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Program Report

Asset Pricing

John Y. Campbell

The NBER established its Program in Asset Pricing in the fall of 1991. This program, together with those in monetary economics and corporate finance, grew out of the earlier financial markets and monetary economics program, and has close links with the Program in International Finance and Macroeconomics. Asset pricing is the study of markets for financial assets, including stocks, bonds, foreign currencies, and derivative securities, such as futures and options. It is a highly technical field of economics, but also one in which new ideas are applied rapidly by practitioners, who take a keen interest in academic research. NBER economists have been studying a variety of topics within the field, including general equilibrium asset pricing models, international financial integration, derivative securities, and some intriguing microeconomic puzzles about asset price behavior.

Asset Pricing in General Equilibrium

One fundamental insight of modern financial theory is that a "stochastic discount factor" exists that can be used to calculate the expected return and price of any asset, given information about the pattern of its cash flows. Without this factor, investors could make riskless profits through arbitrage operations. Different asset pricing models imply different stochastic discount factors, and some models include many stochastic discount factors that will price the assets that are traded. But any model that rules out arbitrage opportunities has at least one stochastic discount factor.

Several NBER economists have been trying to characterize the stochastic discount factor that prices the assets traded in today's world economy. John H. Cochrane and Lars P. Hansen have provided a useful general overview, showing that the stochastic discount factor must be highly volatile if it is to price U.S. equities and fixed-income securities.¹ This poses a problem, because the standard macroeconomic asset pricing model, which aggregates investors into a single "representative agent" who consumes aggregate consumption, implies that the stochastic discount factor is not very volatile when the representative agent has standard preferences and attitudes toward risk.

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One response to this problem is to explore different models of investors' preferences. Phillip A. Braun, George M. Constantinides, and Wayne E. Ferson have argued that past consumption may increase the marginal utility of today's consumption; this "habit-formation" effect greatly increases investors' risk aversion whenever consumption is close to the habit level determined by the recent past history of consumption.² Geert Bekaert, Robert J. Hodrick, and David A. Marshall have explored a model of "first-order risk aversion" in which investors are more concerned about small risks than they are in the standard model.³ Shlomo Benartzi and Richard H. Thaler have developed a heterodox psychological theory of investor behavior that implies that investors place more weight on the possibility of short-term losses than on the hope of short-term gains.⁴

Other NBER economists have argued that aggregate consumption does not adequately measure the risks borne by the investors who are active in asset markets. Cochrane has suggested that it might be better to relate asset prices to the production side of the economy rather than the consumption side, while I have developed a framework in which one can measure risks without using aggregate consumption data.⁵ The framework assumes that markets are complete so that investors can share their risks, but it is also possible that investors are more wary of risky assets because they bear uninsurable idiosyncratic risk. Philippe Weil, and John Heaton and Deborah Lucas have considered the consequences of uninsurable risk for asset pricing.⁶

It is fair to say that no consensus has been reached yet about the

right way to model the stochastic discount factor, but work in the NBER asset pricing program and elsewhere is yielding considerable insight into the problem.

International Financial Integration

One of the most important developments of the last few decades has been the integration of financial markets located in different countries. Twenty years ago it was common for financial economists to ignore foreign markets, but this practice is no longer defensible. K. C. Chan, G. Andrew Karolyi, and René M. Stulz, for example, have shown that the risk premium on a U.S. stock index is explained poorly by the variance of the stock index return (the traditional domestic measure of risk), but is explained much better by the covariance of the index with foreign stock markets.⁷ Bernard Dumas and Bruno Solnik have shown that the risk of exchange rate fluctuations is important in determining the expected returns on foreign currencies and equities.⁸

Kenneth A. Froot has demonstrated that there is a further link between currency fluctuations and stock market movements. In the short run, there is almost no correlation between exchange rate movements and local-currency returns on foreign stocks, but over several years this correlation becomes important. Froot concludes that investor horizons are important in determining the extent to which investors should hedge their foreign equity investments against currency fluctuations.⁹

In an integrated world financial market, it is natural to treat different countries' stock markets as potential investments, to be analyzed

in the same way as domestic stock portfolios. In joint work with Ferson, Campbell R. Harvey has explored the characteristics of developed-country stock markets from this perspective.¹⁰ Harvey recently has extended this work to study emerging stock markets.¹¹

Derivative Securities

An equally important transformation in the world of finance has been the growth of markets for options and other derivative securities. Because options prices are influenced importantly by the volatility of underlying security prices, options markets offer economists the opportunity to measure market expectations of future volatility. Several NBER economists have shown that implied volatilities from options markets are not optimal forecasts of future realized volatilities. Shang-Jin Wei and Jeffrey A. Frankel have argued that implied volatilities tend to vary more than rational forecasts of future volatility.¹² Jaesun Noh, Robert F. Engle, and Alex Kane have shown that one can earn profits in options markets by trading on differences between option-implied volatilities and forecast volatilities from an econometric model.¹³

Robert J. Shiller has argued that the development of new derivatives markets offers important benefits to society. In several papers and a forthcoming book, he advocates the establishment of futures markets for trading macroeconomic risks including the risks of fluctuations in house prices and components of national income.¹⁴

Some Puzzles

Scientific advances often result from efforts to resolve puzzling discrepancies between observed reality and the predictions of standard

theories. Asset pricing program members have illustrated this in several interesting papers. Zvi Bodie, Robert C. Merton, and William F. Samuelson have asked why investment advisers commonly recommend that older people should be more cautious in their investments than younger people. This advice conflicts with the standard theory, which ignores the fact that younger people can absorb risks by varying their labor supply (for example, by retiring later if their investments do poorly). Bodie, Merton, and Samuelson show that conventional investment advice can be justified if the standard theory is augmented to allow for labor supply flexibility.¹⁵

Jeremy C. Stein has asked why trading activity in the housing market tends to be more intense in rising markets than in falling markets. He points out that the significant downpayments needed to buy houses make buyer liquidity an important determinant of demand. He develops a model in which falling house prices reduce the ability of homeowners to make downpayments on new homes; this reduces transactions volume in housing markets.¹⁶

David H. Romer has asked why asset prices sometimes change dramatically in the apparent absence of any important news. He suggests that trading itself may be a source of news. He constructs a model in which each investor thinks that other investors may have good news that can justify a high price. A small downward move in the asset price then may disabuse each investor and lead to a large price decline. Romer offers this as a stylized explanation for the October 1987 market break and other similar episodes.¹⁷

Other Activities

This report has emphasized the basic research being done by members of the asset pricing program. The NBER also seeks to identify intellectually challenging questions of practical importance and to encourage work that will

answer them. Members of the asset pricing program have taken part in two meetings with these objectives: a February 1993 roundtable discussion with regulators and practitioners on the regulation of derivative securities, and a January 1994 conference, organized by Andrew W. Lo and sponsored jointly by the

NBER and the New York Stock Exchange, on "The Industrial Organization of the Securities Industry." There is no shortage of relevant questions in asset pricing, and the asset pricing program will continue to sponsor meetings and research to address them.

¹J. H. Cochrane and L. P. Hansen, "Asset Pricing Explorations for Macroeconomics," in NBER Macroeconomics Annual 1992, O. J. Blanchard and S. Fischer, eds. Cambridge: MIT Press, 1992, pp. 115-169. See also S. G. Cecchetti, P. Lam, and N. Mark, "Testing Volatility Restrictions on Intertemporal Marginal Rates of Substitution Implied by Euler Equations and Asset Returns," forthcoming in *Journal of Finance*.

²P. A. Braun, G. M. Constantinides, and W. E. Ferson, "Time Nonseparability in Aggregate Consumption: International Evidence," NBER Working Paper No. 4104, June 1992.

³G. Bekaert, R. J. Hodrick, and D. A. Marshall, "The Implications of First-Order Risk Aversion for Asset Market Risk Premiums," NBER Working Paper No. 4624, January 1994.

⁴S. Benartzi and R. H. Thaler, "Myopic Loss Aversion and the Equity Premium Puzzle," NBER Working Paper No. 4369, May 1993.

⁵J. H. Cochrane, "A Cross-Sectional Test of a Production-Based Asset Pricing Model," NBER Working Paper No. 4025, March 1992; J. Y. Campbell, "Intertemporal Asset Pricing Without Consumption Data," *American Economic Review* 83 (June 1993), pp. 487-512, and "Understanding Risk and Return," NBER Working Paper No. 4554, November 1993.

⁶P. Weil, "Equilibrium Asset Prices with Undiversifiable Labor Income Risk," NBER Working Paper No. 3975, January 1992; J. Heaton and D. Lucas, "Evaluating the Effects of Incomplete

Markets on Risk Sharing and Asset Pricing," NBER Working Paper No. 4249, January 1993.

⁷K. C. Chan, G. A. Karolyi, and R. M. Stulz, "Global Financial Markets and the Risk Premium on U.S. Equity," NBER Working Paper No. 4074, May 1992.

⁸B. Dumas and B. Solnik, "The World Price of Foreign Exchange Risk," NBER Working Paper No. 4459, September 1993. A useful review of this topic is R. M. Stulz, "International Portfolio Choice and Asset Pricing: An Integrative Survey," NBER Working Paper No. 4645, February 1994.

⁹K. A. Froot, "Currency Hedging Over Long Horizons," NBER Working Paper No. 4355, May 1993.

¹⁰W. E. Ferson and C. R. Harvey, "An Exploratory Investigation of the Fundamental Determinants of National Equity Market Returns," NBER Working Paper No. 4595, December 1993, and "Sources of Risk and Expected Returns in Global Equity Markets," NBER Working Paper No. 4622, January 1994.

¹¹C. R. Harvey, "Predictable Risk and Returns in Emerging Markets," NBER Working Paper No. 4621, January 1994, and "Conditional Asset Allocation in Emerging Markets," NBER Working Paper No. 4623, January 1994.

¹²S.-J. Wei and J. A. Frankel, "Are Option-Implied Forecasts of Exchange Rate Volatility Excessively Variable?" NBER Working Paper No. 3910, November 1991.

¹³J. Nob, R. F. Engle, and A. Kane, "A Test of Efficiency for the S&P 500 Index

Option Market Using Variance Forecasts," NBER Working Paper No. 4520, November 1993. See also D. S. Bates, "Jumps and Stochastic Volatility: Exchange Rate Processes Implicit in PHLX Deutschmark Options," NBER Working Paper No. 4596, December 1993.

¹⁴R. J. Shiller, "Measuring Asset Values for Cash Settlement in Derivative Markets: Hedonic Repeated Measures Indices and Perpetual Futures," *Journal of Finance* 48 (July 1993), pp. 911-931, "Aggregate Income Risks and Hedging Mechanisms," NBER Working Paper No. 4396, July 1993, and in *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*, Oxford: Oxford University Press, 1994.

¹⁵Z. Bodie, W. F. Samuelson, and R. C. Merton, "Labor Supply Flexibility and Portfolio Choice in a Life-Cycle Model," NBER Working Paper No. 3954, January 1992.

¹⁶J. C. Stein, "Prices and Trading Volume in the Housing Market: A Model with Downpayment Effects," NBER Working Paper No. 4373, May 1993.

¹⁷D. H. Romer, "Rational Asset-Price Movements Without News," *American Economic Review* 83 (December 1993), pp. 1112-1130.



Research Summaries

Economic Reform and Modernization in Latin America

Sebastian Edwards

Latin America entered the era following World War II with great optimism. International reserves were at record levels, an incipient manufacturing sector was beginning to develop vigorously, and there was an almost unlimited faith in the ability of government policies to secure growth and cure social ills. The creation of the Bretton Woods institutions generated expectations of a stable international economic environment, free of the financial and payments crises that had afflicted the region for many decades. Starting in the mid-1940s, most Latin American countries followed a development strategy based on a high degree of protectionism, government-led industrialization, and a broad involvement of the state in economic activities. For some time, it seemed that this approach was working, and that early promises of growth and prosperity would materialize, allowing the Latin American countries to gradually move into the ranks of the more advanced nations.¹

Between 1950 and 1980, Latin America grew at an annual average rate of almost 6 percent per annum, significantly faster than the industrial nations, and only marginally slower than the East Asian countries.² However, a number of disturbing developments seriously and steadily undermined the long-term sustainability of the regional strategy. First, excessive protectionism and generalized government controls encouraged rent-seeking activities, and created a very rigid

economic structure. Second, in many countries the combination of increasing burdens on public sector budgets and inefficient tax systems, and the government's reduced ability to provide social services efficiently, generated an increasing degree of inequality.³ Third, as a result of weak structures of public finance, more and more countries were forced to rely on inflationary financing as a way to bridge government expenditures and revenues. And fourth, as a consequence of the inward-looking strategy, exports were greatly discouraged, barely growing between 1960 and 1980.

After the first oil shock of 1973, the mode of development followed by Latin America became increasingly unsustainable. The aggregate current account deficit for Latin America and the Caribbean more than doubled between 1972 and 1982, rising from 2.2 percent to 5.5 percent of GDP. Moreover, the region's foreign debt/GDP ratio increased from 0.20 in 1975 to 0.46 in 1982.⁴

The debt crisis unleashed in 1982, and the failure of policies put in place in some countries to deal with it—the Austral Plan in Argentina, the Cruzado Plan in Brazil, and the APRA Plan in Peru—played an important role in reshaping policy views in Latin America.⁵ It became increasingly apparent that the high degree of reliance on the state to run the economy had not produced the expected results. Instead of *protecting* the public from major external shocks, the overexpanded state had greatly weakened the

ability of these economies to react to foreign disturbances. Politicians and policymakers began to sense—slowly at first, and then at an increasing speed—that the inward-oriented policies followed by the majority of the region were no longer sustainable. As the 1980s unfolded, economists dealing with Latin America with increasing insistence recommended a shift in the region's development strategy toward market-based policies. At the end of the 1980s, a growing number of political leaders began to adopt a new vision of economic policy based on market forces, international competition, and a greatly reduced role for the state in economic affairs. After 1989, there was an intensification and generalization of this reform process, with more and more countries opening to international trade and embarking on ambitious privatization programs. In the early 1990s, policymakers in an increasing number of countries began to supplement the modernization reforms with social programs focused on the reduction of inequality and the eradication of poverty.

