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Program Report

Public Economics

James M. Poterba*

There have been major changes in U.S. tax policy, and much discussion of possible changes in expenditure programs, since my report three years ago on the Public Economics (PE) Program. The Economic Growth and Taxpayer Relief Reconciliation Act of 2001 is the most significant change in federal tax policy since the Tax Reform Act of 1986.

While there have been no comparably dramatic recent changes in government expenditure programs, the policy debate on two major programs has shifted quite sharply. Reforming Social Security and Medicare, long viewed as a political impossibility, has risen high on the policy agenda. While policy debate on these important issues has received little attention since the tragic events of September 11, a political dialogue on these programs started before that date, and it will surely continue in the future. Recent events also have generated new interest in old questions about the government's role in the private economy, with particular emphasis on insurance markets and the transportation sector.

The extraordinary level of policymaking activity with respect to both taxation and expenditure programs has been accompanied by a great deal of research activity by NBER affiliates in the field of public economics. In the last three years, more than 400 Working Papers were published in the PE Program. Program affiliates published four major books on topics involving taxation and public expenditure, along with three special issues of refereed journals and three new *Tax Policy and the Economy* volumes. The 81 program members participated in more than 20 research meetings ranging from small working group gatherings on narrow topics to full-scale Program Meetings and the biennial Trans-Atlantic Public Economics Seminar. The researchers in the PE Program currently are studying the economic effects of taxation, social insurance programs, and a host of other government policies. Their work provides critical input for policymakers who are considering reform options.

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Two new NBER initiatives, the Working Group on Environmental Economics and the Program on the Economics of Education, have been created under the direction of PE Program members Don Fullerton and Caroline M. Hoxby, respectively. These new organizational structures provide an important opportunity for researchers working on specific topics that are broadly within the purview of public economics to meet and discuss recent research developments. The NBER Program on the Well-Being of Children, directed by PE Program member Jonathan Gruber, is another example of such a specialized program.

In this report, I describe several components of the recent research by PE program members. The report is necessarily selective, and it excludes far more research than it includes. In light of the substantial recent policy interest and research activity on taxation and Social Security reform, I have focused most of this summary on new studies that bear on those topics. I also briefly describe new work on two emerging research areas.

Personal Income Taxes

Recent research by NBER affiliates provides new evidence on how taxes affect household decisions about labor supply, saving, charitable giving, and a range of other behaviors. The changes in the U.S. individual income tax that were enacted in 1993 and 1997 have provided an important opportunity to learn more about the impact of taxation. Researchers not only have analyzed these reforms, but also have developed new conceptual approaches for looking at a range of tax policy issues.

One of the most important empirical concerns about the individual income tax is the impact of changes in marginal tax rates on the amount of taxable income reported by taxpayers. Recent research provides substantial new insight on this issue [7512, 7367, 6584, 6582, 6576]. Other research finds new evidence on: the link between taxes and labor supply, as measured by hours of work [6759, 6621]; how tax rates affect taxpayer compliance [6575]; and how the differential tax treatment of different types of capital income affects the structure of household portfolios [8340, 8223, 7392]. Several studies have focused on the increasingly important Earned Income Tax Credit (EITC) [8078, 7363, 6856]. They suggest that tax code provisions have important effects on labor force participation and hours

of work. These findings, which apply primarily to young households with children, are mirrored in findings about the labor supply behavior of older households that face the Social Security earnings test [7923, 7200].

The recent decline in the personal saving rate as measured in the National Income and Product Accounts has drawn new attention to the possible impact of public policy, and in particular the individual income tax, on the level of household saving. Recent NBER studies address the broad impact of the income tax on rates of return and saving [7061], as well as the effect of specialized tax provisions, such as the 401(k) retirement saving program and Individual Retirement Accounts [8032, 7991, 7314, 7268, 7192, 7007]. Two questions that have attracted particular attention are what factors influence employee decisions about 401(k) contributions and participation [7735, 7682] and whether 401(k)-type accounts offer savers a higher rate of return than they could obtain elsewhere [8341, 8170]. Other recent work shows how dividend taxes affect share values [8486, 7445], thus informing the perennial debate about whether the corporate income tax should be integrated with investor-level taxes on corporate capital income.

The tax treatment of capital gains is a feature of the tax code that affects the return to saving and that has attracted significant attention recently. The capital gains tax can affect the overall level of saving, but it is particularly significant because it may affect risk taking and entrepreneurial activity [7976] and because changes in capital gains tax rules can affect the market value of risky assets [8011, 7893, 7644, 6885]. New research illuminates the link between capital gains taxation and the trading decisions of individual investors [7827, 7532, 6616]. Because the capital gains tax treatment of mutual fund investments has become increasingly important for many households, several recent papers explore this aspect of the tax [7669, 7595].

Recent policy debates concerning the estate and gift tax, and the changes to it that were enacted in 2001, have stimulated a very significant body of empirical research on the economic effects of this tax [8333, 8261, 8205, 8158, 7960, 7811, 7775, 7663, 7360, 6842]. These studies develop a conceptual framework for analyzing how the estate tax affects incentives for saving, charitable giving, and inter vivos giving. They also provide important input for the ongoing policy debate on the reform of taxes on intergenerational transfers.

Corporate Income Taxes

While corporate income tax rules were not changed as much during the 1990s as individual income tax rules were, the economic effects of the corporate income tax remain a subject of active investigation. Recent work focuses on the economic impact of investment incentives, including depreciation allowances and investment tax credits [6731, 6615], and on the links between tax policy and corporate financial behavior [8203, 7821, 7433]. There also has been new research on the ultimate incidence of the corporate income tax [8280], and on the effect of tax-induced changes in the cost of capital on business investment [7558].

The taxation of multinational firms is another area of ongoing interest. Researchers have considered the impact on firm dividend decisions of taxes that are triggered by the repatriation of foreign earnings [8507]. More generally, the researchers have looked at the effects that current tax rules have on firm investment and financing decisions [8440, 8144, 7929, 7920, 7903]. One of the most active areas of discussion on corporate tax policy during the 1990s has been the treatment of income earned by firms when they export products [8121, 8009]. Researchers have also considered the role of capital income taxes in inducing investors to hold more assets in their home country, rather than abroad, than a model of diversified investing would suggest [8193]. One

of the new books in the PE program, *International Taxation and Multinational Activity*, edited by Research Associate James R. Hines, Jr., is directly concerned with this broad set of issues.

A number of other issues involving corporate tax policy have also received attention from NBER researchers. These include: the impact of state insurance taxes on the financial behavior of multi-state insurance companies [6590]; the deadweight burdens associated with the taxation of wireless communication [7281]; and the tax treatment of executive compensation and its role in affecting the level and structure of corporate pay [7842, 7626, 7596]. On a broader scale, recent research has explored the potential design of "cash flow" taxes on business income [8122].

Social Security

As the Baby Boom generation grows older, both public and private sector retirement programs have attracted new scrutiny from applied economists. There has been a particular increase in research activity focused on the Social Security systems of the United States and other nations. The research includes historical and descriptive analyses of the evolution of the current U.S. system as well as a basic framework for analyzing retirement income [8488, 8451, 8258, 7362, 6603]. A new book by Research Associates Jonathan Gruber and David A. Wise on *Social Security and Retirement Around the World* provides important evidence on how the social security system may affect labor supply. There is also conceptual research on the appropriate framework to use in evaluating potential Social Security reforms [7119, 7118, 7117, 6719, 6610].

Recent empirical studies illustrate the distributional impact of both the current Social Security program and potential alternatives [8329, 7597, 7570, 7568, 7560, 7520, 6989]. Researchers also have considered the impact of the current system on household behavior, particularly on retirement [7830, 7651, 7339].

Further, new studies investigate the extent to which households understand their current Social Security benefits [7368], whether they recognize and act upon the consequences associated with claiming benefits at different ages [7318], and the interaction between Social Security and other programs that provide benefits to low-income elderly households [7574].

Risk sharing is an important feature of the current Social Security system, and it may become important in various alternatives as well. Several researchers have shown how the current system shares risk across households and generations [8270, 8064, 7861, 7031, 7030, 7016, 6839]. The investment behavior of the current Social Security trust fund also is related to concerns about risk. As policy attention on trust fund investment expanded in recent years, so too did research on the consequences of alternative investment policies [8259, 7739, 7015, 6991].

What are the potential consequences of replacing or supplementing the current Social Security program with systems of individual investment accounts? A number of studies consider the distributional, risk sharing, and other economic effects of such accounts [7767, 7492, 7065, 7050, 7049, 7005, 6970, 6918, 6540]. This line of inquiry helps to inform the ongoing national policy debate on Social Security reform. NBER Research Associate John Y. Campbell and NBER President Martin S. Feldstein edited a new NBER book, *Risk Aspects of Investment-Based Social Security Reforms*, that focuses attention on risk issues.

The current Social Security program also provides inflation-indexed annuities for retirees. A number of recent studies have explored the operation of private annuity markets, with an emphasis on understanding how they might be used in conjunction with a system of individual retirement accounts [8045, 7812].

NBER researchers have not limited their attention to the U.S. Social Security system. They also have considered the social security program in Germany [8503, 7304], in Europe

more generally [8487, 8103], in South Africa [8495], China [6794], and Singapore and Australia [8091].

Other Research Initiatives

While there has been a great deal of research activity on issues involving taxation and Social Security reform, there also has been much progress in studying other issues in public economics. These include the design of public policies toward the environment, the economic effects of public policies that bear on education and health care, and the incentive and distributional impact of expenditure programs designed to benefit children and the elderly. Since there are distinct NBER programs or projects concerned with each of these topics, I will not summarize recent work in these areas. Rather, I will describe some recent advances in two areas that fall broadly within the purview of public economics but are not the subject of separate programs: the political economy of public policy and the economics of public policy toward crime.

Political Economy

Public finance researchers traditionally have focused on the effect of government programs, and the effects of tax policies, with less attention to the question of why legislators and other elected officials enact particular programs. The rapidly expanding field of political economy tackles this aspect of public policy, and in recent years, an increasing volume of activity in public economics has focused on these issues. Recent work tries to explain the structure of welfare programs [8524, 8405, 8267, 6995, 6746, 5774], the nature of policies that transfer resources across generations [8394, 7518], the role of government in financial markets [7110], the difference between elected and appointed officials [7579], the factors that determine the size of government [6789, 6727, 6655], and more generally the impact of political institutions on policy outcomes [8214, 8154, 8036, 7342, 7097, 6848]. In collaboration with

Juergen von Hagen, I edited a new volume on *Fiscal Institutions and Fiscal Performance* that offers new insight on several of these issues.

Other political economy research focuses on issues that involve both political science and public finance, such as the factors that lead to electoral success [8441, 8252] and the nature of sorting across communities by income, preferences, and other factors [7859, 6977, 6822].

Public Policies Toward Crime

Providing for public safety is widely recognized as a central function of the government in modern market economies. This issue has attracted new attention in the last few months, although the particular types of criminal activity attracting attention are rather different than those studied in most academic research on the economics of crime.

Several researchers in the PE program are carrying out projects that will provide information on the impact of public expenditures, whether through prisons or though the provision of police services, on the level of crime. Some studies [8204, 6784] consider the determinants of crime and the impact of public policies. Other research considers the effect of prison sentences of various lengths, both on prospective criminal activity (through deterrence) and on the behavior of those who have been in prison [8489, 8004, 7967, 6786]. Some research considers the economics of criminal organizations [6592], the factors that determine punishments for various crimes [7676], and the impact of changing incarceration and prosecution costs on state and local government budgets [8382].

Government Service

Because public economics is concerned with the analysis of government policy, it is no surprise that many members of the PE Program have been called upon to serve in government agencies that address economic

policy. Program members also try to bring their research to the attention of the policymaking community through outlets such as the annual "Tax Policy and the Economy" conference, held in Washington, D.C., at which researchers present their latest policy-relevant findings.

