorded output soon.

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Bureau Books

Frontiers in Health Policy Research, Volume 2

Frontiers in Health Policy Research, Volume 2, edited by Alan M. Garber who is an NBER Research Associate and Director of the NBER's Program on Health Care, is the second volume in an annual series that presents policy-relevant economic research on issues in health care and health policy. Each volume will contain approximately five papers from an annual conference held in Washington, D.C. Topics to be covered include the implications of health care policy provisions, health care organization and management, health outcomes, health care output and productivity, health-related behavior, health and aging, and health and children. The emphasis will be on less technical papers written primarily for a policy audience. In keeping with the NBER tradition, the papers will present analysis but will not advocate particular policies.

The contributors to Volume 2 include NBER researchers Laurence C. Baker, Alan M. Garber, Daniel Kessler, Thomas E. Macurdy, and Mark B. McClellan, Stanford University; David M. Cutler, Harvard University; and Frank A. Sloan, Duke University. Their topics are: 1) whether where you are admitted makes a difference in your care; 2) managed care and medical technology growth; 3) designing hospital antitrust policy; 4) medical care at the end of life; and, 5) the value of health and what affects it.

This volume should appeal not only to academic economists but to anyone interested in health care policy. Its price is $30.00 (cloth), or $15.00 (paperback). It may be ordered directly from the MIT Press at 5 Cambridge Center, Cambridge, MA 02142; or, by phone to (617) 253-2889; or, by email to mit–press-orders@mit.edu. The MIT Press also has a web site: **www.mitpress.mit.edu/journals.tcl.**

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International Capital Flows

International Capital Flows, edited by Martin S. Feldstein, is now available from the University of Chicago Press. This NBER Conference Report includes papers and discussions that took place at an NBER conference in the fall of 1997. It assembles the views of eminent scholars and practitioners on the experience of capital flows to Latin America, Asia, and Eastern Europe; the roles of banks, equity markets, and foreign direct investment in international capital flows; and the risks to investors and others. The book should interest academic economists, policymakers, and participants in financial markets.

Feldstein is President and CEO of the National Bureau of Economic Research and a Professor of Economics at Harvard University.

The price of the volume is $60 for the clothbound and $25 for the paperback version.

International and Interarea Comparisons of Income, Output, and Prices

International and Interarea Comparisons of Income, Output, and Prices, edited by Alan Heston and Robert E. Lipsey, is available this fall from the University of Chicago Press. This volume includes papers presented at an NBER Conference on Research in Income and Wealth. Two of the papers are theoretical discussions of how international comparisons have been made and should be made. There are descriptions of recent developments in the United Nations International Comparison Program, which is the basis for almost all international comparisons of real consumption and investment. One of these developments is the extension of price and income comparisons to the formerly planned economies of Central and Eastern Europe. Other papers describe international comparisons of output made from the production side and interspatial comparisons within countries. The latter group includes experimental comparisons of consumer prices and of labor compensation among locations within the United States.

Heston is Professor of Economics at the University of Pennsylvania. Lipsey is an NBER Research Associate in the areas of international studies and productivity, and Professor of Economics Emeritus at Queens College and the Graduate Center of the City University of New York.

The price of this volume is $80.00.

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