Latin America's experience with adjustment and market-oriented reforms during 1982–92 has been fascinating, and has generated successes as well as failures. In many cases, the reforms are too recent to draw firm conclusions on their outcomes, but in others there is already enough evidence to provide at least an initial evaluation.⁶

I. The Debt Crisis and the Muddling-Through Period: 1982–7

The debt crisis erupted rather unexpectedly in August of 1982.⁷ Initially most analysts, including those in the multilateral institutions, argued that Latin America was fac-

ing a mere *liquidity* problem. The early years of the crisis were characterized by an *emergency* adjustment process in which countries had to improvise in an effort to rapidly generate massive resource transfers to the advanced world. During this early period, a number of countries—Argentina, Brazil, and Peru—experimented with heterodox plans that ignored the need for fiscal discipline, as a way of reducing inflation. These programs were the last massive adjustment effort based on the traditional Latin American structuralist approach to economic development. Their rapid failure ignited a deep soul-searching process among political leaders and intellectuals in the region.⁸

Since 1987–8, there has been remarkable transformation in economic thinking in Latin America. Protectionism and interventionist views have given way to openness, market orientation, and competition. There have been four main causes behind this doctrinal transformation: first, the realization that the traditional government-led development policies had failed to create a modern economic system; second, the example of the countries of East Asia, with their extremely high rates of growth; third, the fall of the nations of East Europe, and the realization that socialism had led to generalized failure and frustration; and fourth, the policies of the multilateral institutions—especially the International Monetary Fund and the World Bank—that conditioned their funds to the implementation of major reforms.⁹

This change in economic thinking resulted in a new *Latin American Consensus* that has driven the region's reforms.¹⁰ This new consensual view has come to be shared by most policymakers and analysts in the region, and is based

on four main components. First, there is a recognition that achieving macroeconomic stability is a fundamental prerequisite for achieving sustainable growth with equity. Second, the Latin economies have gone through a massive and largely unilateral process of trade liberalization. This opening process has been aimed at transforming the export sector into the region's "engine of growth." Third, a massive privatization and deregulation process aimed at increasing the role of markets, and competition in the development process, has been undertaken. The fourth component of the Latin American reforms is more recent, and deals with the social sectors and antipov-erty programs. Increasingly, policymakers and political leaders in the Latin American countries have come to the agreement that in order to consolidate the reforms, making them a durable part of the region's economic landscape, poverty and inequality have to be addressed in an effective way. To this end, new programs targeted to the poorest sectors of society are being devised in a large number of countries.¹¹

II. An Era of Reform: 1988–93

Even though it is difficult to date exactly the beginning of the reforms in each particular country, it is possible to argue that they acquired full and generalized force only in the late 1980s and early 1990s, after the attempts to use traditional structuralist policies to solve the crisis had failed. At the time the reforms were initiated, the countries in the region experienced very different initial conditions. Some faced very rapid inflation and highly distorted incentive systems; others started from a situation of relatively mild inflation and

moderate distortions. The initial conditions also varied in terms of the economic role of the state, including the importance of state-owned enterprises.

Although the intensity and scope of the reforms have differed across countries, it is possible to classify them into four broad groups according to the approximate time of initiation of the reforms: early reformers, recent reformers, very recent reformers, and future reformers. Generally speaking, early reformers are further along in the transformation, having made progress in many areas. Chile represents a case of its own, having initiated the reforms in 1975, almost a decade before anyone else.¹² Mexico initiated the reforms in 1985 and also has moved broadly and deeply; it has built new institutions that have helped consolidate the new economic system. The recent and very recent reformers vary in the intensity and scope of reforms. Some countries, such as Argentina, have rapidly and simultaneously dealt with many sectors; others have moved selectively on structural reforms, or have been unable to enact credible macroeconomic programs.

In almost every country, the early post-debt crisis years (1982–7) resulted in severe declines in GDP per capita. After 1987, GDP per capita began to recover in many of them. Interestingly enough, growth has shown a stronger trend among advanced reformers than among those countries that delayed the adjustment process.¹³ With a few exceptions, most Latin countries experienced respectable to strong growth in 1992–3.

Macroeconomic stabilization, including the reduction of the debt burden, has been at the center of the reform process. The recognition

by the advanced nations that the crisis was more than a liquidity crunch was a fundamental step in the stabilization process. In general, volunteer debt reduction agreements—the so-called Brady deals—have been undertaken after the country in question has made significant progress in reducing fiscal imbalances, curbing inflation, and achieving macroeconomic stability.¹⁴

Some questions of sequencing and speed were addressed when policymakers designed stabilization programs: for example, should macro adjustment precede the structural reforms, or can both types of policy be undertaken simultaneously? And, should gradual stabilization be attempted, or are abrupt policies more appropriate?¹⁵ In a number of countries, fixed nominal exchange rates have been used as anchors in the anti-inflationary effort. However, this has been a controversial policy. While a number of authors argued that fixing the exchange rate provided credibility to the stabilization programs, others pointed out that fixed rates contributed to real exchange rate overvaluation during the transition toward low inflation, undermining the sustainability of the stabilization effort.¹⁶

Trade liberalization has been at the core of the structural reforms. Import tariffs have been reduced from an average of approximately 70 percent to around 12 percent, and nontariff barriers have almost been eliminated throughout the region in a very short time. As a result, the Latin countries have experienced rapid productivity improvements and significant expansion in exports. Recently, this unilateral opening process has been supplemented by efforts toward the creation, or revitalization, of regional trading blocs—MERCOSUR, the

Andean Pact, the Central American Common Market, and CARICOM.¹⁷ Also, most countries in the region have expressed interest in joining NAFTA.¹⁸ A competitive real exchange rate—and, in particular, the avoidance of overvaluation—has played a key role in determining the success of trade reform attempts. The pressure that massive capital flows have exercised recently on real exchange rates throughout the region has been the cause of some concern among policy analysts, though.¹⁹

One of the salient features of the recent Latin reforms, and one that distinguishes them from past efforts at stabilizing and reducing the extent of distortions, is the emphasis on reducing the size of the state through massive privatization. In many countries, the privatization process has been linked to debt reduction schemes based on debt-equity swaps. As a result of this, foreign firms have played an important role in reshaping Latin America's manufacturing and financial sectors. This development constitutes a marked change from a traditional history of mistrust of foreign firms. Although the privatization process has taken different forms in different countries, it has created thousands of new share owners. Latin American policymakers have discovered that, in many cases, a modern regulatory framework is a requirement for the efficient functioning of the newly privatized sector. However, progress in this area has been uneven throughout the region.²⁰ One area in which very little improvement has occurred is labor market deregulation. In most countries, labor market duality continues to exist, and labor distortions negatively affect welfare and international competitiveness.²¹

For years, the majority of the Latin American countries strictly controlled capital markets, quantitatively allocating credit and keeping interest rates below ongoing rates of inflation.²² The deregulation of the financial sector has been an important component of most reforms. Interest rates have been freed, and the creation of new financial institutions has been encouraged. Some important policy debates in this area have dealt with the optimal timing of financial reform, the role of capital market supervision, and the opening of the capital account. In spite of the reforms of capital markets in the region, investment and savings remain low in most countries. Explaining the behavior of private savings is rapidly becoming one of the most pressing analytical issues in Latin America.

Latin America has a long tradition of poverty and inequality. Moreover, many aspects of human development have deteriorated since the eruption of the debt crisis. Now there is a general recognition in the region that economic growth and education are the main *long-run* determinants of reduced poverty. However, it takes these two channels a long time to actually change human conditions. As a result of this, many governments (and the multilateral institutions) have decided to implement programs aimed at directly and rapidly dealing with poverty and inequality. The new approach being followed in most countries contrasts acutely with traditional practices. Instead of providing "blanket" subsidies through price controls and other distortions, an effort now is being made to *directly target* subsidies to the most vulnerable segments of society.²³ It has been argued that in order to avoid a return

to populist practices, it is necessary to tackle social problems in an effective way, and to develop new institutional settings that assure stability and protect the economy from short-term and myopic political impulses. A number of authors have pointed out that this type of reform will not only help maintain the path toward growth and prosperity, but also is likely to strengthen the region's nascent democracies.²⁴

III. The Future of the Latin American Economic Reforms

In spite of marked progress, a decade after the debt crisis, the reform process is far from over in Latin America; a number of problems still persist. Physical infra-

structure has deteriorated severely, and in many countries the extent of poverty has increased. Despite some spectacular progress, inflation continues to be high. In some countries, the economic reforms have not been accompanied by institutional modernization. Additionally, large capital inflows in many countries recently have financed increasingly large current account deficits, and have generated sizable pressures toward real exchange rate appreciation. Policy reversals have been common in Latin America's history, and have often resulted in frustration and skepticism. The consolidation of the reforms appears to be the most fundamental challenge that the Latin American countries will face in the years to come.

geneous Costa Rica. However, in spite of the obvious individual features of each country or region, it is still possible (and useful) to analyze the recent Latin reforms from a broad and general perspective. This approach allows the extraction of general lessons that I hope will be valuable to other areas engaged in reform efforts. A second difficulty in attempting to discuss the evolution of the region as a whole refers to the low quality of much of the available data. This forces us to be cautious and, at times, to offer only preliminary conclusions.

⁷S. Edwards, "The Pricing of Bank Loans and Bonds in International Financial Markets," *European Economic Review* (June 1986), pp. 565-589, discusses the extent to which the international financial market anticipated the debt crisis. See also S. Edwards, "LDC's Foreign Borrowing and Default Risk: An Empirical Investigation," *American Economic Review* (September 1984), pp. 726-734.

⁸For a detailed discussion of the muddling-through years, see S. Edwards, "Structural Adjustment in Highly Indebted Countries," in *Developing Country Debt and Economic Performance*, Volume 1: *The International Financial System*, J. D. Sachs, ed. Chicago: University of Chicago Press, 1988. Starting in 1988 the NBER has organized an annual conference—the InterAmerican Seminar on Economics, IASE—in Latin America to discuss issues related to economic development. The early meetings of the seminar, held in Mexico City, Bogota, Rio de Janeiro, and Santiago, dealt extensively with the debt crisis. Selected papers from these conferences are published in special issues of the *Journal of Development Economics* and *El Trimestre Económico*, edited by the conference directors, E. Bacha and myself.

⁹For an evaluation of the early relationship between the IMF and the developing countries, see S. Edwards and J. Santaella, "Devaluation Controversies in Developing Countries: Lessons from the Bretton Woods Era," in *A Retrospective on the Bretton Woods System*, M. Bordo and B. Eichengreen, eds. Chicago: University of Chicago Press, 1992. For critical evaluations of the IMF role in the initial years of the debt crisis, see S. Edwards, "The International Monetary Fund and the Developing Countries: A Critical Evaluation," in *Carnegie-*

¹For a brief discussion of the early development strategy in Latin America, see, for example, S. Edwards, "The United States and Foreign Competition in Latin America," in *The Changing Role of the United States in the World Economy*, M. Feldstein, ed. Chicago: University of Chicago Press, 1988. See also *From Despair to Hope: Crisis and Reform in Latin America*, S. Edwards, ed., forthcoming from Oxford University Press.

²Of course, performance varied significantly across countries. Brazil and Mexico grew particularly fast, while Chile tended to lag behind.

³See the discussion in S. Edwards, *From Despair to Hope: Crisis and Reform in Latin America*. See also E. Cardoso, R. Paes de Barros, and A. Urani, "Inflation and Unemployment as Determinants of Inequality in Brazil: The 1980s," in *Stabilization, Economic Reform, and Growth*, R. Dornbusch and S. Edwards, eds. Chicago: University of Chicago Press, forthcoming.

⁴The policies followed by Latin America since World War II contrasted sharply with those adopted by a group of countries in East Asia—Korea, Singapore, and Hong Kong, among others—since the mid-1960s. While the majority of the Latin American governments encouraged inward-looking growth and

underestimated the importance of macroeconomic stability, the East Asian countries implemented policies that vigorously encouraged exports and preserved macroeconomic equilibriums. Additionally, domestic savings in East Asia increased to a point where the need to rely on foreign borrowing was significantly reduced. The essays in *Developing Country Debt and Economic Performance*, Volumes 1, 2, 3, J. D. Sachs et al., eds., Chicago: University of Chicago Press, 1988-90, contain contrasting analyses of the development strategies followed by Latin American, Asian, and Middle Eastern countries.

⁵R. Dornbusch and S. Edwards, "Macroeconomics Populism," *Journal of Development Economics* 32 (1990), pp. 247-277, deals with the APRA plan in the context of populist policies. See also the essays in *The Macroeconomics of Populism in Latin America*, R. Dornbusch and S. Edwards, eds. Chicago: University of Chicago Press, 1991.

⁶One of the greatest difficulties in addressing the economic problems of Latin America is that this is a very diverse region, with countries that have as many differences as similarities. For example, Brazil, with 150 million people and great regional disparities in income and development, contrasts sharply with small and relatively homo-

Rochester Series on Public Policy 31 (Fall 1989). On the initial evolution of Latin American thinking in the post-crisis period, see S. Edwards, "The Debt Crisis and Economic Adjustment in Latin America," *Latin American Economic Review* 24, 3 (1989).

¹⁰Some analysts have referred to this process as the "Washington Consensus," and have suggested that the new policies were imposed on Latin America by the U.S. Treasury, the IMF, and the World Bank. This interpretation is overly U.S.-centrist and clearly misses the internal Latin American political dynamics.

¹¹On the social consequences of structural reforms and labor market behavior under adjustment measures, see S. Edwards, "Economic Reform, Labor Markets, and the Social Sectors: A Latin American Perspective," Working Paper, Institute for Policy Reform, October 1993.

¹²On the Chilean reforms, see, for example, S. Edwards and A. C. Edwards, *Monetarism and Liberalization: The Chilean Experiment*, Chicago: University of Chicago Press, 1991; and "Markets and Democracy: Lessons from Chile," *The World Economy* 15 (1992).