During the last three years, program members have served in a number of distinguished capacities. Lawrence H. Summers, while a Research Associate (on leave) in the PE Program, served as Secretary of the Treasury. R. Glenn Hubbard is currently serving as the Chairman of the Council of Economic Advisers (CEA), while Mark B. McClellan is one of the Council members. Douglas Holtz-Eakin is the Chief Economist at the CEA. Kathleen McGarry has served, and Jeffrey Brown is currently serving, as a senior staff economist at the CEA.

Research Summaries

Integrating Multinational Firms into International Economics

James R. Markusen*

As recently as the mid-1980s, research on multinational firms was almost entirely separate from research on international trade. The latter was dominated by general-equilibrium models using the twin assumptions of perfect competition and constant returns to scale. In this theory, there was little role for individual firms; indeed, theorists spoke only of industries, not firms. Multinational firms generally were approached from a case-study perspective, or at best in a partial-equilibrium setting.

To the extent that multinationals and foreign direct investment were treated at all in trade theory and open-economy macroeconomics, they were viewed as part of the theory of portfolio capital flows. The view was that capital, if unrestricted, flows from where it is abundant to where it is scarce. The treatment of direct investment as a capital flow was evidenced in data sources as well. There were lots of data on direct investment stocks and flows, but little on what multinationals actually produced, where they produced it, and where they sold it.

It took little staring at available statistics to realize that viewing direct investment as a capital flow was largely a mistake. The overwhelming bulk of direct investment flows both from and to the high-income developed countries and there is a high degree of cross penetration by firms from these countries into each other's markets. It also appeared that the decision about whether and where to build a foreign plant is quite separate from how and where to raise the financing for that plant. Lastly, casual observation suggested that the crucial factor of production involved in multinational location decisions was skilled labor, not physical capital. By the late 1970s, I began to believe that location and production decisions should be the focus of a new microeconomic approach to direct investment while financial decisions should remain part of the traditional theory of capital flows.

Much of my work over the last two decades[1] has thus been to develop a microeconomic, general-equilibrium theory of the multinational firm. This theory should satisfy several conditions. First, it should be easily incorporated into general-equilibrium trade theory. Second, it should be consistent with important stylized facts, such as the large volume of cross investment among the high-income countries. Third, it should generate testable predictions and survive more formal econometric testing.

One useful starting point for theory is a conceptual framework proposed by British economist John Dunning, who suggested that there are three conditions needed for a firm to become a multinational. First, the firm must have a product or a production process such that the firm enjoys some market power or cost advantage abroad (ownership advantage). Second, the firm must have a reason to want to locate production abroad rather than concentrate it in the home country (location advantage). Third, the firms must have a reason to want to own a foreign subsidiary rather than simply license to or sub-contract with a foreign firm (internalization advantage).

I have used these ideas as conceptual guides in building a formal theory. In my models with Horstmann and Venables[2], the ownership advantage is modeled by the existence of firm-level as opposed to plant-level scale economies. The general idea is that there are knowledge-based activities such as R and D, management, marketing, and finance that are at least

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partially joint inputs across separate production facilities in that they can yield services in additional locations without reducing services in existing locations. We assume that activities can be fragmented geographically, so that a plant and headquarters can be located in different countries, for example. Finally, we assume that different activities have different factor intensities, such as a skilled-labor-intensive headquarters or components production and an unskilled-labor-intensive production plant. I have termed these properties jointness, fragmentation, and skilled-labor intensity respectively.

Jointness is the key feature which gives rise to horizontal multinationals, firms that produce roughly the same goods and services in multiple locations. For these firms, broadly defined trade costs constitute a location advantage, encouraging branch-plant production abroad. Fragmentation and skilled-labor-intensity are key features which give rise to vertical multinationals, in turn geographically fragmenting the production process by stages. For vertical firms, low trade costs may be a location advantage. Differences in factor endowments and prices across countries encourage geographic fragmentation, resulting in the location of stages of production where the factors of production they use intensively are cheap.

These elements are not difficult to incorporate into industrial-organization models of trade. The latter models are then enriched by allowing firms to choose their "type" in a first-stage, selecting the location of their headquarters and the number and location of their plants. The second stage decision may be a Cournot output game or a standard monopolistic-competition model. Multinationals arise endogenously, depending on country characteristics including country sizes, factor endowments, and trade costs.

Internalization advantages are not easily added to the same models. The issues here are the stuff of the theory of the firm and the boundaries of the firm in particular. The reasons for firms to wish to own foreign subsidiaries rather than to license technol-

ogy, for example, include factors such as moral hazard, asymmetric information, in-complete and non-enforceable contracts, and so forth. It becomes technically awkward to incorporate these factors into general-equilibrium models, so they often are embedded in more specialized, partial-equilibrium models.

Nevertheless, my view is that the same properties of knowledge-based assets that give rise to jointness also give rise to the risk of asset dissipation, moral hazard, and asymmetric information. A blueprint that can be used easily in a foreign plant as well as a domestic one may also be copied easily or stolen. Licensees or possibly the firm's own employees may quickly absorb the technology and defect to start rival firms if contracts are not enforceable. Thus the theory is relatively unified, but internalization or choice of mode issues (for example, owned subsidiary, licensing, exporting) often are addressed in specialized models.

These new models yield clear and testable predictions as to how we should expect multinational activity to relate to country characteristics, industry characteristics, and trade and investment costs. Consider two countries, and an industry in which firms can decompose production into a headquarters activity and a production activity. Horizontal firms, which roughly duplicate the activities of home-country plants in foreign branch plants will tend to arise when countries are similar in size and in relative endowments, and when trade costs are moderate to high relative to investment costs (or technology transfer costs). In particular, it is the host-country's trade and investment costs that matter, not the home country's costs. The results on country size and relative-endowment similarity can best be understood by noting what happens in countries that are not similar in one of these respects. First, if there are plant-level scale economies, then a large difference in country size will favor single-plant national firms that are headquartered and producing in the large country, and exporting to the small country instead of incurring the

high fixed costs of a foreign plant. Second, if countries are of similar size but differ significantly in relative endowments, then single-plant firms headquartered in the skilled-labor abundant country will have an advantage unless trade costs are very high. Third, when countries are similar in size and in relative endowments, there should be two-way direct investment in which horizontal firms penetrate each other's market via branch plants rather than through exports.

Vertical firms separating a single plant and headquarters, on the other hand, are encouraged by factor-endowment dissimilarities. Under the skilled-labor-intensity assumption just discussed, large differences subject to moderate or small trade costs should favor locating the headquarters in the skilled-labor-abundant country and having a single plant in the unskilled-labor-abundant country. Factor-endowment differences between countries will be reinforced if the skilled-labor-abundant country is also the small country. In the latter situation, the headquarters should be located in the skilled-labor-abundant country, while the single plant should be located in the other country both for factor-price motives and for market-size motives (minimizing total trade costs). Vertical activity generally should be one way, from skilled-labor-abundant (especially smaller) countries to unskilled-labor-abundant (especially larger) countries.

As indicated above, these are clearly testable predictions and suggest regression equations to explain world multinational activity. There are now a number of such studies published, including Brainard[3] and Carr, Markusen, and Maskus[4] with others forthcoming or in working paper form. The dependent variable is generally production in country j by affiliates of firms headquartered in country i. The right-hand-side variables (including interaction terms among these variables) are the country sizes, country factor endowments, trade costs in both directions, investment barriers, and industry-specific variables such as firm and plant scale measures, R and D indexes, and so forth. The general

approach outlined above gets good support in the empirical analysis. Key variables have the correct signs and generally high statistical significance. Outward multinational activity from country i to country j (production by affiliates of country i firms in j) is increasing in the joint market size, decreasing in size differences, increasing in the relative skilled labor abundance of country i, increasing in country j's inward trade cost, and decreasing in country j's investment barriers. Across industries, affiliate activity is in-creasing in measures of firm-level scale economies such as R and D, headquarters activities, and advertising intensity, and is decreasing in plant-level scale economies.

There seems to be some consensus that, if one were to look for a single model that is effective in explaining a large proportion of multinational activity, we would clearly choose a pure horizontal model over a pure vertical model. The casual evidence discussed earlier is confirmed by formal econometric testing: multinational activity is highly concentrated among the high-income developed countries with significant two-way penetration of each other's markets in similar products. Such investments quantitatively dominate activity from developed to developing countries. Thus a theory based on knowledge-based assets and firm-level scale economies seems to be a much better approach than a more obvious and traditional theory based on factors flows.

To say that the horizontal approach is a better overall model than a vertical theory is not, of course, to say that vertical activity is unimportant. It is clearly important in many sectors and for many developing host countries and no one is suggesting otherwise. Recent empirical papers by Hanson and Slaughter[5] and Yeaple[6] are quantifying the range of strategies taken by multinational firms across industries and host countries. It is also worth emphasizing that some vertical activity, including assembly, footwear, and clothing production is carried out by independent contractors in devel-

oping countries and thus does not appear in the affiliate production statistics.

Future work will likely proceed on several fronts. In the theory area, more work on internalization or micro-theory-of-the-firm models would be welcome, creating a better understanding of the choice of mode by firms. It is particularly desirable if new models can be fitted together with the general-equilibrium models emphasizing ownership and location. Further work with the general-equilibrium models connecting production decisions with factor markets is important. There seems to be some two-way causality at work, where multinationals are only attracted to countries with minimum levels of labor skills and social infrastructure, yet the entry of multinationals in turn contributes to skill upgrading and skill accumulation.

In the empirical area, work on the choice of mode is also desirable. Why do we see owned-subsidiaries in electronics assembly, but rarely see them in clothing and footwear production which use independent contractors? When and why do we see licensing instead of owned subsidiaries? More clarification on the importance of vertical firms is also desirable, and on the use of certain countries as export platforms.

Research on policy issues also is needed. The two-way causality just noted is important for public policy and suggests the possibility of multiple equilibriums and low-level development traps. While much work has been done on taxes, there is virtually none on the importance and composition of government expenditure. Yet casual evidence suggests that social infrastructure, including physical, educational, and legal infrastructure, is very important in attracting inward investment.

[1] Most of my work on multinationals has now been rewritten, synthesized, and extended in: J. R. Markusen, Multinational Firms and the Theory of International Trade, Cambridge: MIT Press, forthcoming in 2002.
[2] I. J. Horstmann and J. R. Markusen, "Endogenous Market Structures in International Trade," NBER Working Paper No. 3283, March 1990, and in the Journal of International Economics 32 (1992), pp. 109-129; J. R. Markusen and A. J. Venables, "Multinational Firms and the New Trade Theory," NBER Working Paper No. 5036, February 1995, and in Journal of International Economics, 46 (1998), pp. 183-204; J. R. Markusen and A. J. Venables, "The Theory of Endowment, Intra-Industry and Multinational Trade," NBER Working Paper No. 5529, April 1996, and in Journal of International Economics, 52 (2000), pp. 209-35.
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[4] D. L. Carr, J. R. Markusen, and K. E. Maskus, "Estimating the Knowledge-Capital Model of the Multinational Enterprise," NBER Working Paper No. 6773, October 1998, and in American Economic Review, 91 (2001), pp. 693-708. J. R. Markusen and K. E. Maskus, "Multinational Firms: Reconciling Theory and Evidence," NBER Working Paper No. 7163, June 1999, and in Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey, M. Blomstrom and L. Goldberg, eds., Chicago: University of Chicago Press, 2001; J. R. Markusen and K. E. Maskus, "Discriminating Among Alternative Theories of the Multinational Enterprise," NBER Working Paper No.7164, June 1999.
[5] G. H. Hanson, R. J. Mataloni, Jr., and M. J. Slaughter, "Expansion Strategies of U.S. Multinational Firms," NBER Working Paper No. 8433, August 2001.
[6] S. R. Yeaple, "The Role of Skill Endowments in the Patterns of U.S. Outward Foreign Direct Investment," University of Pennsylvania Working Paper, 2001.

Monetary Policy

Frederic S. Mishkin*

From the beginning of my academic career, my research has always been driven by an interest in the role of monetary policy in the economy, even when it dealt with somewhat different topics such as econometric technique or financial instability and banking issues.[1] My stint inside the Federal Reserve System as the research director at the Federal Reserve Bank of New York naturally further stimulated my interest in monetary policy issues and so has led me to think more about how central banks actually conduct monetary policy and how the conduct of monetary policy might be improved. This research summary reports on my work over the past several years on monetary policy strategy and tactics, not only in the United States, but also in emerging markets and other industrialized countries.

Monetary Policy Strategies: The International Experience

In recent years a growing consensus has emerged to elevate price stability to the overriding, long-run goal of monetary policy. Thus it is not surprising that a central feature of monetary policy strategies is the use of a nominal anchor in some form. There are four basic types of monetary policy strategies, each of which uses a different nominal anchor: 1) exchange-rate targeting; 2) monetary targeting; 3) inflation targeting; and 4) monetary policy with an explicit goal, but not an explicit nominal anchor (what I call the "just do it" approach.)

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Monetary Targeting

My work on monetary policy strategy began with a paper written with Ben Bernanke in 1992 that focused on monetary targeting in six industrialized countries; this has been followed by a series of other papers analyzing monetary targeting in industrialized countries.[2] Monetary targeting has been used as a successful strategy for monetary policy in two countries, Germany and Switzerland; for this reason, monetary targeting still has strong advocates and is part of the official policy strategy for the European Central Bank. However, monetary targeting in Germany and Switzerland is quite different from a Friedman-type monetary targeting rule, in which a monetary aggregate is kept on a constant-growth-rate path and is the primary focus of monetary policy. Instead, monetary targeting in Germany and Switzerland should be seen as a method of communicating the strategy of monetary policy, focusing on long-run considerations and the control of inflation. The very flexible approach to monetary targeting — for example, the Bundesbank missed its target ranges on the order of 50 percent of the time — was adopted because the relationship between monetary aggregates and goal variables, such as inflation and nominal income, has not remained strong or reliable in Germany and Switzerland, or in other industrialized countries.[3] Indeed, the key elements of monetary targeting that led to its success in Germany and Switzerland — flexibility, transparency, and accountability — are also central elements in inflation targeting regimes. Other industrialized countries that have pursued monetary targeting, such as the United States, Canada, and the United Kingdom, have found it to be an even less successful strategy, partially because it was not pursued seriously, but also because of the dramatic breakdown of the relationship between monetary aggregates and inflation when monetary targeting was adopted.

Emerging market countries also have toyed with the idea of monetary targeting, particularly in Latin America, but as my paper with Miguel Savastano points out, despite what is often said, no central bank in Latin America has truly practiced monetary targeting.[4] The monetary policy frameworks of many Latin American central banks have used the information conveyed by a monetary aggregate to conduct monetary policy, but the other two elements (public announcements of the targets and some type of accountability mechanism) rarely have been present at the same time. The instability of the money-inflation relationship also has been very visible in emerging market countries. So, it is not surprising that monetary targeting has not been pursued very seriously in these countries.

Exchange-Rate Targeting

Exchange-rate targeting is discussed in several of my papers.[5] Exchange-rate targeting has been an effective means of reducing inflation quickly in both industrialized and emerging market countries. However, exchange-rate targeting results in the loss of independent monetary policy and also means that shocks to the anchor country, to whose currency the domestic currency is pegged, are transmitted to the targeting country because domestic interest rates are determined in the anchor country. Exchange-rate targets thus are likely to lead to higher output volatility and this is exactly the experience that has been found in Latin America.[6] Exchange-rate targeting comes in two basic vari-

eties, "soft pegs," in which the commitment to the peg is not institutionalized, and "hard pegs," where the institutional commitment comes either from establishment of a currency board or from dollarization. Soft pegs leave countries open to speculative attacks and currency crises, which can be costly in industrialized countries, but are frequently devastating to emerging market countries, as we have seen recently in Latin America (Mexico and Ecuador), East Asia (Thailand, Korea, and Indonesia), and Turkey. The breakdown of soft pegs in emerging market countries is as damaging as it is because their debt structure is generally short term and is denominated in foreign currency. Thus a successful speculative attack leads to a sharp deterioration in balance sheets, which in turn leads to a financial crisis.[7]

Given the experience with soft pegs, fewer economists now advocate their use as a monetary policy strategy. However, hard pegs may be desirable, particularly in countries whose political and monetary institutions are especially weak: they may be the only way to break inflationary psychology and to stabilize the economy.[8] Hard pegs can then be thought of as the stabilization policy of last resort, leaving little or no discretion to the monetary authorities. However, hard pegs will not be successful in promoting a healthy economy unless government policies create the right institutional environment. Without rigorous prudential supervision, which ensures the safety and soundness of the financial system, and solid and sustainable fiscal policy, hard pegs will not be able to stabilize the economy.

Inflation Targeting

Inflation targeting is a recent monetary policy strategy that has been a major focus of my recent research.[9] It involves five main elements: 1) the public announcement of medium-term numerical targets for inflation; 2) an institutional commitment to price stability as the primary goal of monetary policy, to which other goals are

subordinated; 3) an information inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments; 4) increased transparency of the monetary policy strategy through communication with the public and the markets about the plans, objectives, and decisions of the monetary authorities; and 5) increased accountability of the central bank for attaining its inflation objectives. This list should clarify one crucial point about inflation targeting: it entails *much more* than a public announcement of numerical targets for inflation for the year ahead. This is especially important in emerging market countries, because many of these countries routinely reported numerical inflation targets or objectives as part of the government's economic plan for the coming year and yet their monetary policy strategy should not be characterized as inflation targeting, which requires the other four elements for it to be sustainable over the medium term.[10] Since 1990, inflation targeting has been adopted by many industrialized countries (New Zealand, Canada, the United Kingdom, Sweden, Israel, Australia, and Switzerland), by several emerging market countries (Chile, Brazil, Korea, Thailand, and South Africa), and by several transition countries (Czech Republic, Poland, and Hungary).

Inflation targeting has several advantages as a medium-term strategy for monetary policy. In contrast to an exchange rate target, inflation targeting enables monetary policy to focus on domestic considerations and to respond to shocks to the domestic economy. In contrast to monetary targeting, inflation targeting has the advantage that a stable relationship between money and inflation is not critical to its success: the strategy does not depend on such a relationship, but instead uses all available information to determine the best settings for the instruments of monetary policy. Inflation targeting also has the key advantage that it is easily understood by the public and is thus highly transparent. Because an explicit numerical target for inflation increases the

accountability of the central bank, inflation targeting also has the potential to reduce the likelihood that the central bank will fall into the time-inconsistency trap even though it allows for some discretion on the part of the central bank. Indeed, Ben Bernanke and I have coined the phrase "constrained discretion" to describe what inflation targeting is all about.[11]

For inflation targeting to deliver these outcomes, there must be a strong institutional commitment to making price stability the primary goal of the central bank. Inflation-targeting regimes also put great stress on the need to make monetary policy transparent and to maintain regular channels of communication with the public; these features have been central to the strategy's success. As illustrated in case studies of both industrialized and emerging market countries,[12] inflation-targeting central banks have frequent communications with the government, and their officials take every opportunity to make public speeches on their monetary policy strategy. Inflation targeting central banks have taken public outreach a step further: they publish *Inflation Report*-type documents (originated by the Bank of England in February 1993) to clearly present their views about the past and *future* performance of inflation and monetary policy. Another key feature of inflation-targeting regimes is that the transparency of policy associated with inflation targeting has tended to make the central bank highly accountable to the public. Sustained success in the conduct of monetary policy as measured against a pre-announced and well-defined inflation target has been instrumental in building public support for an independent central bank, even in the absence of a rigidly defined and legalistic standard of performance evaluation and punishment.

Inflation targeting has been a success in the countries that have adopted it. The evidence shows that inflation targeting countries have been able to reduce their long-run inflation below the levels that they would have attained in the absence of inflation targeting, but not below the levels that

have been attained by some industrial countries that have adopted other monetary regimes.[13] Central bank independence also has been mutually reinforced with inflation targeting, while monetary policy has been more clearly focused on inflation under inflation targeting, and is likely to have been toughened by inflation targeting. Despite the success of inflation targeting, it is no panacea: it requires that basic institutional infrastructure with regard to fiscal policy and the soundness of financial institutions be addressed and improved in order to attain and preserve low and stable inflation.

The "Just Do It" Strategy

Several countries in recent years, most notably the United States, have achieved excellent macroeconomic performance (including low and stable inflation) without using an explicit nominal anchor such as a target for the exchange rate, a monetary aggregate target, or inflation. Although no explicit strategy has been articulated in the U.S. case, a coherent strategy for the conduct of monetary policy nonetheless exists. This strategy, which I call the "just do it" strategy, involves an implicit, but not an explicit nominal anchor, in the form of an overriding concern by the Federal Reserve about controlling inflation in the long run. In addition, it involves forward-looking behavior in which there is careful monitoring for signs of future inflation, coupled with periodic "preemptive strikes" by monetary policy against the threat of inflation.

The main argument for the "just do it" strategy is its demonstrated success and thus: "if it ain't broke, why fix it?" However, the "just do it" strategy suffers from a lack of transparency and accountability of the central bank, which not only may weaken the support for anti-inflationary monetary policy but also is not fully consistent with democratic principles.[14] Also, replacement of the "just do it" with an inflation-targeting approach would help to depersonalize U.S. monetary policy, which would strengthen the central bank's commitment to the long-run goal of price stability and make the achievement of low inflation less dependent on the competence or convictions of a few individuals.

Monetary Policy Tactics

My recent research also has focused on tactical issues for the conduct of monetary policy. For example, in a series of papers with Arturo Estrella I have looked at what information might be valuable for monetary policymakers in forecasting inflation and the real economy.[15] My research also has explored how the NAIRU concept might be used in the conduct of monetary policy.[16] I also have examined the transmission mechanisms of monetary policy to explore what implications they might have for policy.[17]

My hope is that my research on monetary policy strategy and tactics outlined here might help policymakers to design monetary policy more effectively, thereby improving the performance of their economies.

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[1] *Summaries of some of my other lines of research can be found in previous issues of the* NBER Reporter: *F.S. Mishkin, "A Rational Expectations Approach to Macroeconometrics,"* NBER Reporter *(Winter 1982/3), pp. 4-7, and F.S. Mishkin, "Financial Crises,"* NBER Reporter *(Winter 1996/7), pp. 10-12.*

[2] *B.S. Bernanke and F.S. Mishkin, "Bank Behavior and the Strategy of Monetary Policy: Observations from Six Industrialized Countries," NBER Working Paper No. 4082, April 1993, and in* NBER Macroeconomics Annual, *O. J. Blanchard and S. Fischer, eds., Cambridge, MA: MIT Press, 1992, pp. 138-228; F.S. Mishkin, "Strategies for Controlling Inflation," NBER Working Paper No. 6122, February 1998, and in* Monetary Policy and Inflation Targeting, *P. Lowe, ed., Sydney: Reserve Bank of Australia, 1997, pp. 7-38; F.S. Mishkin, "International Experiences with Different Monetary Policy Regimes," NBER Working Paper No. 6965, February 1999, and in* Journal of Monetary Economics, *43 (3) (June 1999), pp. 579-605; F.S. Mishkin, "From Monetary Targeting to Inflation Targeting: Lessons from the Industrialized Countries,"*

in Stabilization and Monetary Policy: The International Experience, *Mexico City: Bank of Mexico, forthcoming.*

[3] *See for example, A. Estrella and F.S. Mishkin, "Is There a Role for Monetary Aggregates in the Conduct of Monetary Policy," NBER Working Paper No. 5845, November 1996, and in* Journal of Monetary Economics, *40 (2) (October 1997), pp 279-304.*

[4] *F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America," NBER Working Paper No. 7617, March 2000, and in* Journal of Development Economics, *forthcoming in October 2001.*

[5] *F.S. Mishkin, "Strategies for Controlling Inflation," and "International Experiences with Different Monetary Policy Regimes"; F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America"; and F.S. Mishkin, "The Dangers of Exchange Rate Pegging in Emerging-Market Countries,"* International Finance, *1(1) (October 1998), pp. 81-101.*