¹³It is important to notice, however, that in spite of recent growth, only 13 countries in the region had income per capita by 1991 that exceeded that of 1980: Colombia, Chile, Paraguay, Bahamas, Barbados, Belize, Jamaica, Antigua, Dominica, St. Kitts and Nevis, St. Vincent and Grenadines, and St. Lucia.

¹⁴The recently approved Brazilian deal is a departure from this norm. For a detailed description of the evolution of the debt problem, see Chapter 4 of S. Edwards, *From Despair to Hope*, op. cit. On the use of market-based mechanisms to reduce the debt burden, see, for instance, S. Edwards, "Capital Flows, Foreign Direct Investment, and Debt-Equity Swaps in Developing Countries," in *Capital Flows in the World Economy*, H. Siebert, ed. Tübingen, Germany: J. C. B. Mohr, 1991.

¹⁵On the sequencing issue, see, for example, S. Edwards, "The Sequencing of Economic Reform: Analytical Issues and Lessons from Latin America," *The World Economy* 13 (1990); "Sequencing and Welfare: Labor Markets and Agriculture," in *Open Economies: Structural Adjustment and Agriculture*,

I. Goldin and L. A. Winters, eds. Cambridge University Press, 1992; and "The Sequencing of Structural Adjustment and Stabilization," Occasional Paper 34, International Center for Economic Growth, 1992. On the debate over the opening of the capital account, see the papers collected in *Capital Controls, Exchange Rates, and Monetary Policy in the World Economy*, S. Edwards, ed., forthcoming from Cambridge University Press.

¹⁶On this debate, see, for example, S. Edwards, "Exchange Rates as Nominal Anchors," *Weltwirtschaftliches Archiv* 129 (1993); "Exchange Rates, Inflation, and Disinflation: Latin American Experiences," NBER Working Paper No. 4320, April 1993; and M. Bruno, "High Inflation and Nominal Anchors of an Open Economy," Princeton Essays in International Finance (1991). See also S. Edwards and F. J. Losada, "Fixed Exchange Rates, Inflation, and Macroeconomic Discipline," NBER Working Paper No. 4661, February 1994. A number of recent analyses have related inflation, and the fate of stabilization policies, to political economy developments. See, for example, A. Cukierman, S. Edwards, and G. Tabellini, "Seigniorage and Political Instability," *American Economic Review* 82 (1992); S. Edwards and G. Tabellini, "Explaining Inflation and Fiscal Deficits in Developing Countries," *Journal of International Money and Finance* 10 (1991); and S. Edwards, "The Political Economy of Inflation and Stabilization in Developing Countries," *Economic Development and Cultural Change* (1994).

¹⁷On Latin America's historical integration efforts, see S. Edwards and M. A. Savastano, "Latin American Economic Integration: Evolution and Future Prospects," in *Regional Economic Integration and Trading Arrangements*, D. Greenaway, ed. New York: New York University Press, 1989, and S. Edwards, "Economic Integration in Latin America: New Perspectives on an Old Dream," *The World Economy* (1993).

¹⁸On trade reform and economic performance, see, for example, S. Edwards, "Trade Orientation, Distortions, and Growth in Developing Countries," *Journal of Development Economics* 39 (1992); "Openness, Trade Liberalization, and Growth in Developing Countries," *Journal of Economic Literature*

(September 1993); "Trade Policy, Exchange Rates, and Growth," NBER Working Paper No. 4511, October 1993; and "Trade Liberalization Reform in Latin America," *Journal of North American Trade* (Spring 1993).

¹⁹On real exchange rate overvaluation, see, for example, S. Edwards, *Exchange Rate Misalignment in Developing Countries*, Baltimore: Johns Hopkins University Press, 1988; *Real Exchange Rates, Devaluation, and Adjustment*, Cambridge: MIT Press, 1989; "Exchange Controls, Devaluations, and Real Exchange Rates: The Latin American Experience," *Economic Development and Cultural Change* (1989). On capital inflows and real exchange rates, see S. Edwards, "Tariffs, Capital Controls, and Equilibrium Real Exchange Rates," *Canadian Journal of Economics* (1989); and "Current and Capital Account Liberalization and Real Exchange Rates in Developing Countries" in *Exchange Rate Policies in Developing and Post Socialist Countries*, E. M. Claassen, ed. ICS Press, 1991.

²⁰See, for example, Chapter 6 of S. Edwards, *From Despair to Hope*, op. cit.

²¹For an analytical discussion of some of these issues, see S. Edwards, "Terms of Trade, Tariffs, and Labor Adjustment in Developing Countries," *World Bank Economic Review* (1988), and S. Edwards and A. C. Edwards, "Labor Market Distortions and Structural Adjustment in Developing Countries," NBER Working Paper No. 3346, May 1990.

²²R. McKinnon, *The Order of Economic Liberalization*, Baltimore: Johns Hopkins University Press, 1991, documents that the ratio of loanable funds to GDP in Latin America was significantly lower than that of Asia during 1960-85. See also S. Edwards, "Financial Liberalization Policies in a Multisector Framework," in *Development Strategies for the 21st Century*, T. Yamasaki, T. Mori, and H. Yamaguchi, eds. Tokyo: Institute of Developing Economies, 1992.

²³See Chapter 8 of S. Edwards, *From Despair to Hope*, op. cit.

²⁴On these issues, see, for example, the detailed discussion in Chapter 8 of S. Edwards, *From Despair to Hope*, op. cit. See also the papers in R. Dornbusch and S. Edwards, *Stabilization, Adjustment, and Growth*, op. cit.

The Role of Corporate Taxes in an Open Economy

Roger H. Gordon

The economic effects of corporate taxes, and their role in the tax structure, has been a major focus of research in public finance for many years. Until recently, however, almost all of this work has assumed that the economy is closed. Thus, the conventional view would be that the personal tax law treats savings invested in corporate equity more favorably than income from most other assets, because taxes on accruing capital gains are deferred and gains still unrealized at death are exempt from tax. The corporate tax then helps to offset this distortion to the allocation of savings by adding a supplementary tax on corporate equity. To the extent that the effective tax rate on corporate equity exceeds the rate applied to other forms of savings, capital will shift from the corporate to the noncorporate sector,¹ and corporations will have an incentive to use debt finance in order to reduce their taxable income.² The presumption since Harberger,³ however, has been that the main effect of the corporate tax is to raise the effective tax rate on savings, and that the burden of the tax falls primarily on capital owners.

During the last few years, much of my research has studied how past conclusions about the role of corporate taxes change once we take into account the fact that economies are open. While taxes on savings and investment are equivalent in a closed economy, they are completely different in a small open economy. If a small open economy uses a corporate income tax, the burden of the tax must fall on immobile factors, pre-

sumably workers and landowners. The corporate tax has no effect on the net return earned on savings, since capital owners always have the option to invest elsewhere, so they can easily escape the tax. I show that taxes on labor income and land dominate corporate taxes in a small open economy, even from the perspective of workers and landowners: under either type of tax, immobile factors bear the burden of the tax, but with labor and land taxes there are no distortions discouraging capital imports.⁴

In spite of this theory, however, essentially all developed countries have significant corporate taxes and have had them for many years. What explains this sharp contrast between theory and practice?

In a paper with Hal Varian,⁵ I examine optimal taxes in *large* open economies. Large countries certainly would want to take advantage of their market power in world capital markets. Capital-importing countries can impose a corporate tax to discourage capital imports, while offsetting this tax for domestic residents by subsidizing domestic savings. In contrast, large capital-exporting countries would want to reduce their capital exports, so they would want to subsidize domestic investment and tax domestic savings. But this forecast, that only large capital-importing countries would impose positive corporate tax rates, is certainly not consistent with the evidence.

Feldstein and Horioka report that net capital flows across countries are surprisingly small;⁶ others show that even gross capital flows are dramatically smaller than would be forecast by existing mod-

els of optimal portfolio choice.⁷ In a paper with A. Lans Bovenberg,⁸ I explore possible explanations for both sets of observations, and their implications for tax policy. We find that the only explanation for both observations is asymmetric information between countries. If investors are not well informed when investing abroad, they should do less well on average than local investors, either because they end up being overcharged for securities by local owners or because they invest real resources less well. In fact, Grubert, Goodspeed, and Swenson find that foreign subsidiaries in the United States report dramatically lower rates of return than domestic U.S. firms do, even after controlling for industry, age, and other such factors.⁹

Even though asymmetric information explains the observed immobility of capital, corporate taxes do not make sense. When asymmetric information is taken into account, capital-importing countries should subsidize foreigners to buy domestic securities: because of the "lemons" problem, too few sales occur, and the capital-importing country as a whole would gain by increasing foreign acquisitions of domestic firms. But this does not happen. While the loss of proprietary information to a foreign acquirer may impose enough extra costs on a country to discourage it from subsidizing foreign acquisitions, the theory is still incapable of explaining observed corporate tax policies.

The theories argue that each country, acting alone, would not want to tax capital income. But if countries cooperate, then they might choose jointly to impose corporate taxes. Unlike the case of tariff policy, however, there have been no documented cases of

countries agreeing on a common corporate tax policy, or even intervening to enforce some implicit agreement. However, I explore whether cooperation might occur without explicit (or even implicit) agreements.¹⁰

A number of countries, including the United States, Japan, and the United Kingdom, grant domestic residents a credit against domestic taxes due on foreign source income for any foreign taxes already paid on this income. Capital-importing countries then can tax investors from countries granting such credits (at rates up to the tax rates prevailing in these other countries) at no cost to the investors. Thus, they would certainly want to do so. Given this response of capital-importing countries, capital-exporting countries as a group could gain by jointly imposing a corporate tax. To prevent capital from simply shifting abroad, they then use crediting provisions to induce other countries to impose a tax at the same rate. When the United States was the dominant capital exporter, there was no need for cooperation among exporters. But there is no evidence of such cooperation among the sizable number of countries that are now important capital exporters.

Perhaps corporate taxes survive in an open economy because they are serving an entirely different role in the tax system. In a paper with Joel B. Slemrod,¹¹ I try to assess to what degree corporate taxes simply tax the competitive return to corporate capital. We calculate what corporate tax liabilities would be under a cash-flow tax. If corporate income simply equaled the competitive return earned by corporate capital, then a cash-flow tax would collect nothing (in present value). Shifting to a cash-flow

tax involves expensing undepreciated capital and new investment, resulting in a reduction in tax liabilities. However, under such a tax, interest deductions also would be eliminated. On net, the latter effect is larger in present value, so that a cash-flow tax collects *more* revenue than the existing tax.¹² Taken literally, this result implies that more than all of the existing tax base consists of something other than the competitive return to capital invested in the corporate sector.

This suggests that the corporate tax is not primarily a tax on the competitive return to corporate capital. But then what is being taxed by the corporate tax, and what economic implications does the tax have as a result? One possible explanation that I have explored with Jeffrey K. MacKie-Mason is that entrepreneurs easily can retain their earnings within their firms rather than pay them out as salary or bonuses.¹³ This retained income ends up being taxed as corporate profits (and unrealized capital gains on corporate equity), rather than as personal income. If entrepreneurs eventually bequeath the shares in the firm to their heirs, then the income is entirely free from personal taxes. This strategy of leaving money within the firm is advantageous for tax reasons whenever the corporate tax rate is less than the personal tax rate. The optimal policy response in a closed economy, given this possibility of shifting reported income between the corporate and the personal tax bases, is to impose a cash-flow tax on corporate income at the same rate that applies to labor income under the personal income tax. The corporate tax then serves as a backstop to the personal tax on labor income.

In an open economy, additional complications arise, in spite of the

lack of labor mobility. Firms can use transfer pricing to shift profits elsewhere when domestic tax rates are high. Domestic entrepreneurs can set up firms abroad, rather than at home, to escape domestic taxes. In response, the theory forecasts that the optimal corporate tax rate will be somewhat below the top personal tax rate, in order to lessen the use of transfer pricing. Also, taxes will be imposed on foreign earnings, for example when they are repatriated. However, the corporate tax still is needed as a backstop to personal taxes on labor income, even in an open economy. This rationale for the corporate tax is therefore much more consistent with observed tax policy.

If the threat of income shifting is so important, then there should be some clear evidence of it in response to recent changes in corporate relative to personal tax rates in the United States. In exploring this question, MacKie-Mason and I began by studying the degree to which U.S. firms have shifted between corporate and noncorporate status in response to tax differences.¹⁴ We find that firm choices do seem to respond as expected to tax incentives. For example, there has been a dramatic jump in the number of S corporations since 1986 in response to the drop in personal relative to corporate tax rates.¹⁵ But given the substantial variation in relative tax rates in recent years, the variation in the fraction of capital located in the corporate sector has been quite modest. The pressure created by this type of income shifting alone would not seem important enough to explain the stability in corporate tax policy across both time and countries.

Even within firms that remain corporate, however, the amount of income shifting that occurs could

be very responsive to tax differentials. Owner/managers of corporations have substantial control over their form of compensation, and can easily change how they are paid in response to tax incentives. Given the steady reduction in personal relative to corporate tax rates in recent years, if income shifting were important, we should have seen a significant shift in taxable income out of the corporate into the personal tax base. In fact, there have been a number of recent papers reporting evidence consistent with such a shift. Poterba and Auerbach find,¹⁶ for example, that reported before-tax rates of return in the U.S. corporate sector have been declining quite sharply in recent years. In contrast, Feenberg and Poterba find that incomes of the richest one-quarter of one percent of taxpayers grew dramatically during the same time period, and

particularly after the 1986 tax reform.¹⁷ In future research, I intend to look more carefully at the nature of these changes, to see if together they can be explained by income shifting.

One remaining puzzle concerns why existing corporate taxes attempt to include the return earned by corporate capital, given the forecasts from the theory that such taxes on capital should not exist in an open economy. While Slemrod and I find that no revenue is raised from attempts to tax the return to capital, these attempts certainly introduce many forms of distortion to the behavior of corporations. Perhaps because the efficiency cost of these distortions is small, there has not been much pressure to eliminate them. In particular, in work done partly with John D. Wilson,¹⁸ I find that even though on average

substantial taxes are paid on new investments, the certainty equivalent cost of these taxes is small. That is because the taxes imply that investors share future risks as well as future returns with the government, and because new investment (and the implied tax payments) tends to occur when the economy is doing unexpectedly well.