[6] *See F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America."*

[7] *For example, see F.S. Mishkin, "Understanding Financial Crises: A Developing Country Perspective," NBER Working Paper No. 5600, June 1997; and in* Annual World Bank Conference on Development Economics, *M. Bruno and B. Pleskovic, eds., Washington D.C.: World Bank, 1996, pp. 29-62; F.S. Mishkin, "Lessons from the Asian Crisis," NBER Working Paper No. 7102, August 2000, and in* Journal of International Money and Finance, *18 (4) (August 1999), pp. 709-23, and in F.S. Mishkin, "Lessons from the Tequila Crisis,"* Journal of Banking and Finance, *23 (10) (October 1999), pp. 1521-33.*

[8] *Hard pegs also may be desirable as a means of furthering economic integration with the anchor country, but this is a completely separate issue from whether they are a desirable monetary policy strategy.*

[9] *B.S. Bernanke and F.S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy?" NBER Working Paper No. 5893, July 1997, and in* Journal of Economic Perspectives *11 (2) (Spring 1997), pp. 97-116; F.S. Mishkin and A.S. Posen, "Inflation Targeting: Lessons from Four Countries," NBER Working Paper No. 6126, February 1998, and in*

Federal Reserve Bank of New York, Economic Policy Review, 3 (3) (August 1997), pp. 9-110; *F.S. Mishkin, "Strategies for Controlling Inflation"; F.S. Mishkin, "International Experiences with Different Monetary Policy Regimes"; B.S. Bernanke, T. Laubach, F.S. Mishkin, and A.S. Posen,* Inflation Targeting: Lessons from the International Experience, *Princeton: Princeton University Press, 1999; "Inflation Targeting in Emerging Market Countries,"* American Economic Review, *90 (2) (May 2000), pp. 105-9; F.S. Mishkin, "Issues in Inflation Targeting," in* Price Stability and the Long-Run Target for Monetary Policy, *Ottawa, Canada: Bank of Canada, 2001, pp. 203-22; F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America"; F.S. Mishkin, "From Monetary Targeting to Inflation Targeting: Lessons from the Industrialized Countries"; F.S. Mishkin and K. Schmidt-Hebbel, "One Decade of Inflation Targeting in the World: What Do We Know and What Do We Need to Know?" NBER Working Paper No. 8397, July 2001, and in* A Decade of Inflation Targeting in the World, *N. Loayza and R. Soto, eds., Santiago: Central Bank of Chile, forthcoming.*

[10]   *See F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America."*

[11]   *B.S. Bernanke and F.S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy?"*

[12]   *F.S. Mishkin and A.S. Posen, "Inflation Targeting: Lessons from Four Countries"; B.S. Bernanke, T. Laubach, F.S. Mishkin, and A.S. Posen,* Inflation Targeting: Lessons from the International Experience*; and F.S. Mishkin and M. Savastano, "Monetary Policy Strategies for Latin America."*

[13]   *B.S. Bernanke, T. Laubach, F.S. Mishkin, and A.S. Posen,* Inflation Targeting: Lessons from the International Experience.

[14]   *F.S. Mishkin, "Central Banking in a Democratic Society: Implications for Transition Countries,"* Zagreb Journal of Economics, *3 (3) (1999), pp. 51-74, and in* Central Banking, Monetary Policy and the Implications for Transition Economies, *M. Blejer and M. Skreb, eds., Boston: Kluwer Academic Publishers, 1999, pp. 31-53; "What Should Central Banks Do?" Federal Reserve Bank of St. Louis Review, 82 (6) (November/December 2000), pp. 1-13.*

[15]   *A. Estrella and F.S. Mishkin, "The Predictive Power of the Term Structure of Interest Rates: Implications for the European Central Bank," NBER Working Paper No. 5279, March 1998, and in* European Economic Review, *41 (1997), pp. 1375-1401; A. Estrella and F.S. Mishkin, "Predicting U.S. Recessions: Financial Variables as Leading Indicators," NBER Working Paper No. 5379, June 1999, and in* Review of Economics and Statistics, *80 (1) (February 1998), pp. 45-61; and A. Estrella and F.S. Mishkin, "Is There a Role for Monetary Aggregates in the Conduct of Monetary Policy?"*

[16]   *A. Estrella and F.S. Mishkin, "The Role of NAIRU in Monetary Policy: Implications of Model Formulation and Uncertainty," NBER Working Paper No. 6518, September 2000, and in* Monetary Policy Rules, *J. Taylor, ed., Chicago: University of Chicago Press, 1999, pp. 405-30.*

[17]   *F.S. Mishkin, "The Channels of Monetary Transmission: Lessons for Monetary Policy," NBER Working Paper No. 5464, May 1996, and in* Banque De France Bulletin Digest, *No. 27 (March 1996), pp. 33-44; and F.S. Mishkin, "The Transmission Mechanism and the Role of Asset Prices in Monetary Policy," NBER Working Paper No. 8617, December 2001.*

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Twin Crises

Aaron Tornell*

Many recent crises, including the Tequila and Asian crises, have been different from earlier periods when currency crises coincided with banking crises, and fiscal deficits were not the main villains. My research with Jeffrey D. Sachs and Andres Velasco indicates that these "new" crises do not spread randomly across countries, but typically are preceded by a real exchange rate appreciation and a lending boom, along with debts denominated in foreign currency.[1]

When the crisis hits, a real depreciation takes place. Since many agents, including those in nontradable sectors, had denominated their debts in foreign currency during the boom years, the real depreciation implies dramatic balance sheet effects. Many agents see the value of their debt mushroom, while their revenues remain flat. This results in a reduction in their ability to service debt as well as in plummeting net worth.

In subsequent work with Anne O. Krueger, I studied the evolution of Mexico and other emerging economies in the aftermath of crisis.[2] Typically, after a short-lived recession, aggregate GDP recuperates quite quickly. However, a long lasting credit crunch develops. This crunch affects mainly small and medium firms in the nontradable sector, and has made evident the central role played by bank credit for such groups of firms. Developed economies typically experience neither such pronounced asymmetrical sectoral patterns nor such dramatic boom-bust cycles. The objective of my theoretical research in this area has been to develop a framework to explain these facts, as well as to evaluate the effects of monetary and fiscal policies in emerging economies.[3] In this article, I briefly

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describe the stylized facts and then present an overview of my theoretical research.

The boom-bust cycle experienced by Mexico around the Tequila crisis, and Thailand around the Asian crisis, is typical of countries undergoing twin currency and banking crises. Typically, prior to such a twin crisis an economy experiences: 1) a lending boom, along which bank credit to the private sector grows unusually quickly; and 2) an appreciation of the real exchange rate. When a twin crisis occurs, the real exchange rate depreciates, and the banking system "goes under." Typically, that failure is not caused by a run on banks by depositors, but rather by a sharp deterioration in the banks' loan portfolio; many borrowers are unable to service their debt. To save the banking system, bailouts are granted, frequently with IMF support. Despite this support, in the aftermath of crisis there is: 1) a recession, which is typically short-lived (GDP usually starts to grow in the second year after the crisis); and 2) a long-lived credit crunch that develops parallel to an expansion in GDP.

The puzzling coexistence of a credit crunch and GDP growth several years after the crisis reflects the fact that aggregate GDP performance masks an asymmetric sectoral performance. In the aftermath of crisis, the tradable (T)-sector experiences an acceleration of growth, while the nontradable (N)-sector experiences a fall and a sluggish recuperation. In contrast, prior to a crisis, the N-sector grows faster than the T-sector.

This asymmetric sectoral response is associated with the fact that the credit crunch mainly affects households and small and medium-sized firms in the N-sector. Firms in the T-sector are not very dependent on bank credit, because they have access to other forms of external finance: trade credit, as well as equity and bond markets. In contrast in emerging economies, N-sector agents

are heavily dependent on bank credit, which is determined mainly by collateral values, not investment opportunities.

In joint work with Martin Schneider, I develop a framework for explaining the boom-bust cycle just described. We consider a model that stresses the asymmetric pattern of the N and T sectors along the cycle, and the importance of bank credit as the prime source of external finance for the N-sector.

The key effects stem from the interaction of two distortions: imperfect enforceability of contracts, which induces borrowing constraints; and systemic bailout guarantees that insure lenders against only systemic — as opposed to idiosyncratic — credit risk.

The interaction of these two distortions generates a self-reinforcing mechanism that is key to explaining the facts. On the one hand, if there is real exchange rate risk, agents might find it optimal to borrow in dollars (that is, to denominate their debt in T-goods). This is because the subsidy implicit in the systemic bailout guarantee can be cashed in only if the borrower is unable to repay in some state of systemic crisis. On the other hand, if a critical mass of agents denominate their debt in foreign currency (T-goods), then the economy becomes vulnerable to twin crises, giving rise to real exchange rate risk. That is, if the amount of T-denominated debt is high, a real depreciation can severely squeeze cashflow, or even bankrupt banks altogether. Since they face binding borrowing constraints, the banks then have to curtail lending to the N-sector. Weak investment demand from the N-sector for its own products in turn validates the real depreciation. That is, the economy becomes vulnerable to self-fulfilling crises in which a real depreciation coincides with a meltdown of the banking system.

The self-reinforcing feedback just described can generate a boom-bust

cycle in an economy following financial liberalization and structural reform. This occurs because a brighter future encourages the N-sector to run a deficit and to build up productive capacity. Deficits are financed through banks, which in turn borrow from abroad. Growth is gradual, because borrowing constraints are relaxed only through the reinvestment of profits.

Absent bailout guarantees and adverse exogenous shocks, this transition path will not see risky debt denomination. If bailout guarantees are present, their interaction with borrowing constraints both fuels the boom and induces endogenous volatility. Guarantees alleviate the "underinvestment" problem usually associated with constrained banks. They permit high leverage with debt denominated in T goods, and faster credit growth. As a result, the N-sector also grows faster than if guarantees were absent. Since N goods are demanded for investment by the N-sector itself, both output and the relative price of nontradables increase during the boom. Indeed, since debt is denominated in T goods, a real appreciation (a relative price increase) increases banks' cash flow. For constrained banks, this translates into more lending through a "balance sheet effect." More lending, in turn, permits more investment in N goods, which absorbs the higher output.

However, the debt burden eventually becomes high enough to make the economy vulnerable to the twin crises just described. Importantly, such crises are not merely financial, but have substantial output costs: in the crisis period, internal funds and investment demand collapse. This leads to a drop in N-sector output. Subsequently, bal-

ance sheet effects permit only a slow recovery. This provides an account of a complete boom-bust episode.

Let us now turn to policy issues. The fact that financial markets are not well developed in emerging economies implies that bank credit is the only source of external funds for a large set of agents in the economy. As a result, many agents are not able to exploit all investment opportunities. Instead, their investment will be determined mainly by collateral values. In this world, lending booms are episodes during which borrowing constraints are eased. To the extent that there is underinvestment in the economy, these episodes may lead to an increase in long-run growth.[4]

Generally, during lending booms capital inflows from abroad are channeled to domestic agents through the domestic banking system. Since the banks typically enjoy systemic bailout guarantees (implicit or explicit), one observes risky debt structures, such as foreign-currency denominated debt (for the reasons we described earlier). Therefore, higher economic growth comes at the cost of greater vulnerability to crises, which are followed by long lasting credit crunches.

The issue then arises as to whether there are other means for easing borrowing constraints and promoting growth. Clearly, implementing judicial reform and establishing an efficient regulatory framework will achieve this goal. That would allow firms to diversify away from bank credit and to access other forms of external finance. However, the evidence indicates that judicial reform is "more easily said than done." It seems that in the near future, bank credit will continue to be the prime source of

external finance for a large set of firms in emerging economies. Given this fact, two important research questions arise. First, is there a way to improve the trade-off between long-run growth and the severity of the boom-bust cycle? Second, what are the appropriate monetary and fiscal policies in the aftermath of crisis? I am currently working on these issues.

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[2] A. O. Krueger and A. Tornell, "The Role of Bank Restructuring in Recovering from Crises: Mexico 1995-98," NBER Working Paper No. 7042, March 1999.
[3] J. D. Sachs, A. Tornell, and A. Velasco, "The Mexican Peso Crisis: Sudden Death or Death Foretold?" NBER Working Paper No. 5563, May 1996, and in Journal of International Economics, 41 (4) (November 1996), pp. 265-84; M. Schneider and A. Tornell, "Balance Sheet Effects, Bailout Guarantees, and Financial Crises," NBER Working Paper No. 8060, December 2000.
[4] A. Tornell, "Policy in an Economy with Balance Sheet Effects," in Preventing Currency Crises in Emerging Markets, S. Edwards and J. A. Frankel, eds., forthcoming from the University of Chicago Press, 2002.

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NBER Profile: *Judith M. Gueron*

Judith M. Gueron, President of the Manpower Demonstration Research Corporation (MDRC), was elected a director-at-large of the NBER at the October meeting of NBER's Board of Directors. Gueron received a B.A. in economics from Radcliffe College and an M.A. and Ph.D. in economics from Harvard University.

From 1972-4 she was Director of Special Projects and Studies and a Consultant at the New York City Human Resources Administration (Office of Policy Research). She became Research Director of MDRC — a nonprofit, nonpartisan research organization which designs and field-tests education and employment-related programs aimed at improving the well-being of low-income Americans — in 1974 and was promoted to Executive Vice President for Research and Evaluation there in 1978. In 1986 she became MDRC's President.

Gueron is currently also President-Elect of the Association for Public Policy Analysis and Management and a member of the Board of Directors of Alcoa. She has written and testified extensively on welfare reform and program evaluation and has been responsible for the design and oversight of many of the nation's largest evaluations and demonstrations of social programs.

She is married to Henri Gueron. They have two grown daughters and one grandchild.

NBER Profile: *James R. Markusen*

"Jim" Markusen has been an NBER Research Associate since 1990 in the Program on International Trade and Investment. He is also the Stanford Calderwood Professor of Economics at the University of Colorado, Boulder.

Markusen earned his B.A. and Ph.D degrees in economics from Boston College. His first faculty position was at the University of Western Ontario; he also had visiting appointments in Ghana, Australia, New Zealand, Germany, Israel, Sweden, and Spain. In 1990 he moved to the University of Colorado, Boulder, where he headed the economics department from 1991 to 1995.

Markusen served as a researcher and advisor during the mid-1980s for the McDonald Royal Commission in Canada, which laid the foundation for the U.S.-Canada free trade agreement. In the early 1990s, he worked with Mexican economists on the North American auto industry, attempting to estimate the effects of the (then) proposed North America free trade area (NAFTA) on the location of production and employment within North America. Currently, he is serving as an advisory to the Danish Ministry of Trade and Industry on a project to provide development assistance to the Baltic States. He also has finished a book on the role of multinationals in the international economy, which will be published by the MIT Press in the summer of 2002.

Markusen often attempts to present the pro-globalization case in anti-globalization conferences, after which he enjoys a hard bike ride in the mountains, followed by research into local micro brews. He is married to economist Ann Carlos, a native of Ireland. They have two teenage boys; one is a university student in Ireland, and the other attends school and plays ice hockey in Boulder.

NBER Profile: *Frederic S. Mishkin*

Frederic S. Mishkin is a Research Associate in the NBER Programs in Monetary Economics and Economic Fluctuations and Growth and the Alfred Lerner Professor of Banking and Financial Institutions at the Graduate School of Business, Columbia University. Since receiving his Ph.D. from MIT in 1976, he has taught at the University of Chicago, Northwestern University, Princeton University, and Columbia. He also has received an honorary professorship from the Peoples (Renmin) University of China. From 1994 to 1997, he was Executive Vice President and Director of Re-search at the Federal Reserve Bank of New York and an associate economist of the Federal Open Market Committee of the Federal Reserve System.

Mishkin's research focuses on monetary policy and its impact on financial markets and the aggregate economy. He is the author of more than ten books, including *The Economics of Money, Banking and Financial Markets*, 6th Edition (Addison Wesley Longman, 2001),

the number one selling textbook in its field. He has also published over one hundred articles in professional journals and books.

Mishkin has served on the editorial board of the *American Economic Review* and currently serves on the editorial boards of eight academic journals. He has been a consultant to the Board of Governors of the Federal Reserve System, the World Bank, and the International Monetary Fund, as well as to many central banks throughout the world. He is currently an academic consultant to and serves on the Economic Advisory Panel of the Federal Reserve Bank of New York and is a member of the International Advisory Board to the Financial Supervisory Service of South Korea.

Mishkin and his wife, Sally Hammond, live in Irvington, NY, and have two children, Matthew, 19, and Laura, 14. During the summer, when he is not working or traveling, he can be found on the Hudson River in his Capri 22 sailboat. In the winter he enjoys cross-country skiing.

NBER Profile: *Aaron Tornell*

Aaron Tornell is an NBER Faculty Research Fellow in the Program on International Finance and Macroeconomics and a professor of economics at the University of California at Los Angeles (UCLA). He received his undergraduate degree in economics from the Instituto Tecnologico Autonomo de Mexico in 1983 and his Ph.D. in economics from MIT in 1987.

From 1987-9, Tornell was an assistant professor of economics at Columbia University. He then served as an advisor to the Minister of Finance of Mexico (1989-91) and Associate Managing Director of the Soros Fund (1992). Returning to academe,

he became an assistant professor of economics at Harvard University in 1993 and was promoted to associate professor there in 1997. In 1999, he left for UCLA; he was an associate professor until July 200l when he was promoted to full professor.

Tornell also has served as Associate Editor of the Journal of International Economics. His own research is widely published in academic journals.

In his free time, he likes swimming (especially in lakes) and skiing. He also enjoys traveling through Mexico's old southern towns and visiting the pre-Hispanic ruins of Mexico and Guatemala.

Conferences

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Tax Policy and the Economy

The NBER's Sixteenth Annual Conference on Tax Policy and the Economy, organized by James M. Poterba of NBER and MIT, took place in Washington, D.C. on October 30. These papers were discussed:

Robert Moffitt, NBER and Johns Hopkins University, "The Economic Effects of Means-Tested Transfer Programs"

James J. Choi, Harvard University; **David Laibson**, NBER and

Harvard University; **Brigitte Madrian**, NBER and University of Chicago; and **Andrew Metrick**, NBER and University of Pennsylvania, "Defined Contribution Pensions: Plan Rules, Participant Choices, and the Path of Least Resistance"

Jonathan Gruber, NBER and MIT, "Taxes and Health Insurance"

Charles E. McLure, Jr., NBER and Stanford University, "Thinking Straight About the Taxation of

Electronic Commerce: Tax Principles, Compliance Problems, and Nexus"

Ryan Edwards and **Ronald Lee**, University of California at Berkeley, "The Fiscal Impact of Population Aging in the United States: Assessing the Uncertainties"

Martin S. Feldstein, NBER and Harvard University, and **Andrew A. Samwick**, NBER and Dartmouth College, "Potential Paths of Social Security Reform"

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The system of means-tested transfers in the United States has evolved in important ways over the last decade: the Medicaid program and the Earned Income Tax Credit program have expanded significantly and the Aid to Families with Dependent Children (AFDC) program, now titled the Temporary Assistance for Needy Families program, has contracted. Further, AFDC has undergone a significant restructuring, with an increased emphasis on work requirements. These trends, as well as others in earlier decades, represent a gradual movement toward a categorical transfer system in which specific low-income groups are offered different packages of benefits and services. This represents a decisive rejection of the negative income tax philosophy. **Moffitt** reviews the trends in the structure of the major means-tested programs and what economic research has to say about their effects on behavior.

Choi, **Laibson**, **Madrian**, and **Metrick** analyze a new micro-level dataset that contains a number of natural experiments on institutional variation in 401(k) plan rules. They measure

the impact of 401(k) plan features, including investment defaults, rollovers, employer matching contributions, eligibility requirements, and financial education. They also present new survey evidence on savings adequacy. Their analysis identifies a key behavioral principle that should partially guide the design of 401(k) plans: employees often follow "the path of least resistance." For better or worse, plan administrators can manipulate the path of least resistance to powerfully influence the savings and investment choices of their employees.

Gruber lays out a framework for researchers and policymakers to think about how tax policies might affect the level and distribution of health insurance coverage in the United States. He begins by reviewing the key relevant facts about health insurance policy. Then he discusses the central parameters that we need to know about in order to fully model both the impact of the existing tax subsidy and the effects of tax-based approaches to increasing insurance coverage in the United States. Next, he describes what we know about these parameters. Finally, Gruber considers the implica-

tions of the facts and our existing knowledge for the design of tax policy towards health insurance in the United States.

The Internet Tax Freedom Act (ITFA), which imposes a moratorium on state and local taxes on Internet access and prohibits "multiple and discriminatory" state and local taxes on electronic commerce, has been extended until November 1, 2003. The debate on whether and how to tax electronic commerce has not ended, though. **McLure** notes that under an economically efficient sales tax, all sales to consumers would be taxed, all sales to business would be exempt, and sales by local merchants and by remote (out-of-state) vendors would be taxed equally. A compliance-friendly sales tax would exhibit substantial simplicity and uniformity in the tax base, legal framework, and administrative procedures. Existing sales taxes exhibit none of these characteristics, though. Many sales to consumers are exempt, many sales to business are taxed, and, because of the Supreme Court decision in *Quill*, which is based on the complexity of the system, many sales by remote vendors are not

taxed. The system is extremely complex, in large part because there is essentially no uniformity from state to state. Under the Streamlined Sales Tax Project the states recently have begun serious efforts to simplify their sales taxes, making them more nearly uniform, in hopes of gaining Congressional or judicial reversal of *Quill*. These efforts would substantially simplify the system, but would not achieve economic neutrality, because many sales to consumers would remain exempt and many sales to business would still be taxed. Moreover, differences in tax bases, legal framework, and administrative procedures would remain. "Technology" ("lookup tables" that categorize products as taxable or exempt in each state) might be able to handle differences in tax bases, but not those in legal structure and administrative procedures.

Lee and **Edwards** examine the fiscal impact of population aging in a probabilistic setting. They find that the old age dependency ratio is virtually certain to rise by more than 50 percent through the 2030s, and will probably continue to increase after 2050, possibly by a great deal. Under current program structures, population aging would be virtually certain to increase the costliness of Federal programs as a share of GDP by roughly 35 percent by the 2030s, and by

roughly 60 percent in the second half of the century. The authors project Federal expenditures (excluding interest payments and prefunded programs) to rise from 16 percent of GDP in 2000 to 30 percent in 2075, almost doubling, while state and local expenditures rise only modestly relative to GDP. Almost all of this increase is for programs going primarily to the elderly, which rise from 8 percent of GDP in 1999 to 21 percent of GDP in 2075, mainly because of costs of health care for the elderly, with pensions a distant second. Governments will likely respond to these aging-induced cost changes by altering program structures, so that these conditional projections will not be realized.

Feldstein and **Samwick** present several alternative Social Security reform options in which the projected level of benefits for every future cohort of retirees is as high or higher than the benefits projected in current law. These future benefits can be achieved without any increase in the payroll tax or in other tax rates. Under each option, the Social Security Trust Fund is solvent and ends with a sustainable positive and growing balance. Each option combines the current pay-as-you-go system of defined benefits with an investment-based personal retirement account (PRA). Assets in

the PRA can be bequeathed if the individual dies before normal retirement age. The authors also consider the option in which an individual can take all or part of his accumulated PRA balance as a lump sum at normal retirement age. The basic plan that they present in greatest detail combines a transfer to the personal retirement account of a portion of the individual's payroll tax equal to 1.5 percent of earnings if the individual agrees to deposit an equal out-of-pocket amount. The additional national saving that results from this option leads to increased business investment and therefore to increased general tax revenue; a portion of that revenue, equal to 1 percent of the PRA balances, is transferred to the Social Security Trust Fund. The other options that they present include plans with no out-of-pocket contributions by individuals and others with no transfer of general revenue to the Trust Fund. They also discuss the implications of different rates of return on the PRA balances and, more generally, the issue of risk, including a market-based method of guaranteeing the real principal of all PRA deposits.

These papers will be published by the MIT Press as *Tax Policy and the Economy*, Volume 16. They are also available at "Books in Progress" on the NBER's website.