If the primary function of the corporate tax is indeed as a backstop to the personal tax on labor income, rather than as a tax on the return to capital invested in the corporate sector, then a very different set of behavioral responses must be taken into account when considering changes in corporate tax rates. Much work remains to be done to document the extent and the form of income shifting, and its implications for tax policy

¹A careful study documenting this reallocation is D. Fullerton, A. T. King, J. B. Shoven, and J. Whalley, "Corporate Tax Integration in the United States: A General Equilibrium Approach," *American Economic Review* (September 1981), pp. 677-691.

²For a recent assessment of the size of this distortion, see R. H. Gordon and J. K. MacKie-Mason, "Effects of the Tax Reform Act of 1986 on Corporate Financial Policy and Organizational Form," in *Do Taxes Matter? The Impact of the Tax Reform Act of 1986*, J. B. Slemrod, ed., Cambridge: MIT Press, 1991, pp. 91-131.

³A. C. Harberger, "The Incidence of the Corporate Income Tax," *Journal of Political Economy* (June 1962), pp. 215-240.

⁴R. H. Gordon, "Taxation of Investment and Savings in a World Economy," *American Economic Review* (December 1986), pp. 1086-1102.

⁵R. H. Gordon and H. R. Varian, "Taxation of Asset Income in the Presence of a World Securities Market," *Journal of International Economics* (June 1989), pp. 205-226.

⁶M. Feldstein and C. Horioka, "Domestic Savings and International Capital Flows," *The Economic Journal* 90 (1980), pp. 314-329.

⁷See, for example, M. Adler and B. Dumas, "International Portfolio Choice and Corporation Finance: A Synthesis," *Journal of Finance* 38 (1983), pp. 925-984, and K. R. French and J. M. Poterba, "Investor Diversification and International Equity Markets," NBER Working Paper No. 3609, January 1991, and *American Economic Review* (May 1991), pp. 222-226.

⁸R. H. Gordon and A. L. Bovenberg, "Why Is Capital So Immobile Internationally? Possible Explanations and Implications for Capital Income Taxation," mimeo, 1993.

⁹H. Grubert, T. Goodspeed, and D. Swenson, "Explaining the Low Taxable Income of Foreign-Controlled Companies in the United States," in *Studies in International Taxation*, R. G. Hubbard, A. Giovannini, and J. B. Slemrod, eds., Chicago: University of Chicago Press, 1993, pp. 237-270.

¹⁰R. H. Gordon, "Can Capital Income Taxes Survive in Open Economies?"

Journal of Finance (July 1992), pp. 1159-1180.

¹¹R. H. Gordon and J. B. Slemrod, "Do We Collect Any Revenue from Taxing Capital Income?" in *Tax Policy and the Economy*, Volume 2, L. H. Summers, ed., Cambridge: MIT Press, 1988, pp. 89-130.

¹²This remains true even if personal taxes on income from financial assets also were eliminated.

¹³R. H. Gordon and J. K. MacKie-Mason, "Why Is There Corporate Taxation in a Small Open Economy? The Role of Transfer Pricing and Income Shifting," in *International Taxation*, M. Feldstein, J. R. Hines, and R. G. Hubbard, eds., forthcoming from University of Chicago Press.

¹⁴R. H. Gordon and J. K. MacKie-Mason, "Taxes and the Choice of Organizational Form," NBER Working Paper No. 3781, July 1991, and "Tax Distortions to the Choice of Organizational Form," *Journal of Public Economics*, forthcoming.

¹⁵Income of S corporations is taxed as personal rather than corporate income,

but the firms otherwise share many of the legal attributes of corporations, such as limited liability.

¹⁶J. M. Poterba and A. J. Auerbach, "Why Have Corporate Tax Revenues Declined?" in *Tax Policy and the Economy*, Volume 1, L. H. Summers, ed., Cambridge: MIT Press, 1987, pp. 1-28.

¹⁷D. R. Feenberg and J. M. Poterba, "Income Inequality and the Incomes of Very High-Income Taxpayers: Evidence

from Tax Returns," *Tax Policy and the Economy*, Volume 7, J. M. Poterba, ed., Cambridge: MIT Press, 1993, pp. 145-177.

¹⁸R. H. Gordon, "Taxation of Corporate Capital Income: Tax Revenues vs. Tax Distortions," *Quarterly Journal of Economics* (February 1985), pp. 1-27, and R. H. Gordon and J. D. Wilson, "Measuring the Efficiency Cost of Taxing Risky Capital Income," *American Economic Review* (June 1989), pp. 427-439.

argue that the presence of penalties serves to focus the firm's attention on safety issues, eventually leading to hazard abatement. Having multiple inspections of the same plant within the same year, with or without a penalty imposed, does not seem to reduce injuries further. Imposing larger penalties also does not seem to have much impact on injuries, at least within the range that OSHA usually employs.²

We also have examined the effectiveness of different types of inspections. For example, many inspections are based on worker complaints rather than being planned by OSHA. Some have argued that if workers are ignorant of true hazards and simply use complaints to harass employers, then these inspections may be a waste of OSHA resources. However, we find that complaint inspections are about as effective as planned inspections in reducing injuries.³ Complaints appear to be especially effective in larger plants, which tend to be more heavily unionized. Complaints also seem to be less reliant on penalties for their effectiveness, perhaps because the complaining workers can take advantage of the inspection to force hazard abatement, even when the firm is not penalized.

Health, Safety, and Environmental Regulation

Wayne B. Gray

Since the early 1970s, the United States has seen a substantial increase in federal government regulation, through the establishment of several new regulatory agencies. The Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) have aroused particular controversy, attacked by some for being too strict and imposing large costs on business, and by others for being too lenient and allowing many hazards to remain. Congress is currently considering legislation affecting both agencies, and the debate about how much regulation is appropriate continues.

My research on OSHA and EPA has considered both the benefits and costs of regulation. I have examined the effectiveness of OSHA enforcement in reducing injuries, violations, and worker exposures to health hazards. My studies of the costs imposed by regulation have focused on the impact of regulation on productivity.

OSHA Safety Regulation

Traditionally, U.S. regulatory

agencies have followed a "command and control" strategy, establishing standards designed to reduce hazards and requiring firms to meet them. Since compliance is costly, some firms are likely to violate standards unless the agency's enforcement activity provided a sufficient deterrence. Critics of OSHA's safety regulation have argued that infrequent inspections and small penalties provide little deterrence. In addition, many injuries are caused by factors not covered by standards, so even complete compliance would not eliminate injuries completely.

John T. Scholz and I have found evidence that OSHA inspections do

"OSHA inspections do reduce injuries. . . . Plants penalized by OSHA averaged a 22 percent reduction in injuries over the following few years."

reduce injuries.¹ This impact appears to be restricted to inspections followed by penalties; not being penalized means OSHA found nothing wrong, and nonpenalty inspections had little or no effect on injuries. Plants penalized by OSHA averaged a 22 percent reduction in injuries over the following few years. We

OSHA Health Regulation

Measuring the effectiveness of OSHA regulation for health hazards is difficult, since work-related illnesses can take years or decades to develop. This means that we must rely on indirect indicators of potential future illnesses, such as worker exposure to hazardous substances, rather than direct measures of current injuries. Since OSHA's health standards often are aimed precisely

at lowering worker exposures to hazards, violations of health standards also could indicate future health problems.

In work with Carol A. Jones, I examined OSHA's effectiveness, using data that linked all OSHA inspections at a given plant over time. First inspections tend to find the most violations, and subsequent inspections of the same plant find progressively fewer problems, suggesting that plants are responding to the earlier inspections by reducing hazards.⁴ For health and safety inspections, the first inspection seems to lead to a 50 percent reduction in violations.

We find similar effects when we focus exclusively on health inspections, with a 45 percent reduction of violations after the first inspection.⁵ OSHA inspectors also collect test samples to document workers' exposure to health hazards. We find that worker overexposure to hazardous substances falls, with a decline of 37 percent after the first inspection, and continues to decline after subsequent inspections. These results suggest that OSHA is effective in reducing health hazards, at least in those plants that have had health inspections. Because most of the reduction in hazards is attributed to the first inspection of a plant, our results also provide a suggestion for improving enforcement effectiveness: focus more on uninspected plants, rather than inspecting the same plants repeatedly.

Regulation and Productivity

It can be difficult to identify the costs imposed by regulation. Compliance with a particular regulation

may involve new capital equipment, the energy and labor needed to operate the equipment, and the managerial and engineering expertise to decide which equipment is needed. For environmental regulation, there are surveys of pollution abatement expenditures, but these may not consider all the different types of costs. If a plant chooses to completely redesign its production process to reduce emissions, it may be difficult to identify what fraction of the redesign costs should be attributed to pollution abatement.

One way to go beyond reported compliance costs is to examine productivity measures. This is especially true for measures of total

"Industries that faced more regulation had slower productivity growth and a greater productivity slowdown in the 1970s. About 30 percent of the productivity slowdown in the average manufacturing industry could be attributed to OSHA and EPA regulation."

factor productivity, which account for the contribution of both capital and labor to output. If a changed production process means higher production costs, then productivity will fall. Examining productivity also can help measure compliance costs of other regulatory areas, such as OSHA, where no cost surveys are done.

My research on regulation began by examining the reasons for the slowdown in manufacturing productivity during the 1970s. I compared the productivity experience of different manufacturing industries with the amount of OSHA and EPA regulation directed toward them.⁶ Regulation measures included enforcement activity for

both OSHA and EPA, as well as pollution abatement costs. Industries that faced more regulation had slower productivity growth and a greater productivity slowdown in the 1970s. About 30 percent of the productivity slowdown in the average manufacturing industry could be attributed to OSHA and EPA regulation.

Modeling Regulation

The decisions of regulatory agencies and regulated firms can be interconnected, especially when the regulators want to avoid adverse publicity associated with plant closings. Mary Deily and I examined this issue using data on air pollution enforcement and plant closings in the steel industry, where such pressures were acute: 43 percent of the plants we studied closed by 1986.⁷ Plants facing greater expected enforcement were more likely to close, although the magnitude of the effect was small (raising enforcement by 12 percent would increase the probability of closing by only 1 percentage point). Enforcement decisions appear to be more sensitive to the likelihood of a plant closing: a 10 percentage point increase in the probability of closing reduces enforcement by 6.5 percent.

¹W. B. Gray and J. T. Scholz, "Does Regulatory Enforcement Work? A Panel Analysis of OSHA Enforcement," NBER Working Paper No. 3774, July 1991, and *Law and Society Review* 27 (1993), pp. 177-213; also J. T. Scholz and W. B. Gray, "OSHA Enforcement and Workplace Injuries: A Behavioral Approach to Risk Assessment," NBER Working Paper No. 2813, January 1989, and *Journal of Risk and Uncertainty* 3 (1990), pp. 283-305.

²W. B. Gray and J. T. Scholz, "Analyzing the Equity and Efficiency of OSHA

Enforcement," *Law and Policy* 13 (1991), pp. 185-214.

³W. B. Gray and J. T. Scholz, "How Effective Are Complaint Inspections?" report submitted to OSHA, June 1992.

⁴W. B. Gray and C. A. Jones, "Longitudinal Patterns with OSHA Health and Safety Regulations in the Manufacturing Sector," NBER Working Paper No. 3213, December 1989, and *Journal of Human Resources* 26 (1991), pp. 623-653.

⁵W. B. Gray and C. A. Jones, "Are OSHA Health Inspections Effective? A

Longitudinal Study in the Manufacturing Sector," NBER Working Paper No. 3233, January 1990, and *Review of Economics and Statistics* 73 (1991), pp. 504-508.

⁶W. B. Gray, "The Cost of Regulation: OSHA, EPA, and the Productivity Slowdown," NBER Working Paper No. 1405, July 1984, and *American Economic Review* 77 (1987), pp. 998-1006.

⁷M. Deily and W. B. Gray, "Enforcement of Pollution Regulations in a Declining Industry," *Journal of Environmental Economics and Management* 21 (Fall 1991), pp. 260-274.

NBER Profile: Sebastian Edwards

Sebastian Edwards is currently Chief Economist for the Latin American and the Caribbean region at the World Bank, and the Henry Ford II Professor of International Business Economics at Anderson Graduate School of Management, University of California, Los Angeles. He has been an NBER research associate in international studies since 1982, and is cochairman of the NBER's Inter-American Seminar in Economics.

Edwards was born in Santiago, Chile. He was educated at the Catholic University of Chile, and received an M.A. and Ph.D. in economics at the University of Chicago.

Edwards has been a consultant to a number of institutions, including the Inter-American Development Bank, the World Bank, the IMF, the OECD, and the U.S. Agency for Economic Develop-

ment. He has worked in Argentina, Bolivia, Mexico, Colombia, Guatemala, Nicaragua, Honduras, Costa Rica, Morocco, Chile, Indonesia, New Zealand, Korea, Tanzania, and Venezuela.

Coeditor of the *Journal of Development Economics*, Edwards's own articles on international economics, macroeconomics, and economic development have been published in a number of professional journals. His books include *Monetarism and Liberalization: The Chilean Experiment* (coauthor); *Exchange Rate Misalignment in Developing Countries*; and *Real Exchanges, Devaluation, and Adjustment: Exchange Rate Policy in Developing Countries*.

Edwards is married to Alejandra Cox, also a Chicago economist. They currently live in Bethesda, MD, with their children, Magdalena



(17), Benjamin (12), and Victoria (9). With so many children, they cannot afford a pet. Edwards collects Latin American art, and lately has become an obsessive runner. There are rumors that he is writing a novel.



NBER Profile: *Roger H. Gordon*

Roger H. Gordon has been a member of the NBER's Program in Public Economics (formerly Taxation) since 1977, and a professor of economics at the University of Michigan since 1986. He received his B.A. in applied math from Harvard College, and his Ph.D. in economics from MIT.

Gordon was an assistant professor at Princeton University in 1976–80, a member of the technical staff at Bell Laboratories from 1980–3, and an associate professor of economics at Michigan from 1984–6. He also has been a visiting professor at Tel-Aviv University, University of Bonn, People's University in Beijing, New University of Lisbon, the then Central School of Planning and Statistics in War-

saw, University of Wisconsin, MIT, University of Munich, University of Tilburg in the Netherlands, and Northwestern University.