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Macroeconomic Policy in a Dynamic, Uncertain Economy

An NBER-Universities Research Conference on "Macroeconomic Policy in a Dynamic, Uncertain Economy" took place in Cambridge on November 30 and December 1. Organizers Susanto Basu, NBER and University of Michigan, and Simon Gilchrist, NBER and Boston University, chose these papers for discussion:

Alexei Onatski, Columbia University, "Robust Monetary Policy under Model, Data, and Shock Uncertainty in a Small Forward-Looking Model of the U.S. Economy"
Discussant: Timothy Cogley, Arizona State University

Alex Cukierman, Tel Aviv University, and **Francesco Lippi**, Stanford University, "Endogenous Monetary Policy with Unobserved Potential Output"
Discussant: Simon Gilchrist

Athanasios Orphanides and **John C. Williams**, Federal Reserve Board, "Imperfect Knowledge, Inflation Expectations, and Monetary Policy"
Discussant: John V. Leahy, NBER and Boston University

Pedro P. Álvarez-Lois, Bank of Spain, "Capacity Utilization and the Asymmetric Effects of Monetary Policy"
Discussant: John Fernald, Federal Reserve Bank of Chicago

Andreas Hornstein and **Pierre-Daniel Sarte**, Federal Reserve Bank of Richmond, "Sticky Prices and Inventories: Production Smoothing Reconsidered"
Discussant: Mark Bils, NBER and University of Rochester

Eric M. Leeper, Indiana University, and **Tao Zha**, Federal Reserve Bank of Atlanta, "Empirical Analysis of Policy Interventions"
Discussant: Kenneth D. West, NBER and University of Wisconsin

Matteo Iacoviello, London School of Economics, "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle"
Discussant: Christopher House, University of Michigan

William Dupor, University of Pennsylvania, "Nominal Price versus Asset Price Stabilization"
Discussant: Frederic S. Mishkin, NBER and Columbia University

Onatski analyzes simple policy rules under model uncertainty in an empirical New Keynesian model of the U. S. economy earlier studied in Rudebusch (2000). He addresses three sets of issues: the degree of policy activism under model, data, and shock uncertainty; the stabilization properties of nominal income rules; and the robustness of forecast-based rules. He finds that aggressive policy rules are relatively more robust than cautious rules with respect to uncertainty about point estimates of parameters of the reference model. However, cautious rules look relatively more robust under more broadly specified uncertainty. Nominal income rules are much less robust than rules responding to inflation and the output gap. The policy rules responding to a forecast of inflation and the current output gap are quite robust, even for forecast horizons longer than one year.

Cukierman and **Lippi** characterize endogenous monetary policy when policymakers are uncertain about the extent to which movements in output and inflation are caused by permanent changes in potential output, or by temporary, but persistent, demand and cost shocks. The authors refer to this informational limitation as the "permanent-temporary confusion" (PTC). The two main results of the paper are: 1) under reasonable conditions, policy is likely to be excessively loose (restrictive) for some time when there is a large decrease (increase) in potential output in comparison to a no-PTC benchmark. This framework thus takes a step towards providing a unified explanation for the inflation of the 1970s and the price stability of the 1990s. 2) Using forecasts of potential output in policy formulation leads to an ex-ante, welfare-superior monetary policy as long as the noise in the potential output indicator is finite.

Orphanides and **Williams** investigate the role of imperfect knowledge about the structure of the economy on: the formation of expectations, macroeconomic dynamics, and the efficient formulation of monetary policy. With imperfect knowledge, economic agents rely on an adaptive learning technology to form expectations and they continuously update their beliefs about the dynamic structure of the economy based on incoming data. Perpetual learning introduces an additional layer of dynamic interactions between monetary policy and economic outcomes. As a result, efficient monetary policy needs to account for the influence of policy on learning, as well as the traditional stabilization concerns present under rational expectations with perfect knowledge. Using a simple model, the authors show that policies that are efficient under rational expectations can be quite inefficient when knowledge is imperfect. However, significantly improved economic performance generally can be achieved by placing greater emphasis on controlling inflation. Policies emphasizing tight inflation control reduce the persistence of inflation and facilitate the formation of accurate expectations of inflation. This enhances economic stability and mitigates the influence of imperfect knowledge.

Álvarez Lois analyzes the role of variable capacity utilization as a source

of asymmetries in the relationship between monetary policy and economic activity. The nature of the asymmetry is linked directly to the bottlenecks and stock-outs that emerge from the existence of capacity constraints in the real side of the economy. Within a dynamic stochastic general equilibrium framework, money has real effects because of the presence of rigidities in portfolio decisions. The model features variable capacity utilization rates across firms caused by demand uncertainty. The overall message of this paper is that, depending on the rate of capacity utilization, similar monetary policy actions will have significantly different macroeconomic effects. These asymmetries are likely to have relevant implications in the conduct of monetary policy.

Hornstein and **Sarte** study the implications of nominal price rigidities in a model where firms use inventories to smooth production because of increasing marginal cost. Conventional criticisms of production smoothing models have focused on their inability to replicate these two stylized facts: inventory investment is correlated positively with sales and, therefore, production is more volatile than sales; movements in inventory-sales ratios are persistent. In contrast, the authors show that a standard production smoothing model of inventory behavior is consistent with these facts when prices are sticky. Furthermore, these results hold irrespective of whether the economy is driven by nominal demand or real supply shocks. It also has been suggested that increasing short-run marginal cost at the firm level can make the effects of nominal

shocks more persistent. The authors show that if firms can hold inventories, nominal demand shocks will have lasting effects on sales, but not necessarily on production.

Leeper and **Zha** construct linear projections of macroeconomic variables conditional on hypothetical paths of monetary policy, using as an example an identified vector autoregression model. Hypothetical policies are ones in which both the policy intervention and its effects are consistent with history; otherwise, the linear projections are likely to be unreliable. The authors use this approach to interpret Federal Reserve decisions, which are frequently reassessed in light of new information about the tradeoffs policymakers face. The interventions that the authors consider matter: interventions can shift projected paths and probability distributions of macro variables in economically meaningful ways.

Iacoviello explores the role of asset prices, debt obligations, and borrowing constraints in the transmission mechanism of monetary and other shocks to the real economy. After presenting some vector autoregression evidence on house prices and the business cycle for a number of European countries, he constructs a dynamic neo-Keynesian economy modeling the real estate market and borrowing restrictions on the firm and the household side. In such an economy, where debt obligations are held in nominal terms, the effects of monetary policy actions on inflation and asset prices critically modify agents' financial positions and borrowing possibilities (through collateral value and debt-deflation effects), thereby amplifying

and persisting over time. At the same time, higher firm leverage sharply increases output sensitivity to tight money, while household leverage reduces it slightly. One novel feature of this economy is that nominal debt amplifies the effect of monetary disturbances, but at the same time acts as a stabilizer for the supply shocks: as a consequence, Iacoviello finds that debt indexation does not make the economy less volatile when the monetary authority controls the interest rate.

Dupor studies the optimal response of monetary policy under commitment to a distortionary shock to firms' investment demand. He considers a model with nominal price rigidity and convex investment adjustment costs. He documents the desirability of, and the trade-off between, nominal price and asset price stabilization in response to this shock. Optimal policy is contractionary in response to an inefficient boom in investment and asset prices. By tightening policy, the monetary authority depresses the capital rental rate, partially offsetting the increased demand for investment, which reduces the value of installed capital and stabilizes asset prices. Relative to the optimal policy, nominal price stabilization generates short-run overinvestment and asset price inflation. In this and other sticky price models, nominal price inflation measures labor market distortion. The market price of the capital stock, through marginal q, usefully summarizes capital market distortion. Dupor calculates significant relative welfare gains from following the optimal policy instead of nominal price stabilization in response to the shock.

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Third Annual Conference in India

On December 17-19, the NBER and India's National Council for Applied Economic Research (NCAER) again brought together a group of ten NBER economists and about two dozen economists from Indian universities, research institutions, and government departments for their third annual conference in India. **Raghuram G. Rajan**, NBER and University of Chicago, organized the conference jointly with **Subir Gokarn** of NCAER.

The U.S. and Canadian participants were: Jagdish Bhagwati, NBER Director and Columbia University; Mihir Desai, Martin Feldstein, Caroline M. Hoxby, and Michael Kremer, NBER and Harvard University; Sebastian Edwards, NBER and University of California, Los Angeles; Anne O. Krueger, on leave from the NBER at the IMF; Randall Morck, NBER and University of Alberta; and Rene M. Stulz, NBER and Ohio State University.

After introductory remarks about the U.S. and Indian economies by NBER President Feldstein and Suman Bery of NCAER, the participants discussed: why India does not export more; experiments in education in various countries; fear of floating exchange rates; the stock market and foreign investment; and the financial sector in an emerging market economy.

A summary of the conference discussion will be available on the NBER web site at: www.nber.org/india.

Bureau News

Utgoff to Lead Statistical Agency

NBER Director Kathleen P. Utgoff has been nominated commissioner of the Bureau of Labor Statistics. Utgoff was previously vice president of the Center for Naval Analyses, a research and development center in Virginia, where she was responsible for research on workforce issues, the environment, health care,

and infrastructure. She also served as chief economist and partner at Groom and Nordberg, the largest employee benefits law firm in the country.

Utgoff was widely recognized for her work as executive director of the Pension Benefit Guaranty Corporation, an agency within the Department

of Labor. She also served as a senior economist for the Council of Economic Advisers in the Executive Office of the President. Her Bachelor of Arts degree in economics is from the California State University at Northridge and her Ph.D. in economics is from the University of California at Los Angeles.

Health Care

The NBER's Program on Health Care, directed by Alan M. Garber, NBER and Stanford University, met in Cambridge on October 26. They discussed these papers:

Michael Baker and **Mark Stabile**, NBER and University of Toronto, and **Catherine Deri**, University of Toronto, "What Do Self-Reported, Objective, Measures of Health Measure?" (NBER Working Paper No. 8419)

Mark Duggan, NBER and University of Chicago, "Can the Private Sector Improve the Efficiency of Government Programs? Evidence from Medicaid Managed Care"

Ernst R. Berndt, NBER and MIT; **Julie M. Donohue**, **Arnold M. Epstein**, and **Meredith B. Rosenthal**, Harvard University; and **Richard G. Frank**, NBER and Harvard University, "Some Economics of Direct-to-Consumer

Advertising of Prescription Drugs"

Karen Eggleston, Tufts University; **Nolan Miller**, Harvard University; and **Richard J. Zeckhauser**, NBER and Harvard University, "Ownership Structure and Provider Behavior"

Jason R. Barro, NBER and Harvard University, and **Robert Huckman**, Harvard University, "Returns to Hospital Advertising"

Baker, **Stabile**, and **Deri** explore measurement error in objective, self-reported measures of health. They use a unique dataset that matches a variety of self-reports of health with respondents' medical records. The findings are striking. For example, the ratio of the error variance to the total variance ranges from just over 30 percent for the incidence of diabetes to over 80 percent for the incidence of arthritis. Furthermore, for many conditions the error is significantly related to individuals' labor market activity, as hypothesized in the literature. In the final section of the paper, the authors compare estimates of the effect of these different measures of health on labor market activity.

Currently more than 20 million Medicaid recipients are covered by a managed care plan; the remaining 15 million are enrolled in the Medicaid fee-for-service system. Identifying the causal effect of HMO enrollment on government spending is difficult if, as is often the case, recipients have the option to enroll in a plan. Those who choose to enroll in a plan may differ unobservably from those who do not. **Duggan** exploits 21 county-level mandates introduced during the last decade in the state of California that required Medicaid recipients to enroll in an HMO. His results suggest that the move from fee-for-service to managed care was associated with a 15 percent increase in government spending. The effect was smaller in counties with relatively high pre-mandate (and thus voluntary) managed care penetra-tion, suggesting that low-cost individuals choose to enroll in an HMO when given the option.

Since 1994, total spending on consumer-directed promotion for prescription drugs has grown nearly tenfold. One factor that may have contributed to that growth is the release in 1997 of FDA guidelines that essentially made television and radio advertising much more feasible for the industry. Direct-to-consumer advertising (DTCA) is a departure from the traditional marketing strategy in the pharmaceutical industry that targets physicians as patients' intermediaries. Policymakers and others have expressed concerns that advertising to consumers will further accelerate the growth in prescription drug spending and lead to inappropriate use of pharmaceutical therapies. **Berndt** and his co-authors model the determinants of the level of spending on DTCA and consider its role in stimulating demand for individual products and therapeutic classes. In addition, they examine the relationship between DTCA and promotion to physicians as alternative or complementary strategies to promote prescription drugs. They also look for evidence concerning the impact of DTCA on price competition.

Government-sponsored health payment systems often offer the same payments for a service to all providers, regardless of ownership structure. However, the provider's behavior will likely depend on its ownership structure. **Eggleston**, **Miller**, and **Zeckhauser** study how for-profit, nonprofit, and public providers respond to a prospective payment system (similar to the DRG system used by Medicare in the United States) in a static game when costs are uncertain. For-profits default in high-cost states, provide minimum quality in low-cost states, and have a relatively high incentive to invest in cost reduction. Public providers, enjoying soft budget constraints, always deliver care to patients, but have lower incentives to invest. Nonprofits default as often as for-profits, but provide higher quality in low-cost states. Their incentives to invest may be higher than for-profits or lower than public providers, depending on the weights in the nonprofit's objective function. The authors also study the effect of extending the game to allow for elastic patient demand, quality competition, and multi-period play.

Barro and **Huckman** explore the effectiveness of the recent increase in hospital advertising in its ability to generate additional hospital admissions or achieve higher prices. They use several empirical techniques to estimate the influence of advertising on hospitals, including an instrumental variables approach and the use of a legal change in the New York hospital market. They find some evidence that advertising is effective in increasing hospital admissions, but only for high quality hospitals. They also find some limited evidence that advertising has a delayed positive effect on hospital prices, again only for the high quality hospitals.

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Public Economics

Over 50 members and guests of the NBER's Program on Public Economics, directed by James M. Poterba of NBER and MIT, met in Cambridge on November 1 and 2. The following papers were discussed:

Douglas B. Bernheim, NBER and Stanford University, **Robert J. Lemke**, Florida International University, and **John Karl Scholz**, NBER and the University of Wisconsin, "Do Estate and Gift Taxes Affect the Timing of Private Transfers?" (NBER Working Paper No. 8333)
Discussant: Kathleen McGarry, NBER and University of California at Los Angeles

Alberto Alesina and **Caroline M. Hoxby**, NBER and Harvard University, and **Reza Baqir**, University of California at Berkeley, "Political Jurisdictions in Heterogeneous Communities" (NBER Working Paper No. 7859)
Discussant: Thomas J. Nechyba, NBER and Duke University

Darius Lakdawalla, NBER and RAND Corporation, "The Declining Quality of Teachers" (NBER Working Paper No. 8263)
Discussant: Mark Duggan, NBER and University of Chicago

Jonathan Gruber, NBER and MIT, and **Botond Koszegi**, University of California at Berkeley, "A Theory of Government Regulation of Addictive Bads: Optimal Tax Levels and Tax Incidence for Cigarette Excise Taxation"
Discussant: David Laibson, NBER and Harvard University

Raymond Fisman, Columbia University, and **Shang-Jin Wei**, NBER and Harvard University, "Tax Rates and Tax Evasion: Evidence from the 'Missing Imports' in China" (NBER Working Paper No. 8551)
Discussant: James R. Hines, Jr., NBER and University of Michigan

Bruce D. Meyer, NBER and Northwestern University, and **Bradley T. Heim**, Northwestern University, "Structural Labor Supply Models when Budget Constraints are Nonlinear," and "Work Costs and Nonconvex Preferences in the Estimation of Labor Supply Models"
Discussant: Jerry A. Hausman, NBER and MIT

Emmanuel Saez, NBER and Harvard University, "Optimal Progressive Capital Income Taxes in the Infinite Horizon Model"
Discussant: Kenneth L. Judd, NBER and Stanford University

Bernheim, **Lemke**, and **Scholz** seek to identify the effects of gift and estate taxation on the timing of private transfers. Their analysis is based on data from the 1989, 1992, 1995, and 1998 waves of the Surveys of Consumer Finances. Legislative activity during that period reduced the tax disadvantage of bequests relative to gifts. Moreover, the magnitude of this reduction differed systematically across identifiable household categories. The authors find that households experiencing larger declines in the expected tax disadvantages of bequests substantially reduced their inter vivos transfers relative to households experiencing small declines in the tax disadvantages of bequests. This implies that the timing of transfers is highly responsive to applicable gift and estate tax rates. These conclusions are based both on simple comparisons of the probability of giving across different time periods and groups, and on empirical specifications that control for a variety of potentially confounding factors, such as systematic changes in the fraction of wealth attributable to unrealized capital gains. The results also provide evidence of a systematic bequest motive for some high-wealth households.

Hoxby and her co-authors investigate how the number and size of local political jurisdictions in an area is determined. They focus on the tradeoff between the benefits of economies of scale and the costs of a heterogeneous population. They consider heterogeneity in income, race, ethnicity, and religion, and they test the model using U.S. school districts, school attendance areas, municipalities, and special districts. They find only weak evidence of tradeoffs between economies of scale and income heterogeneity, ethnic heterogeneity, or religious heterogeneity. However, they consistently find evidence of a tradeoff between economies of scale and racial heterogeneity, even when they examine shocks to racial het- erogeneity generated by the two World Wars. It appears that people are consistently willing to sacrifice economies of scale in order to avoid racial heterogeneity in their jurisdiction.

Lakdawalla shows that, while the relative quality of teachers is declining, this decline is a result of technical change, which improves the specialized knowledge of skilled workers outside teaching but not the general knowledge of schoolteachers. This raises the price of skilled teachers, but not their productivity. Schools respond by lowering the relative skill of teachers and raising teacher quantity. Growth in input prices hurts the productivity of primary schools and raises the unit cost of primary education. These predictions appear to be consistent with the data. Analysis of U.S. Census microdata suggests that, from the 1900 birth cohort to the 1950 birth cohort, the relative schooling of teachers has declined by about three years, and the human capital of teach-

ers may have declined in value relative to that of college graduates by as much as 30 percent, but the teacher-student ratio has more than doubled over the last half century in a wide array of developed countries. Moreover, the per student cost of primary school education in the United States also has risen dramatically over the past 50 years.

The standard normative analysis of government policy towards products that are addictive and "bads" is carried out in the context of a "rational addiction" model. But the available evidence is at least as consistent, if not more so, with an alternative model in which individuals are "time inconsistent" about decisions such as smoking: they have a higher discount rate between this period and the next than between future periods. This alternative formulation delivers radically different implications for government policy towards smoking. **Gruber** and **Koszegi** estimate that the optimal tax on cigarettes is $1.80 or more above what is implied by the standard model. They also estimate that cigarette excise taxes are much less regressive, and indeed for most parameter values are progressive, because lower income groups are much more price elastic and therefore benefit more from the commitment device provided by higher excise taxes.

Fisman and **Wei** present a case study of tax evasion in China. The novel feature of their approach is that, at a very disaggregated level of individual products, they can measure evasion relatively precisely by comparing the values that China reports as imports from Hong Kong with what Hong Kong reports as exports to China. They can match this "evasion gap" with the tariff (and VAT tax) schedule at the product level. The result is striking: using the data for

1998, they find that on average, a 1 percent increase in the tax rate results in a 3 percent increase in evasion. The result is similar when a first-difference specification is used with data for 1997 and 1998. This relationship is nonlinear: the elasticity of evasion is larger at high tax levels. Furthermore, the evasion gap is correlated negatively with the tax rates on closely related products, suggesting that part of the evasion takes place by misreporting the type of imports, in addition to underreporting the value of imports. This effect is even more pronounced when the evasion gap is measured using quantities rather than values.

Heim and **Meyer** examine the role of economic assumptions in structural labor supply methods and how some of the assumptions may be relaxed. First they show the sources of inconsistency in the local linearization method. Then they examine the standard approach generally attributed to Hausman, and show that it relies on the convexity of preferences in the construction of the likelihood function, although this assumption is not particularly explicit. They demonstrate that the criticisms of MaCurdy can be reinterpreted as showing where in the estimation method the assumption of convexity is enforced. They provide a formal argument that, if observed preferences are nonconvex but the estimation method does not allow for nonconvexity, then estimated parameters may not satisfy the Slutsky restrictions, as has often been found. Finally, they show that the standard methods in the literature do not permit estimation of parameters consistent with nonconvex preferences, and they describe methods that allow for less restrictive assumptions.

Heim and Meyer go on to critique the manner in which work costs have been introduced into labor supply esti-

mation, and note the difficulty of incorporating a realistic rendering of the costs of work. They show that work costs will be subsumed into observable preferences if they are not accounted for in the budget constraint. They then show that even if preferences are inherently convex, the presence of unobservable work costs can make observable preferences appear nonconvex. Absent strong functional form assumptions, these work costs are not identified in the data. However, even if work costs cannot be identified separately, policy relevant calculations, such as estimates of the effect of tax changes on labor supply or deadweight loss calculations, are not affected by the fact that estimated preferences incorporate work costs.

Saez analyzes optimal progressive capital income taxation in the infinite horizon dynastic model. He shows that progressive taxation is a much more powerful and useful tool for redistributing wealth than linear taxation on which previous literature has focused. He considers progressive capital income tax schedules taking a simple two-bracket form with an exemption bracket at the bottom and a single marginal tax rate above a time-varying exemption threshold. Individuals are taxed until their wealth is reduced to the exemption threshold. When the intertemportal elasticity of substitution is not too large and the top tail of the initial wealth distribution is infinite and thick enough, the optimal exemption threshold converges to a finite limit. As a result, the optimal tax system drives all the large fortunes down to a finite level and produces a truncated long-run wealth distribution. A number of numerical simulations illustrate the theoretical result.

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Monetary Economics

Members and guests of the NBER's Program on Monetary Economics met in Cambridge on November 2. Ben S. Bernanke, NBER and Princeton University, organized this program:

Lawrence J. Christiano and **Martin Eichenbaum**, NBER and Northwestern University, and **Charles L. Evans**, Federal Reserve Bank of Chicago, "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy" (NBER Working Paper No. 8403) Discussant: Alan Stockman, NBER and University of Rochester

Michael Dotsey, Federal Reserve Bank of Richmond, and **Robert G. King**, NBER and Boston University, "Pricing, Production, and Persistence" (NBER Working Paper No. 8407) Discussant: Julio J. Rotemberg, NBER and Harvard University

Yacine Aït-Sahalia and **Jonathan A. Parker**, NBER and Princeton University, and **Motohiro Yogo**, Harvard University, "Luxury Goods and the Equity Premium" (NBER Working Paper No. 8417) Discussant: Annette Vissing-Jorgensen, NBER and University of Chicago

Jordi Galí, NBER and Universitat Pompeu Fabra; **Mark Gertler**, NBER and New York University; and **J. David López-Salido**, Bank of Spain, "Markups, Gaps, and the Welfare Costs of Business Fluctuations" Discussant: Susanto Basu, NBER and University of Michigan

Ricardo J. Caballero, NBER and MIT, and **Arvind Krishnamurthy**, Northwestern University, "A 'Vertical' Analysis of Crises and Central Bank Intervention" (NBER Working Paper No. 8428) Discussant: Andres Velasco, NBER and Harvard University

Christopher L. House, NBER and Boston University, "Adverse Selection and the Accelerator" Discussant: Jeremy Stein, NBER and Harvard University

Christiano, Eichenbaum, and **Evans** present a model embodying moderate amounts of nominal rigidities that explains the observed inertia in inflation and persistence in output. The key features of the model prevent a sharp rise in marginal costs after an expansionary shock to monetary policy. Of these features, the most important are staggered wage contracts averaging three quarters in duration and variable capital utilization.