Gordon has been coeditor of the *American Economic Review* since 1991, and has been a member of the editorial boards of *Econometrica*, *Journal of Public Economics*, and *International Tax and Public Finance*. His research on taxation has been published in a number of scholarly journals, and in NBER books and Working Papers.

Gordon's wife, Michelle White, is also an economics professor at the University of Michigan. They enjoy hiking, going to the opera, and traveling to out-of-the-way places.

NBER Profile: *Wayne B. Gray*

Wayne B. Gray is a research associate in the NBER's productivity and labor studies programs, and an associate professor of economics at Clark University. He has taught at Clark since 1984, when he received his Ph.D. from Harvard University. He did his undergraduate work at Dartmouth College.

Gray's research has concentrated on the effects and effectiveness of government regulation, especially OSHA and EPA regulation of workplace and environmental hazards. He recently spent a year as a Census Fellow at the Census Bureau's Center for Economic Studies in

Washington, working with plant-level productivity data. He now is helping to make that data available to researchers outside of Washington, serving as the Research Coordinator for the Census Bureau's newly established Boston Research Data Center.

Gray's wife, Elizabeth, is a biologist, specializing for the moment in studying the behavioral eccentricities of Erika (7) and Ronald (3). Gray's hobbies include squash (both playing and growing), cross-country skiing, and science fiction.





NBER Profile: *James F. Smith*

James F. Smith, president of the National Association of Business Economists in 1989-90, has represented that organization on the NBER's Board of Directors since 1992. Smith is also a professor of finance at the Kenan-Flagler Business School at the University of North Carolina, Chapel Hill.

A native of Dallas, Smith received his B.A., M.A., and Ph.D. in economics from Southern Methodist University. He worked at Sears, Roebuck, and Company in Chicago from 1965-80, and was chief economist for the Union Carbide Corporation from 1980-5. The following year,

Smith was director of regional services and U.S. consulting for Wharton Econometric Forecasting Associates. From 1986-8, he was at the University of Texas, Austin, as senior lecturer in finance and director and chief economist of the Bureau of Business Research.

Smith also served as senior economist on the Board of Governors of the Federal Reserve System in 1975-7, and as a consultant to the Council of Economic Advisers in 1981. He and his wife, Susan, who serves as a volunteer at Triangle Hospice, have four grown children: three sons and a daughter. The Smiths' hobbies include playing bridge and traveling.

Conferences

Regionalism

The NBER, in cooperation with the Tokyo Center for Economic Research (TCER) and the Centre for Economic Policy Research (CEPR), sponsored a conference on "Regionalism" in Tokyo on January 8 and 9. Takatoshi Ito, NBER, and Hitotsubashi University; Peter Johns, CEPR; and Kazuo Ueda, University of Tokyo, planned this program.

Jonathan Eaton, NBER and Boston University, and **Akiko Tamura**, Boston University, "Bilateralism and Regionalism in Trade and

Investment: The United States and Japan"

Discussants:

Kyoji Fukao, Hitotsubashi University, and

Sadao Nagoaka, Seikei University

Toshihiro Ihori, University of Tokyo, "Economic Integration of Countries with International Public Goods"

Discussants:

Jonathan Eaton, and Yasushi Iwamoto, Kyoto University

Andrew Hughes Hallett, Strathclyde University, and

C. A. Primo Braga, World Bank, "The New Regionalism and the Threat of Protectionism"

Discussants:

Kym Anderson, University of Adelaide, and

Midori Tani, Ministry of International Trade & Industry

Kym Anderson, and

Richard H. Snape, Monash University, "European and American Regionalism: Effects, On and Options for Asia"

Discussants:

Taro Akiyama, Yokohama National University,

Takatoshi Ito, and Midori Tani

Sadao Nagoaka, "Regional Integration and External Liberalization: A Political Economy Approach"

Discussants:

Andrew Hughes Hallett, and
Tetsushi Honda, Tokyo
Metropolitan University

Warwick J. McKibbin,

Australian National University,
"Dynamic Adjustment to Regional
Integration: Europe 1992 and
NAFTA"

Discussants:

David Selover, Wesleyan
University, and
Shin-Ichi Fukuda, Hitotsubashi
University

Shin-Ichi Fukuda, and

Ji Cong, Keio University, "On the
Choice of Invoice Currency by
Japanese Exporters: the PTM
Approach"

Discussants:

Warwick J. McKibbin and
Kazuo Ueda

Eaton and Tamura analyze patterns of Japanese and U.S. trade and investment. They note that both Japan and the United States have strong ties to each other and to East Asia, while the United States also has strong ties to other countries in the Western Hemisphere. Even after taking scale and region into account, the authors find, trade flows and direct foreign investment positions are highly correlated across countries. While outward direct foreign investment is highly correlated with exports, it is also highly correlated with imports. This suggests that there is little association between outward direct foreign investment and the bilateral trade balance.

Ihori models economic integration subject to random emergency costs. To mitigate the effects of these emergencies, each country that belongs to a "club" provides an international public good. Ihori shows that an increase in the prob-

ability of war, or the penalty ratio in a club, may raise welfare and increase the size of the club if there is little risk aversion with respect to private consumption.

Hallett and Braga discuss the incentives that lead countries to form trading blocs, and the relations between these blocs. They argue that regional agreements can work better toward cooperation than global rules, because the losses for a participant ostracized from his bloc are more immediate and tangible. However, intrabloc trade relations ultimately will depend on how effective special interest groups are in distorting blocwide trade policies to suit their particular interests.

Anderson and Snape find that the share of intraregional world trade has been increasing. Further, the proportion of GDP traded has been increasing rapidly enough for growth to occur in extraregional trade. They argue that, on balance, the concerns of economies excluded from regional agreements with regard to trade and investment diversion probably are exaggerated. Still, the authors conclude that the excluded small open economies have cause for concern that regional agreements will erode the GATT-based multilateral trading system.

Nagoaka analyzes the effects of regional integration on external liberalization of industries protected for political reasons. He demonstrates that regional integration creates four positive incentives for liberalization, including reducing the degree of policy endogeneity and its negative incentive effect. He also analyzes how these effects are influenced by political integration (that is, shifting the focus of political concern from national to regional industries) and by the de-

gree of policy coordination (that is, free trade agreements versus customs unions).

Recent research on the gains to trade liberalization suggests that the static gains that many economists attempt to measure may be dwarfed by the dynamic gains, for example through capital accumulation. A similar argument can be made for the consequences of regional integration: as distortions are removed, the effects on aggregate output through dynamic adjustments are likely to be larger than simple static calculations suggest. **McKibbin** focuses on the dynamic gains to regional integration for two recent episodes: European integration, known as Europe 1992; and the North American Free Trade Agreement. He estimates the size and nature of both global and regional adjustments to these two examples of regional integration.

Fukuda and Cong investigate why invoice ratios of the Japanese yen are relatively low for Japan's exports. Given the "pricing-to-market" behavior of Japanese exporters, demand conditions in the foreign markets can explain their choice of invoice currency. In particular, Fukuda and Cong explain why yen-denominated invoice ratios of TVs, VCRs, and automobiles are so low in exporting to the United States, but are very high in exporting to the East Asian countries.



Political Economy of Trade Protection

The NBER held a conference on "The Political Economy of Trade Protection" on February 3 and 4. The program, organized by NBER Research Associate Anne O. Krueger of Stanford University, was:

Douglas Nelson, Tulane University, "The Political Economy of U.S. Automobile Protection"

Discussants:

Anne Brunsdale, U.S. International Trade Commission, and Richard Cooper, Harvard University

Bruce Gardner, University of Maryland, "The Political Economy of U.S. Export Subsidies for Wheat"

David Orden, Virginia Polytechnic Institute, "Divergent Agricultural Interest Groups and the Political Economy of NAFTA"

Discussants:

William Frenzel, Brookings Institution; Robert Paarlberg, Wellesley College; and Edward Schuh, University of Minnesota

Douglas Irwin, University of Chicago, "Trade Politics and the Semiconductor Industry"

Discussants:

Andrew Dick, University of California, Los Angeles, and Lionel Olmer, Paul, Weiss, Rifkind, Wharton, & Garrison

Following a brief review of the economics of the auto industry and the consequences of its protection, **Nelson** discusses the politics surrounding the 1981 decision to ne-

Michael Finger and **Ann Harrison**, World Bank, "The MFA Paradox: More Protection and More Trade?"

Discussants:

Robert E. Baldwin, NBER and University of Wisconsin, Madison; Jagdish Bhagwati, Columbia University; and Mac Destler, University of Maryland

Michael Moore, George Washington University, "Steel Protection in the 1980s: The Waning Influence of Big Steel?"

Discussants:

William Lane, Caterpillar, Inc.; James R. Markusen, NBER and University of Colorado; and Michael Moskow, Northwestern University

Joseph Kalt, Harvard University, "Precedent and Legal Argument in U.S. Trade Policy: Do They Matter to the Political Economy of the Lumber Dispute?"

Discussants:

Geoffrey Carliner, NBER, and Alan Rugman, University of Toronto

Robert W. Staiger, NBER and University of Wisconsin, Madison, and

Frank A. Wolak, NBER and Stanford University, "Further Evidence on the Uses and Effects of Antidumping Law: Differences Across Import Sources"

Discussant:

Kala Krishna, NBER and Pennsylvania State University

gotiate a voluntary export restraint (VER). He also discusses the politics of North American integration from the point of view of the auto industry. He concludes that, while

VERs on Japanese autos accomplished the short-term economic goal of raising industry profitability, they were not successful in the long-run political goal of disciplining Japanese competition. With respect to long-run economic goals, Nelson argues that protection was not necessary for industry adjustment.

From 1985-93, the U.S. government provided \$4.9 billion in subsidies to targeted foreign buyers of U.S. wheat under its Export Enhancement Program (EEP). The subsidies averaged \$31 per metric ton, or about 25 percent of the U.S. price. But **Gardner** finds that the EEP generated little gain for U.S. farmers, compared to its costs. One economic argument for the EEP that also carried political weight was that, by increasing the costs of the European Community's wheat export subsidies, the EEP would encourage the EC to negotiate joint subsidy reductions. In fact, in 1993 the EC did agree to multilateral subsidy reductions in the GATT, as well as to reforming their own policies unilaterally.

Orden finds that there was widespread support for NAFTA by export-oriented U.S. agricultural producer groups, because of its proposed phase-out of trade barriers with Mexico. Wheat producers, however, withheld their endorsement, seeking leverage on Canadian export subsidies. And import-competing producers of peanuts, sugar, winter vegetables, and citrus opposed specific phase-out provisions. The agricultural commodity groups were able to bargain for support in the subsequent legislative debate, though. Final concessions protect sugar and winter fruits and vegetables from Mexican competition, and ensnarl the United States in disputes on Canadian wheat and peanut butter. This illustrates

the difficulty of moderating entrenched domestic farm programs through international agreements.

Irwin analyzes the political and economic forces leading up to the 1986 trade accord in which the United States forced Japan to end the "dumping" of semiconductors in all world markets and to help secure 20 percent of the Japanese semiconductor market for foreign firms within five years. The antidumping provisions of the 1986 agreement resulted in such steep price rises for certain semiconductors that downstream user industries forced the U.S. government to remove them in the 1991 renegotiation of the agreement. The equally controversial 20 percent market share provision—based on circumstantial evidence that the Japanese market was closed—provided "affirmative action" for the industry in its efforts to sell more in Japan, but has been criticized as constituting "export protectionism."

According to **Finger** and **Harrison**, the textile industry's political power stemmed from its importance in southern states and from the power of the southern delegation in the U.S. Congress in the 1960s. Although the strongest resistance to the industry's pressure for protection came from the foreign policy interests of the executive branch, the southern delegation forced negotiation of voluntary export restraints by major exporters by holding hostage the Kennedy administration's trade expansion bill. And, through their particular power over agricultural legislation, the southern delegation won passage of amendments to agriculture bills to enforce these "voluntary" restraints at the U.S. border.

Moore notes that the U.S. integrated steel industry has been very

successful in securing import protection over the last 20 years. Critical to that success has been a cohesive coalition of steel producers, the steelworkers' union, and "steel town" congressional representatives. The political strength of this coalition has diminished substantially over the last decade, as the integrated steel industry has restructured, and as minimills have become increasingly important. After 1989, quotas on steel were non-binding, and the industry was largely unsuccessful in obtaining antidumping duties in its 1993 unfair trade petitions.

For more than a decade, the United States and Canada have been engaged in a rancorous dispute over trade in softwood lumber. **Kalt** examines whether, and to what extent, the legal rules, standards, and precedents of countervailing duty law influence the success or failure of the two contending parties. He finds that an issue with large stakes is never lost

by the politically favored party, even when legal precedent and the burden of argument is against that party's interest.

Staiger and **Wolak** present further evidence on the effects of U.S. antidumping law on imports and domestic output, and on the ways in which antidumping law is used in the United States. They allow for the possibility that domestic firms may pursue independent filing strategies with respect to imports from different countries, and that the effects of filing on imports and domestic output may differ across import sources as well. By disaggregating in this way, they hope to contribute to a more comprehensive understanding of the uses and effects of antidumping law in practice.

Selected papers from this conference and their commentary will be published by the University of Chicago Press in an NBER conference volume. Availability of the volume will be announced in a future issue of the *NBER Reporter*.

Ninth Annual Conference on Macroeconomics

More than 80 academics, government economists, and journalists attended the NBER's Ninth Annual Conference on Macroeconomics in Cambridge on March 11 and 12. Stanley Fischer and Julio J. Rotemberg, both of NBER and MIT, prepared this program.

Christina D. Romer and **David H. Romer**, NBER and University of California, Berkeley, "What Ends Recessions?"

Discussants:

John H. Cochrane, NBER and University of Chicago, and Ray C. Fair, Yale University

Andrew Atkeson, NBER and University of Chicago, and **Christopher Phelan**, University of Wisconsin, "Reconsidering the Costs of Business Cycles with Incomplete Markets" (NBER Working Paper No. 4719)

Discussants:

John C. Heaton, NBER and MIT, and

James Tobin, Yale University

John Page, World Bank, "The East Asian Miracle: Four Lessons for Development Policy"

Discussants:

Susan M. Collins, NBER and

Georgetown University, and

Takatoshi Ito, NBER and

Hitotsubashi University

Alan J. Auerbach, NBER and University of Pennsylvania, "The U.S. Fiscal Problem: Where We Are, How We Got Here, and Where We Are Going" (NBER Working Paper No. 4709)

Discussants:

Martin Feldstein, NBER and

Harvard University, and

V. V. Chari, Northwestern

University

Romer and **Romer** analyze the contributions of both monetary and fiscal policy to postwar economic recoveries. They find that the Federal Reserve typically responds to downturns with prompt and large reductions in interest rates. These interest rate declines account for nearly all of the above-average growth that occurs in the first year of recoveries, **Romer** and **Romer** find. In contrast, fiscal policy rarely changes before the trough in economic activity, and even then its responses are usually small. On several occasions, though, expansionary fiscal policies have made a substantial contribution to above-normal growth *outside* of recoveries.

Atkeson and **Phelan** argue that the main effect of countercyclical policy aimed at reducing aggregate economic fluctuations may be simply to ensure that all individuals do not face the same risk of unemployment at the same time. They show that the potential welfare

Christopher A. Sims, NBER and Yale University, and

Eric Leeper, Federal Reserve Bank of Atlanta, "Toward a Modern Macroeconomic Model Usable for Policy Analysis"

Discussants:

Robert G. King, University of

Virginia, and

Laurence H. Meyer, Laurence H.

Meyer Associates

Philippe Aghion, Oxford University, and

Olivier J. Blanchard, NBER and MIT, "On the Speed of Transition in Central Europe" (NBER Working Paper No. 4736)

Discussants:

Patrick J. Kehoe, University of

Pennsylvania, and

David Lipton, U.S. Department of the Treasury

gains from eliminating that correlation in risk among individuals is *smaller* when there are incomplete markets than when markets are complete. They conclude that there is essentially no potential welfare gain from countercyclical policies that do not change individual risk.

Page looks at four public policy lessons of the East Asian miracle. He argues first that the eight high-performing Asian economies can be grouped together and distinguished from other low- and middle-income countries on the basis of their rapid, sustained, and shared growth. He then presents evidence on the relative roles of factor accumulation and change in total factor productivity (TFP) for growth. **Page** concludes that export orientation rather than selective intervention played the dominant role in increasing economywide TFP growth rates.

According to **Auerbach**, deficit forecasts over the past decade have

proved very inaccurate and overly optimistic. There is no simple explanation for such errors, and hence no obvious remedy for the future. The budget rules of the period may have hastened legislators to act, but were poorly designed for the purpose of restoring fiscal balance. The Gramm-Rudman-Hollings Act and, particularly, the 1990 Budget Enforcement Act, embedded forecasting errors in their rules; both permitted the postponement of serious action. Even with the passage of the 1993 Omnibus Budget Reconciliation Act, the United States still faces a major fiscal imbalance, attributable to growing health care costs and changing population demographics.

Sims and **Leeper** build a relatively complete econometric model whose equations are consistent with a theoretical model. Thus, they aim to bridge the gap between the literature that fits comprehensive econometric models to U.S. data, and the literature on complete general equilibrium models.

Transition in Central Europe involves the closing and restructuring of state firms, as well as the emergence of a new private sector. The speed of closing and restructuring, and the rate of private job creation, determine the dynamics of unemployment. Unemployment in turn affects the decisions both to restructure and to create new private jobs. **Aghion** and **Blanchard** present a model that captures these interactions, characterizes the equilibrium speed of transition and unemployment, and describes the role of policy.

These papers and their discussions will be published by the MIT Press as *NBER Macroeconomics Annual, Volume 9*. Its availability will be announced in a future issue of the *NBER Reporter*.

Taxing Multinational Corporations

More than 80 economists, policymakers, and journalists met in Washington, DC on April 19 for a nontechnical NBER conference on "Taxing Multinational Corporations" organized by Bureau President Martin Feldstein, James R. Hines, Jr. of NBER and Harvard University, and R. Glenn Hubbard, NBER and Columbia University. The program was:

Robert E. Lipsey, NBER and Queens College, "Outward Direct Investment and the U.S. Economy" (NBER Working Paper No. 4691)

Martin Feldstein, "Tax Rules and the Effect of Foreign Direct Investment on U.S. National Income"

Joosung Jun, NBER and Yale University, "Corporate Taxes and the Cost of Capital for U.S. Multinationals"

Roger H. Gordon and **Jeffrey K. MacKie-Mason**, NBER and University of Michigan, "The Importance of Income Shifting to the Design and Analysis of Tax Policy" (NBER Working Paper No. 4690. For a description of this paper, see the text referred to in footnote 13 of Gordon's research summary earlier in this issue, "The Role of Corporate Taxes in an Open Economy.")

According to **Lipsey**, overseas production has contributed to the ability of American multinationals to retain world market shares in the face of the long-term decline in the share of the United States as a country, and in the face of short-term changes, such as exchange rate fluctuations. Overseas production has performed the same func-

Andrew B. Lyon, NBER and University of Maryland, and **Gerald Silverstein**, U.S. Department of the Treasury, "Alternative Minimum Tax Rules and Multinational Corporations"

James R. Hines, Jr., "Taxes, Technology Transfer, and the R and D Activities of Multinational Firms"

Rosanne Altshuler, NBER and Rutgers University, and

T. Scott Newlon and **William C. Randolph**, U.S. Department of the Treasury, "Tax Planning, Timing Effects, and the Impact of Repatriation Taxes on Dividend Remittances" (NBER Working Paper No. 4667)

Jason G. Cummins, Columbia University, and

R. Glenn Hubbard, "Is Foreign Direct Investment Sensitive to Taxes?" (NBER Working Paper No. 4703)

Kenneth A. Froot, NBER and Harvard University, and **James R. Hines, Jr.**, "Interest Allocation Rules and the Changing Cost of Debt Finance"

Jason G. Cummins, **Trevor Harris**, and **Kevin A. Hassett**, Columbia University, "International Accounting, Asymmetric Information, and Firm Investment" (NBER Working Paper No. 4685)

tions for Swedish firms and, more recently, for Japanese firms. Within U.S. multinationals, those with higher shares of production overseas have higher employment at home relative to production at home. Foreign production appears to require larger numbers of employees in headquarters activities, such as R and D, and supervision.

Feldstein shows that the credit for foreign taxes paid does not induce U.S. firms to expand their foreign direct investment (FDI) enough so that the return on FDI to the United States is less than the return on the displaced domestic investment. A typical marginal FDI (which has the same net return to an American multinational parent as an alternative marginal domestic investment) actually has a higher return to the United States than the domestic investment it displaces. In order to maximize the present value of U.S. national income, one would not replace the current foreign tax credit with a deduction for foreign taxes. Instead, one would move in the opposite direction, encouraging more FDI in general, and investments that employ substantial foreign debt per dollar of U.S. capital in particular.

Jun modifies the conventional cost-of-capital measure to incorporate the impact of international tax rules. He finds that corporate tax rules on foreign investment cause U.S. firms operating in major foreign markets to face about a 20 percent higher cost of capital on average than domestic firms in the United States. Further, U.S. firms very likely face a higher cost of capital than local firms in foreign markets. U.S. firms also may have a cost-of-capital disadvantage vis-à-vis firms from other countries in a given foreign market, in part because of the absence of a dividend imputation scheme in the United States and in part to relatively strict U.S. rules regarding the exemption or deferral of home country tax on foreign source income and the foreign tax credit utilization.

Lyon and **Silverstein** show some of the ways that U.S.-based multinational corporations may be affected by the alternative mini-

num tax (AMT). In 1990, more than half of all foreign-source income was received by corporations subject to the AMT. As a result, the tax prices on foreign-source income created by the AMT may be at least as important as those created by the regular tax. The AMT creates a relative incentive for AMT firms to invest abroad rather than domestically, and a temporary timing opportunity that allows repatriation of income from abroad at a lower cost than if the firm were subject to the rules of the regular tax system. These two different incentives have an ambiguous effect on U.S. domestic investment overall if repatriated income is retained by the parent in the United States. The AMT may provide an opportunity for firms to repatriate income from foreign locations with poor reinvestment opportunities, and to reinvest the funds abroad in different foreign locations with better opportunities, in order to take advantage of the temporary relatively lower cost of capital.

Hines asks first whether R and D activity by multinational firms is sensitive to local tax conditions, and second whether imported technology and R and D are complements or substitutes. He finds that R and D responds to local tax rates, and that local R and D is a substitute for imported technology. Firms appear to react to high royalty tax rates by paying fewer royalties and performing additional R and D locally. To the extent that royalty payments reflect actual technology transfer (rather than adept accounting practices), the behavior of multinational firms suggests that local R and D is a substitute for imported technology.

Altshuler, Newlon, and Randolph recognize that repatriation taxes on dividends may vary over

time, providing firms with an incentive to time repatriations so that they occur in years when repatriation tax rates are relatively low. They use information about cross-country differences in tax rates to estimate the influence of permanent tax changes, as would occur with changes in statutory tax rates, versus the influence of transitory tax changes on dividend repatriations. Using data from U.S. tax returns for a large sample of U.S. corporations and their foreign subsidiaries, they find that the permanent tax price effect is significantly different from the transitory price effect, and is not significantly different from zero. The transitory tax price effect is negative and significant. This suggests that repatriation taxes *do* affect dividend repatriation, but only to the extent that they vary over time.

Cummins and Hubbard use previously unexplored panel data on FDI by subsidiaries of U.S. multinational firms that contain information on new capital investment overseas. This enables them to measure tax influences on FDI more precisely, and to focus on structural models of subsidiaries' investment decisions. Their empirical results cast significant doubt on the simplest notion that "taxes don't matter" for U.S. firms' FDI decisions. Taxes appear to influence FDI in precisely the ways indicated by traditional neoclassical economic models of investment behavior. The authors' results also support the application of the "tax capitalization" model to the study of dividend repatriation and FDI decisions.

Froot and Hines examine the impact of the change in the U.S. interest allocation rules that followed passage of the Tax Reform Act of 1986. The 1986 act significantly lim-

ited the tax deductibility of the U.S. interest expenses of certain American multinational corporations. This tax change increased the tax liabilities of certain American multinationals, and made additional borrowing more expensive for these firms. Froot and Hines find that the change in interest allocation rules discouraged borrowing and new investments. Firms that were unable to deduct all of their interest expenses against their U.S. tax liabilities issued 4.2 percent less debt (measured as a fraction of total firm assets), and invested 3.5 percent less in property, plant, and equipment during 1986-91 than other firms did. This is consistent with other evidence that suggests that the Tax Reform Act of 1986 significantly raised the borrowing costs of some American multinational firms.

Cummins, Harris, and Hassett describe two different accounting regimes that govern reporting practices in most developed countries. "One-book" countries, such as Germany, use their tax books as the basis for financial reporting. "Two-book" countries, including the United States, keep the books largely separate. Firms in one-book countries may be reluctant to claim some tax benefits if reductions in their taxable income can be misinterpreted by financial market participants as signals of lower profitability. The authors' estimates suggest that differences in accounting regimes play an important role in describing domestic investment patterns, both within and across countries.

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

Bureau News

Industrial Organization Program Meeting

Members of the NBER's Program in Industrial Organization held their winter meeting on February 11 and 12. Program director Nancy L. Rose, NBER and Stanford University, and Robert H. Porter, NBER and Northwestern University, selected the following papers for discussion:

Steven T. Berry and **Ariel Pakes**, NBER and Yale University, and **James A. Levinsohn**, NBER and University of Michigan, "Voluntary Export Restraints and the U.S. Automobile Industry"

Discussant:

Frank A. Wolak, NBER and Stanford University

William M. Emmons III, Harvard University, and **Robin A. Prager**, MIT, "The Effects of Market Structure and Ownership on Prices and Service Offerings in the U.S. Cable Television Industry"

Discussant:

Margaret Slade, University of

British Columbia

Steven N. Wiggins, Texas A&M University, and

Robert Maness, Louisiana State University, "Price Competition in Pharmaceutical Markets"

Discussant:

Michael D. Whinston, NBER and Harvard University

Nancy L. Rose, and

Andrea Shepard, NBER and Stanford University, "Firm Diversification and CEO Compensation: Managerial Ability or Executive Entrenchment?" (NBER Working Paper No. 4723)

Discussant:

Benjamin Hermalin, University of California, Berkeley

Timothy F. Bresnahan, NBER and Stanford University, and

Shane Greenstein, NBER and University of Illinois, "The Competitive Crash in Large Scale Computing"

Discussant:

Bronwyn H. Hall, NBER and

University of California, Berkeley

Glenn Ellison, Harvard University, and

Edward L. Glaeser, NBER and Harvard University, "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach"

Discussant:

Peter C. Reiss, NBER and University of Wisconsin, Madison

Anne Gron, University of Chicago, "Regulation and the Prevalence of Direct Writers in Property-Casualty Insurance"

Discussant:

Nancy Wallace, University of California, Berkeley

Steven T. Berry,

Michael Carnall, University of Illinois, and

Pablo Spiller, University of California, Berkeley, "Airline Hubs: Cost and Demand"

Discussant:

Severin Borenstein, NBER and University of California, Berkeley

Berry, Levinsohn, and Pakes estimate that the Voluntary Export Restraint (VER) imposed by the United States on imports of automobiles from Japan during the 1980s was not really binding in its initial years, but increasingly became binding as the U.S. recession faded. They also find that, had a tariff been used instead of a VER, the import restriction would have enhanced U.S. welfare by about \$4 billion from 1985-8 relative to free trade (no import restriction).

Drawing on data from 1983 and 1989, **Emmons** and **Prager** ana-

lyze the underlying characteristics and behavior of competing versus monopoly cable television operators on the one hand, and privately versus nonprivately owned operators on the other. They find that competition and nonprivate ownership are associated with significantly lower prices for basic cable television service, but no differences in service quality.

Wiggins and **Maness** investigate the relationship between the number of competitors and the intensity of price competition in the pharmaceutical industry. They find

that prices start out high, decline sharply with early entry while remaining substantially above marginal cost, and then continue to decline with an increased number of sellers, even when there are relatively large numbers (20-30) of competitors. Their results support the position that entry of competing products offers pricing discipline for market leaders.

Rose and **Shepard** analyze data on 558 CEOs during 1985-90 that suggest that there are substantial compensation premiums for managers of diversified firms. The CEO

of a firm with two distinct lines of business averages 10 to 12 percent more in salary and bonus, and 13 to 17 percent more in total compensation, than the CEO of a similar-sized but undiversified firm. This corresponds to an average salary gain of \$100,000 to \$145,000 per year. Diversification may raise pay either because the CEO's job requires higher ability, or because it is associated with CEO entrenchment. The data support the ability explanation: the diversification premium is unaffected by tenure, and increasing diversification reduces compensation for incumbent CEOs.

Using a large dataset on mainframe computer users, **Bresnahan** and **Greenstein** focus on the changes wrought by the diffusion of microprocessor-based systems between 1984 and 1991. They find that many buyers face significant adjustment costs in moving between alternative computing platforms.

Ellison and **Glaeser** discuss the prevalence of Silicon Valley-style localization of individual manufacturing industries in the United States. They reaffirm previous observations that almost all industries are localized, although they find the degree of localization to be slight in about half of the industries in their sample. They use a number of comparisons to describe the scope and extent of geographic concentrations in U.S. manufacturing industries.

Gron finds that regulation of insurance rates is associated with significantly lower market shares for direct writers, or exclusive agents of insurers. However, the estimated difference between direct writers' market share in regulated and unregulated states is nearly the same for automobile lines, where regulation applies, as for homeowners' insurance, where regulation does

not affect prices directly. Systematic differences in profitability, growth, or firm size across regulated and unregulated states do not explain the observed relationship between rate regulation and direct writer market share, either.

Some analysts emphasize the potential for "monopoly power" on flights out of airline hubs, while some emphasize the potential cost reductions. **Berry, Carnall**, and **Spiller** combine a differentiated products model of demand for air travel with a model that allows hubs to decrease costs through the airlines' use of more efficiently sized planes. They find that hubs allow firms to charge higher prices to business travelers, but there are also cost reductions, at least for many types of flights. Further, variation in markups across different ticket prices accounts for at least one-third of the observed variance in prices, the authors estimate.

Blinder Nominated to Fed

Alan S. Blinder, who has been a research associate in the NBER's Program in Economic Fluctuations since 1978, was nominated by President Clinton to be vice chairman of the Federal Reserve Board of Governors. Blinder, who is also on leave from the economics department at Princeton University, is currently a member of the President's Council of Economic Advisers.

Blinder received his A.B. from Princeton, an M.Sc. from the London School of Economics, and a Ph.D. from MIT. He and his wife, Madeline, have two sons, Scott and William.



Economic Fluctuations Research Meeting

More than 65 members and guests of the NBER's Program in Economic Fluctuations gathered for a research meeting on February 17 and 18. Faculty Research Fellow Orazio Attanasio and Program Director Robert E. Hall, both of Stanford University, organized this agenda:

Steven J. Davis, NBER and University of Chicago, and

John C. Haltiwanger, NBER and University of Maryland, "Driving Forces and Employment Fluctuations: New Evidence and Alternative Interpretations"

Discussant:

Robert E. Hall

John H. Cochrane, NBER and University of Chicago, "Shocks" (NBER Working Paper No. 4698)

Discussant:

Olivier J. Blanchard, NBER and MIT

Susanto Basu, University of Michigan, "Procyclical Productivity: Overhead Inputs or Cyclical Utilization?"

Discussant:

Narayana Kocherlakota, University of Iowa

Richard Startz, University of Washington, "Growth States and Sectoral Shocks"

Discussant:

Peter Klenow, University of Chicago

Valerie R. Bencivenga and
Bruce Smith, Cornell University,
and

Ross M. Starr, University of
California, San Diego, "Liquidity
of Secondary Capital Markets,
Capital Accumulation, and the
Term Structure of Asset Yields"

Discussant:

John G. Heaton, NBER and MIT

Lars Peter Hansen, NBER and

University of Chicago,

Thomas J. Sargent, NBER and
Stanford University, and

Thomas D. Tallarini, Jr.,
University of Chicago, "Pessi-
mism, Neurosis, and Feelings
About Risk in General
Equilibrium"

Discussant:

Andrew W. Abel, NBER and
University of Pennsylvania

Davis and **Haltiwanger** ask what types of disturbances, including oil price shocks and innovations in monetary policy, affect employment and how. Focusing on the U.S. manufacturing sector during the 1970s and 1980s, they find a consistent difference in the dynamic response of gross job flows to aggregate and allocative shocks. Aggregate shocks produce relatively short-lived effects on job creation and destruction. Allocative shocks cause a sharp increase in job destruction that diminishes quickly, but their impact on job creation is long lasting, and peaks at about four quarters. Finally, the dynamic response of job creation and destruction to oil and credit shocks does not closely resemble the response to either aggregate or allocative shocks. This suggests that oil and credit shocks do not fit the profile of either the typical aggregate or allocative disturbance.

What shocks drive economic fluctuations? **Cochrane** examines technology and money shocks in some detail, and briefly reviews the evidence on oil price and credit shocks. He concludes that none of these popular candidates can account for the bulk of economic fluctuations. He then examines whether "consumption shocks," news that agents see but that we do not, can account for fluctuations.

Basu begins with the premise that materials input is likely to be measured with less cyclical error than labor and capital input, and that materials are likely to be used in strict proportion to capital and labor. In that case, materials growth provides a good measure of the unobserved changes in capital and labor input. Using this measure, he finds that the true growth of variable labor and capital inputs, on average, is almost twice the measured change in the capital stock or labor hours. More than half of that is caused by the presence of overhead inputs in production; the rest is caused by cyclical factor utilization.

GNP growth typically vibrates around a mean of a few percent per year; but, periodically, mean growth undergoes a major shift, thereafter vibrating around a new level. **Startz** presents a transmission mechanism that translates random sectoral shocks into just this sort of behavior, creating what might be thought of as multiple growth states. Small shocks cause vibration within a state; sufficiently large shocks cause a change of state. The model has two output sectors: input factors are drawn into the "leading sector," where learning-by-doing increases that sector's technological lead. If the "leading sector" is also the inherently high-growth sector, then growth is fast in both sectors.

Shocks to preferences and technologies cause a switch in the leading role between the high-growth and slow-growth sectors.

Bencivenga, Smith, and Starr investigate the role of liquidity in determining the level of activity both in secondary capital markets and in the real economy. They focus on the implications of transaction costs (a measure of liquidity) for equilibrium values. Host transactions in the financial markets of advanced economies occur in the secondary market; they rearrange the ownership of existing capital, rather than channeling savings into new investment. This trade is nevertheless highly productive; by providing liquidity to wealthholders, it promotes the accumulation of long-lived capital necessary to economic development and to an advanced industrial economy.

Hansen, Sargent, and Tallarini introduce a "risk adjustment" into general equilibrium versions of linear-quadratic economies. In addition to augmenting risk premiums in security market prices, the risk adjustment implies equilibrium quantity allocation rules that are sensitive to the amount of uncertainty in the environment. An alternative interpretation of the risk adjustment is: a pessimistic distortion in the forecasts of economic agents.



Nonrepresentative Agent Models

Ricardo J. Caballero, NBER and MIT, and Andrew Caplin, NBER and Columbia University, organized a workshop on "Nonrepresentative Agent Models" on February 19 for members of the Bureau's Program in Economic Fluctuations. The agenda was:

Andrew Caplin, and **John V. Leahy**, NBER and Harvard University, "Miracle on Sixth Avenue: Information Externalities and Search" and "The Economics of Adjustment" (NBER Working Paper No. 4687)

Boyan Jovanovic, NBER and New York University, and **Yaw Nyarko**, New York University, "The Bayesian Foundations of Learning-by-Doing" and "A Bayesian Learning-by-Doing Model Fitted to Plant and Other Data"

Ricardo J. Caballero, and

Mohamad L. Hammour, Columbia University, "Of the Timing and Efficiency of Creative Destruction"

Olivier J. Blanchard, NBER and MIT,

Simon Commander, World Bank, and

Fabrizio Coricelli, University of Sienna, "Unemployment and Restructuring in Eastern Europe"

J. Joseph Beaulieu and **Joseph Matthey**, Federal Reserve Board of Governors, "The Effects of General Inflation and Idiosyncratic Cost Shocks on Within-Commodity Price Dispersion: Evidence from Microdata"

Ricardo J. Caballero, and **Eduardo Engel**, Harvard University, "Explaining Investment Dynamics in U.S. Manufacturing: A Generalized (S,s) Approach"

Caplin and **Leahy** show that a simple model can explain both the long period when properties on Lower Sixth Avenue in New York are vacant, and the speed of the subsequent turnaround in that portion of the real estate market. They assume that vacant buildings are options available for many alternative uses. Committing a property to any one of these uses is costly. Owners can learn about the best use for their property from the experience of neighboring properties. Caplin and Leahy suggest that the delay until the first vacant unit is occupied is too long, because each owner has an incentive to wait for another owner to accept a tenant in order to use that tenant's experience to improve the rental price decision.

In their second paper, **Caplin** and **Leahy** argue that many topics

in macroeconomics can be viewed as part of the broader theory of the economics of adjustment. Their approach to the economics of adjustment stresses the role of learning and information externalities. They discuss how these concerns alter the quantitative nature of the adjustment process. In particular, there appears to be a general bias toward the underprovision of information in a variety of settings, and that leads to inefficient adjustment.

Jovanovic and **Nyarko** propose a model of learning how to perform an activity, with only two parameters: how much productivity one can gain by learning; and how fast the learning is attained. They then fit the model to the experience of new plants, but it also can be fitted to the experience of workers learning about a new activity that they perform repeatedly.

The authors conclude that the gains from learning-by-doing on a *given* activity are large and highly variable. Also, the transfer of knowledge from one technological generation to the next is difficult to estimate and surprisingly weak.

Caballero and **Hammour** analyze the timing, pace, and efficiency of the ongoing process of job reallocation that results from product and process innovation. In an efficient economy, both job destruction and creation ought to occur during cyclical downturns, when the opportunity cost of reallocation is lowest. However, malfunctioning labor markets generally disrupt this synchronized pattern by decoupling creation and destruction. Recessions, by accelerating job destruction, will have a beneficial "cleansing" effect on the productive structure; however, if more unemployment is undesirable, then the cleansing effect is always outweighed by the welfare loss from higher unemployment.

Blanchard, **Commander**, and **Coricelli** describe the evolution of labor markets in Eastern Europe since the beginning of the economic transition, using a number of country studies carried out by the World Bank. Specifically, they show the dynamics of employment, unemployment, and wages in the private and state sectors. For a few countries, they estimate the gross flows among employment, unemployment, and nonparticipation. Based on those findings, the authors offer an informal model of the interactions between unemployment and restructuring.

Beaulieu and **Matthey** examine plant-level product records from the U.S. Census of Manufactures to estimate the effects of inflation on price dispersion through variation in the drift rate of average target

prices within a market. They explain about one-fifth of the variation in the amount of price dispersion across different commodities. In general, they find that the higher the drift rate of the desired price of a given commodity, the larger the amount of price dispersion. The standard deviation of idiosyncratic shocks also is correlated positively with the degree of price dispersion,

while the standard deviation of aggregate shocks is correlated negatively with price dispersion.

Caballero and Engel derive a model of sectoral investment, which builds from the microeconomic adjustments of firms facing stochastic fixed costs of adjustment. They find clear evidence of nonlinearities in the dynamic behavior of postwar sectoral invest-

ment in U.S. manufacturing equipment and structures. The mean and standard deviation of the distribution of fixed adjustment costs faced by firms are 16 and 6.5 percent of a year's revenue (net labor payments) for equipment, and 59 and 8 percent for structures. For a given sequence of aggregate shocks, the nonlinear model generates brisker expansions and sharper contractions than its linear counterpart.

Behavioral Theories of Financial Markets

An NBER meeting on theories of the behavior of financial markets, organized by Research Associates Robert J. Shiller of Yale University and Richard H. Thaler of Cornell University, took place in Cambridge on February 25 and 26. Behavioral theories of financial markets address the concerns, attitudes, and abilities of market participants, and attempt to explain patterns of prices and returns. Some research demonstrates that financial markets do not always function "efficiently"; other work studies human behavior itself, emphasizing actions taken in financial markets.

The program for this meeting was:

David Ikenberry, Rice University.

Josef Lakonishok, University of Illinois, and

Theo Vermaelen, The European Institute of Business Administra-

tion, "Market Underreaction to Open Market Share Repurchases"

Discussant:

William Nelson, Federal Reserve System

William Nelson, "Do Firms Buy Low and Sell High? Evidence of Excess Returns on Firms That Issue or Replace Equity"

Discussant:

Josef Lakonishok

William Goetzmann, Yale University, and

Nadev Peles, Columbia University, "Cognitive Dissonance and Mutual Fund Investors"

Discussant:

Richard Herrnstein, Harvard University

Brad Barber, University of California, Davis, "Noise Trader Risk, Odd-Lot Trading, and Security Returns"

Discussant:

Werner De Bondt, University of Wisconsin, Madison

David Hirshleifer and **Ivo Welch**, University of California, Los Angeles,

"Institutional Memory, Inertia, and Investment Decisions"

Discussant:

Jeremy C. Stein, NBER and MIT

Johnette M. Sigwarth,

University of Iowa, "Changes in Consumer Confidence and the January Small-Firm Effect"

Discussant:

Richard H. Thaler

Rafael LaPorta, Harvard

University, "Expectations and the Cross-Section of Stock Returns"

Discussant:

Kenneth R. French, NBER and University of Chicago

Jeffrey Pontiff, University of Washington, "Costs of Arbitrage in Closed-End Funds"

Discussant:

Andrei Shleifer, NBER and Harvard University

Ikenberry, Lakonishok, and Vermaelen examine the long-run performance of 1239 share repurchases announced during 1980 to 1990. Using carefully constructed benchmarks, they find that the average excess four-year buy-and-hold return after the announcement of a

share repurchase is 12.6 percent. For "value" stocks, companies that are more likely to be making repurchases because of valuation, the average excess return is 45 percent. Thus, undervaluation appears to be an important motive. Furthermore, it appears that the market errs in its

initial response, and ignores much of the signal conveyed by this type of repurchase announcement.

Nelson observes large, positive excess long-horizon returns for firms that buy their own equity and large, negative excess returns for firms that sell it. During 1926-85,

the margin between portfolios of firms that repurchased their own equity and those that issued equity was about 10 percent per year for the five years after a significant change occurred in shares outstanding. Firms of all sizes have excess returns, which tend to increase with firm size. There are excess returns for all three 20-year subperiods, and they have risen dramatically over time. The size and duration of the margin, as well as the pattern across firms grouped by past performance, suggest that equity transactions occur in anticipation of the excess returns.

Goetzmann and Peles propose that some mutual fund investors are motivated by cognitive dissonance in their response to past performance of mutual funds. Cognitive dissonance is the conflict between beliefs and actions. New investors implicitly justify their use of performance rankings by the need for a rational basis upon which to choose mutual funds. Existing mutual fund investors resist switching funds because it implies that their previous difficult choice was, in fact, wrong. They reduce cognitive dissonance by positively adjusting their beliefs about their current fund. As a consequence, money will tend to flow more quickly into winners than out of losers. Indeed, Goetzmann and Peles note that the results of a pilot questionnaire study of mutual fund investors confirm earlier documented evidence of an "endowment effect," and suggest the presence of cognitive dissonance.

Barber shows that small firms do well when small investors are optimistic. In contrast, large firms generally are unaffected by the sentiment of small investors. Barber also shows that, on average, securities

that are sensitive to changes in small investor sentiment (and thus have high levels of noise trader risk) earn higher returns than securities that are insensitive to changes in small investor sentiment.

Hirshleifer and Welch examine the consequences of imperfect institutional memory for organizational decisions. In their model, new managers are aware of the firm's previous actions, but not the rationale for these actions. If the environment is stable, a firm that has followed an old investment policy long enough, and then changes management, generally

"The average excess four-year buy-and-hold return after the announcement of a share repurchase is 12.6 percent."

will have a greater tendency to follow old actions than a firm with full memory (that is, if the old manager had continued). On the other hand, if the environment is volatile, and the old manager has followed a policy only briefly, then the previous investment decisions are not very informative, and new managers can be excessively impulsive (prone to follow their latest information without regard to history).

Do changes in consumer confidence explain the January small-firm effect? Surveys show that consumers experience renewed optimism in January and continued pessimism throughout the fourth quarter. **Sigwarth** considers changes in confidence stockselling for the purpose of tax losses, and differential information among shareholders. She shows that for 1983-92, changes in consumer confidence provide a partial explanation for the January small-firm effect.

LaPorta uses survey data on stock market analysts for 1981-9 to show that value strategies work because they exploit systematic errors in the way that investors form expectations about the future. Strategies that exploit errors in analysts' expectations earn high risk-adjusted returns, because investors overreact to new information. In the year following an analysis, analysts sharply revise their expectations in the direction and magnitude predicted by the overreaction hypothesis. Furthermore, the behavior of excess returns around quarterly earnings announcements supports the overreaction hypothesis.

Pontiff finds that the behavior of closed-end fund discounts is consistent with models of costly arbitrage.

The market value of a closed-end fund is more likely to deviate from the value of its assets when interest rates are high, and for funds that: 1) have portfolios that are difficult to replicate; 2) pay out smaller dividends; and 3) have larger relative bid-ask spreads. These factors are related to the magnitude of the deviation, as opposed to the direction, and explain one-fifth of cross-sectional mispricing variation.



Productivity Program Meets

The NBER's Program in Productivity met in Cambridge on March 7. Adam B. Jaffe, NBER and Harvard University, organized the following program:

Samuel S. Kortum, NBER and Boston University, "A Model of Research, Patenting, and Productivity Growth" (NBER Working Paper No. 4646)

Discussant:

Peter Klenow, University of Chicago

Lynne G. Zucker and **Marilynn B. Brewer**, University of California, Los Angeles; and **Michael R. Darby**, NBER and University of California, Los Angeles, "Intellectual Capital and the Birth of U.S. Biotechnology

Enterprises" (NBER Working Paper No. 4653)

Discussant:

Joshua Lerner, Harvard University
Boyan Jovanovic, NBER and New York University, and

Yaw Nyarko, New York University, "A Bayesian Learning-by-Doing Model Fitted to Plant and Other Data" (See "Nonrepresentative Agent Models" earlier in this section of the *Reporter*.)

Discussant:

Robert S. Pindyck, NBER and MIT
David Austin, Resources for the Future, "Patent Citations and Appropriability"

Discussant:

Jenny Lanjouw, NBER and Yale University

Kortum develops a model of research as a search process, seeking to explain the interrelationships among employment of research scientists and engineers, patented inventions, and total factor productivity. He suggests that inventions that can be patented are becoming increasingly difficult to discover as the quality of research techniques in use improves. Still, inventions that eventually are patented represent measurable improvements on current techniques. Since the economy is growing, patents are increasingly valuable, thereby explaining continued increases in research efforts.

Zucker, Darby, and Brewer examine how the intellectual capital of scientists making frontier discoveries, the presence of university bioscience programs and venture capital firms, and other economic variables are linked to the founding of U.S. biotechnology enterprises during 1976-89. They find that

the timing and location of the birth of biotech enterprises is determined primarily by intellectual capital measures, particularly the local number of highly productive "star" scientists actively publishing genetic sequence discoveries. They believe that biotechnology may be prototypical of the birth patterns in other innovative industries.

Analyzing a large collection of biotechnology patents, **Austin** evaluates a proxy for the value of a patent based on the number of patent citations. He finds that patents that eventually receive many citations are associated with larger positive stock market returns on their grant date than patents that ultimately receive no citations. Patents whose citations come largely from other patents owned by the same firm are more valuable (than other patents). Thus, the rate of "self-citation" is a good indicator of successful appropriation of the returns to the invention, Austin concludes.

During the afternoon session of the program meeting, Wes Cohen of Carnegie-Mellon University described his current study of cooperative university/industry research centers. Frank R. Lichtenberg, of NBER and Columbia University, discussed his project on R and D collaboration in Europe; Program Director Zvi Griliches, of Harvard University, talked about the Israeli data on R and D that he and Chaim Regev are collecting; and Ron Jarmin of the U.S. Census Bureau described his ongoing research on measuring spillovers in learning-by-doing among manufacturing establishments.



Mishkin to N.Y. Fed

Frederic S. Mishkin, a member of the NBER's Programs in Economic Fluctuations and Monetary Economics since 1980, was recently named Executive Vice President and Director of Research of the Federal Reserve Bank of New York. Mishkin will assume his new position in September, taking a leave from his post as the A. Barton Hepburn Professor of Economics at Columbia University's Graduate School of Business.

Mishkin received both his B.S. and Ph.D. from MIT. He has taught at the University of Chicago, Northwestern University, and Princeton University, and is the author of *The Economics of Money, Banking, and Financial Markets*, 3rd edition, the leading textbook in its field. Mishkin is also an associate editor of four professional journals, and has served on the editorial board of the *American Economic Review*.

Economic Growth

The NBER's Program on Economic Growth met in Cambridge on March 18 and 19. NBER Research Associates Robert J. Barro, Harvard University, and Paul M. Romer, University of California, Berkeley, organized this program.

Paul M. Romer, "New Goods, Old Theory, and the Welfare Costs of Trade Restrictions" (NBER Working Paper No. 4452)

Discussant:

Oliver Hart, NBER and Harvard University

Philip Keefer and

Stephen Knack, University of Maryland, "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures"

Discussant:

According to **Romer**, the typical economic model implicitly assumes that the set of goods in an economy never changes. As a result, the predicted efficiency loss from a tariff is small: on the order of the square of the tariff rate. If we assume instead that international trade can bring new goods into an economy, then the fraction of national income lost when a tariff is imposed can be as much as two times the tariff rate.

Keefer and **Knack** find that institutions that protect property rights are crucial to economic growth and to investment. Moreover, the effect of those institutions on growth persists, even after controlling for investment. This suggests that the security of property rights affects not only the magnitude of investment, but also the efficiency with which inputs to production are allocated.

Young documents the funda-

Jim Alt, Harvard University

Alwyn Young, NBER and MIT, "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience" (NBER Working Paper No. 4680)

Discussant:

Hak K. Pyo, Seoul National University

Boyan Jovanovic, NBER and New York University, and

Yaw Nyarko, New York University, "The Bayesian Foundations of Learning by Doing" (See "Nonrepresentative Agent Models" earlier in this section of the *Reporter*)

Discussant:

Peter Howitt, University of Western Ontario

Andrew D. Foster and

Mark R. Rosenzweig, University of Pennsylvania, "Technological

mental role played by factor accumulation in explaining the extraordinary postwar growth of Hong Kong, Singapore, South Korea, and Taiwan. Participation rates, educational levels, and (with the exception of Hong Kong) investment rates have risen rapidly in all four economies. In addition, there have been large intersectoral reallocations of labor with (again, except in Hong Kong) nonagricultural and manufacturing employment growing one-and-a-half to two times as fast as the aggregate working population. Thus, while the growth of output per capita in these economies has averaged 6 to 7 percent per year over the past two-and-a-half decades, the growth of output per effective worker in the nonagricultural sector has been only 3 to 4 percent per year.

Foster and **Rosenzweig** examine the extent to which the returns

to schooling (and other factors of production) are altered by technical change. They use data from rural India spanning a period in which there were quite different rates of economic growth across regions because of differences in technologies. They find that the returns to education rose at higher rates in areas experiencing higher rates of increase in real agricultural profits. They also find that enrollment rates are higher in *all* rural households in areas with high rates of productivity. But, when the pace of technical change increases, enrollment rates respond positively only in farm households.

Change and Human Capital Returns and Investments: Consequences of the Green Revolution" Discussant:

Jonathan Morduch, Harvard University

Michael Kremer, NBER and MIT, and

Eric Maskin, Harvard University, "Segregation by Skill and the Rise in Inequality"

Discussant:

Sherwin Rosen, University of Chicago

Casey B. Mulligan, University of Chicago, and

Xavier Sala-i-Martin, NBER and Yale University, "Some Evidence on the Link Between Aggregate Income and Human Capital"

Discussant:

Kevin M. Murphy, NBER and University of Chicago

Kremer and **Maskin** note that recent increases in wage inequality have been accompanied by increasing segregation of high- and low-skilled workers into separate firms. Both trends can be explained if workers of different skill are not

perfect substitutes. Then either skill-biased technological progress or increased skill dispersion can cause high-skilled workers to segregate into separate firms and reduce wages of low-skilled workers. Data from the United States and United Kingdom suggest that skill-biased technological progress does not explain rising inequality.

Mulligan and Sala-i-Martin construct economywide aggregates of human capital for each of 48 states in six census years, 1940–90. Their measures focus on the earning power of the labor force, and allow for the fact that the relevance and quality of schooling and on-the-job training vary over time and across locations. They find that in

1990, the human capital stock was highest in New York, followed by Delaware and Minnesota. The lowest values were in Montana, Mississippi, and Rhode Island. The Northeast as a whole enjoyed the highest values of human capital between 1940 and 1980, but lost its lead to the Midwest in 1990.



Spring Meeting of Asset Pricing Program

Members of the NBER's Program in Asset Pricing met in Cambridge on April 8. Their agenda, organized by Andrew B. Abel, NBER and University of Pennsylvania, was:

Urban J. Jermann, Graduate Institute of International Studies, Geneva, "Asset Pricing in Production Economies"

Discussant:

John H. Cochrane, NBER and University of Chicago

Geert Bekaert, Stanford University,

Robert J. Hodrick, NBER and Northwestern University, and

David A. Marshall, Northwestern University, "The Implications of First-Order Risk Aversion for Asset Market Risk Premiums" (NBER Working Paper No. 4624)

Discussant:

Stanley E. Zin, NBER and Carnegie-Mellon University

Jacob Boudoukh and

Robert F. Whitelaw, New York University, and

Matthew Richardson, University of Pennsylvania, "Industry Returns and the Fisher Effect"

Discussant:

Frederic S. Mishkin, NBER and Columbia University

Peter Bossaerts, California Institute of Technology, and

Pierre Hillion, The European Institute of Business Administration, "Selecting Models to Forecast Financial Returns: A New Criterion"

Discussant:

Andrew W. Lo, NBER and MIT

Jaesun Noh and

Alex Kane, University of California, San Diego, and

Robert F. Engle, NBER and University of San Diego, "Test of Efficiency for the S&P 500 Index Option Market Using Variance Forecasts" (NBER Working Paper No. 4520)

Discussant:

David S. Bates, NBER and University of Pennsylvania

Robert F. Stambaugh, NBER and University of Pennsylvania, "Estimating Conditional Expectations When Volatility Fluctuates" (NBER Technical Paper No. 140)

Discussant:

Daniel Nelson, NBER and University of Chicago

Jermann develops a model to account for the fact that, historically, the average annual rate of return on equity has exceeded the annual rate of return on short-term debt by about 6 percentage points. In the model, consumers form habits that can lead to a relatively large premium in the return on stocks relative to bonds. The model also assumes that it is costly to change the capital stock, which leads to increases in the variability of stock prices. Further, the model includes financial leverage, which contributes to dividend volatility. Together, these effects account for about half of the premium earned by equity.

Traditional theoretical models have been unable to account for the apparent predictability of excess returns in markets for equity, bonds, and foreign exchange. **Bekaert, Hodrick, and Marshall** develop a new model based on a concept known as first-order risk aversion: that is, substantial aversion to even small gambles. Using this formulation of risk aversion in a two-country monetary model increases the degree to which asset returns are predictable, but not by enough to match the predictability of actual returns, as measured in the data.