Using a small macroeconomic model and a larger fully articulated model, **Dotsey** and **King** show how a particular view of real marginal cost can lead to substantial persistence. This view is based on three features of the "supply side" of the economy that the authors believe are realistic: an important role for produced inputs; variable capacity utilization; and labor supply variability through changes in employment. Importantly, these "real flexibilities" work together to dramatically reduce the elasticity of marginal cost with respect to output. These "real flexibilities" consequently reduce the extent of price adjustment in state-dependent pricing economies. The structural features also lead the sticky price model to display volatility and comovement of factor inputs and factor prices that are more closely in line with conventional wisdom about business cycles.

Aït-Sahalia, **Parker**, and **Yogo** evaluate the return on equity using novel data on the consumption of luxury goods. Specifying household utility as a function of the consumption of a luxury good and a basic good, the authors derive and evaluate the riskiness of equity in such a world. Consumption data from household surveys and national accounts overstate the risk aversion necessary to match the observed equity premium because they contain basic consumption goods. The risk aversion implied by equity returns and the consumption of luxury goods is more than an order of magnitude less than is found by using national accounts consumption data. For the very rich, the equity premium is much less of a puzzle.

Galí, **Gertler**, and **López-Salido** present a simple, theory-based measure of the variations in aggregate economic efficiency associated with business fluctuations. They decompose this indicator, which they refer to as "the gap," into two constituent parts: a price markup and a wage markup. They show that the latter accounts for the bulk of the fluctuations in their gap measure. Finally, they derive a measure of the welfare costs of business cycles that is related directly to their gap variable, and which explicitly takes into account the existence of a varying aggregate inefficiency. When applied to postwar U.S. data, for plausible parametrizations, the authors' measure suggests welfare losses of fluctuations that are of a higher order of magnitude than those derived by Lucas (1987).

During emerging market crises, agents may be liquid enough to borrow from other domestic agents, but they lack the international liquidity or collateral to borrow from foreigners — that is, they face a "vertical" supply curve for international funds. In this setting, **Caballero** and **Krishnamurthy** show that an (ex post) optimizing central bank's response to a crisis is to defend the exchange rate by injecting international reserves and tightening monetary policy. However, while this response can be rationalized ex post, it has negative consequences ex ante

when domestic financial markets are underdeveloped, because it reduces the already insufficient private sector incentives to insure against external crises. Instead, if a central bank could commit, it should expand rather than contract monetary policy. Lacking the willingness, credibility, or feasibility to implement an expansionary monetary policy during crises has important drawbacks. It means limiting injections of international reserves and resorting to other, more costly instru-ments, such as capital controls and international liquidity requirements, to address the insurance problem.

House constructs a dynamic model in which adverse selection in credit markets causes a financial accelerator. He then answers three questions: Does the financial system stabilize or destabilize the economy? How large are these effects? And, how can we empirically distinguish between amplifiers and stabilizers? House contrasts his model with the costly state verification model. Unlike the costly state verification mechanism, the adverse selection model has the potential to stabilize shocks rather than amplify them. He shows that the adverse selection forces are much more powerful than the amplifier effects in the costly state verification framework. Although accelerators and stabilizers are equivalent observationally along many dimensions, House presents a statistic that can distinguish between them.

Macroeconomics and Individual Decisionmaking

The NBER's Working Group on Macroeconomics and Individual Decisionmaking, directed by George A. Akerlof, University of California at Berkeley, and Robert J. Shiller, NBER and Yale University, met in Cambridge on November 3. The following papers were discussed:

John C. Driscoll, NBER and Brown University, and **Steinar Holden**, University of Oslo, "Fair Treatment and Inflation Persistence"
Discussant: Venkataraman Bhaskar, University of Essex

Jonathan Gardner and **Andrew Oswald**, Warwick University, "Does Money Buy Happiness? A Longitudinal Study Using Data on Windfalls"
Discussant: Alberto F. Alesina, NBER and Harvard University

N. Gregory Mankiw, NBER and Harvard University, and **Ricardo Reis**, Harvard University, "Sticky Information Versus Sticky Prices: A Proposal to Replace the New-Keynesian Phillips Curve"
Discussant: Xavier Gabaix, MIT

Laurence M. Ball and **Robert A.**

Moffitt, NBER and Johns Hopkins University, "Productivity Growth and the Phillips Curve" (NBER Working Paper No. 8421)
Discussant: Pierre Fortin, Université du Québec à Montreal

David Laibson, NBER and Harvard University, **Andrea Repetto**, Universidad de Chile, and **Jeremy B. Tobacman**, Harvard University, "Wealth Accumulation, Credit Card Borrowing, and Consumption-Income Comovement"
Discussant: Robert B. Barsky, NBER and University of Michigan

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Most wage-contracting models with rational expectations fail to replicate the persistence in inflation observed in the data. **Driscoll** and **Holden** develop a wage-contracting model in a setting following Bhaskar (1990) in which workers are concerned about being treated fairly: they care disproportionately more about being paid less than other identical workers than they care about being paid more than them. This model generates a number of equilibriums, where workers want to match the wage set by other workers. If workers' expectations are based on the past behavior of wage growth, these beliefs will be self-fulfilling and thus rational. Moreover, the multiplicity of equilibriums is con-sistent with the idea that there may be a natural range of unemployment, rather than a single natural rate. The authors estimate the model on quarterly U.S. data over the period 1955-2000. They find that the dynamics of the Phillips curve do change below unemployment rates of 4.7 and above rates of 6.5 percent.

The most fundamental idea in economics is that money makes people happy. **Gardner** and **Oswald** construct a test: they study longitudinal information on the psychological health and reported happiness of approximately 9,000 randomly chosen people. In the spirit of a natural experiment, they show that those in the panel who receive windfalls — by win-ning lottery money or receiving an inheritance — have higher mental wellbeing in the following year. A windfall of 50,000 pounds (approximately 75,000 U.S. dollars) is associated with a rise in wellbeing of between 0.1 and 0.3 standard deviations. Approximately one million pounds (1.5 million dollars), therefore, would be needed to move someone from close to the bottom of a happiness frequency distribution to close to the top. Whether these happiness gains wear off over time remains an open question.

Mankiw and **Reis** examine a model of dynamic price adjustment based on the assumption that information disseminates slowly throughout

the population. Compared to the commonly used sticky-price model, this sticky-information model displays three, related properties that are more consistent with accepted views about the effects of monetary policy. First, disinflations are always contractionary (although announced disinflations are less contractionary than surprise ones). Second, monetary policy shocks have their maximum impact on inflation with a substantial delay. Third, the change in inflation is positively correlated with the level of economic activity.

Ball and **Moffitt** present a model in which workers' aspirations for wage increases adjust slowly to shifts in productivity growth. The model yields a Phillips curve with a new variable: the gap between productivity growth and an average of past wage growth. Empirically, this variable shows up strongly in the U.S. Phillips curve. Including it explains the otherwise puzzling shift in the unemployment-inflation tradeoff since 1995.

Research in the consumption literature usually attempts to explain a single empirical regularity at a time. **Laibson**, **Repetto**, and **Tobacman** instead ask whether a single consumption model can simultaneously explain a wide range of facts about wealth accumulation, credit card borrowing, and consumption-income comovement. Their analysis implements a life cycle simulation framework that incorporates dependents, stochastic labor income, liquidity constraints, liquid assets, revolving credit, illiquid assets, and retirement. They use the Method of Simulated Moments to econometrically compare the choices of their simulated consumers with the choices of actual consumers as calculated from household survey data. They reject the null hypothesis of exponential discounting in favor of the hyperbolic discounting alternative. However, the hyperbolic model also fails to explain all of the micro-survey evidence. High levels of wealth accumulation and high frequencies of credit card borrowing are difficult to reconcile with any existing model.

Asset Pricing

Nearly 75 members and guests of the NBER's Program on Asset Pricing met in Cambridge on November 9. Organizers Luis M. Viceira and Tuomo Vuolteenaho, both of NBER and Harvard University, chose these papers to discuss:

Ravi Bansal, Duke University, and **Robert F. Dittmar** and **Christian T. Lundblad**, Indiana University, "Consumption, Dividends, and the Cross-Section of Equity Returns" Discussant: Martin Lettau, New York University

Andrew Ang and **Geert Bekaert**, NBER and Columbia University, "Stock Return Predictability: Is It There?"
Discussant: Samuel Thompson, Harvard University

Jonathan Lewellen, MIT, "Predicting Returns with Financial Ratios"
Discussant: Robert F. Stambaugh, NBER and University of Pennsylvania

Joao F. Gomes and **Lu Zhang**, University of Pennsylvania, and **Amir Yaron**, NBER and University of Pennsylvania, "Asset Pricing Implications of Firms' Financing Constraints"
Discussant: John H. Cochrane, NBER and University of Chicago

Michael W. Brandt, NBER and University of Pennsylvania; **John H. Cochrane**; and **Pedro Santa-Clara**, University of California, Los Angeles, "International Risk Sharing is Better Than You Think (Or Exchange Rates Are Much Too Smooth)"
Discussant: Ravi Jagannathan, NBER and Northwestern University

Lubos Pástor, University of Chicago, and **Robert F. Stambaugh**, "Liquidity Risk and Expected Stock Returns"
Discussant: Jiang Wang, NBER and MIT

A central economic idea is that an asset's risk premium is determined by its ability to insure against fluctuations in consumption (that is, by consumption beta). Consistent with this intuition, **Bansal**, **Dittmar**, and **Lundblad** show that a model with constant consumption betas does extremely well in capturing cross-sectional differences in risk premiums. More specifically, the authors present a dynamic general equilibrium model in which cross-sectional differences in an asset's consumption beta are determined by cross-sectional differences in the exposure of the asset's dividends to aggregate consumption — that is, by the consumption leverage of the asset's dividends. They measure this consumption leverage in one case as the stochastic cointegration parameter between dividends and consumption and in another by the covariance of ex-post dividend growth rates with the expected growth rate of consumption. Cross-sectional differences in this consumption leverage parameter can explain up to 65 percent of the cross-sectional variation in risk premiums across 31 portfolios — which include the market, 10 momentum-, 10 size-, and 10 book-to-market-sorted portfolios. The consumption leverage model

can justify much of the observed value, momentum, and size-risk premium spreads. For this asset menu, empirical three-factor models (size, BM, and market factors, for example) can justify about 17 percent of the cross-sectional differences in risk premiums. Time-varying beta asset pricing models also have considerable difficulty justifying the cross-section of risk premiums for these assets.

Ang and **Bekaert** ask whether stock returns in France, Germany, Japan, the United Kingdom, and the United States are predictable by three instruments: the dividend yield, the earnings yield, and the short rate. The predictability regression is suggested by a present value model with earnings growth, payout ratios, and the short rate as state variables. The authors find the short rate to be the only robust short-run predictor of excess returns, and find little evidence of excess return predictability by earnings or dividend yields across all countries. There is no evidence of long-horizon return predictability once the authors account for finite sample influence. Cross-country predictability is stronger than predictability using local instruments. Finally, dividend and earnings yield predict future cashflow growth rates both in the United States and in other countries.

Lewellen reports on the predictive power of dividend yield, book to market, and the earnings-price ratio. He shows that previous studies overstate the bias in predictive regressions and consequently understate the forecasting power of the three financial ratios. Dividend yield predicts stock returns from 1946-97, as well as in various subperiods. Book-to-market and the earnings-price ratio predict returns during the shorter 1963-97 sample. The evidence remains strong despite the ratios' poor forecasting ability in recent years.

Gomes, **Yaron**, and **Zhang** ask whether firms' financing constraints are quantitatively important in explaining asset returns. To answer this question they first show that, for a large class of theoretical models, these constraints have a parsimonious representation amenable to empirical analysis. They find that financing frictions lower both the market Sharpe ratio and the correlation between the pricing kernel and returns. Consequently, these frictions significantly worsen the performance of investment-based asset pricing models. These results bring into question whether the asset pricing fluctuations, induced by the presence of the financing constraints, provide a realistic channel for the propagation mechanism in several macroeconomic models.

Exchange rates depreciate by the difference between the domestic and foreign marginal utility growths. Exchange rates vary a lot, as much as 10 percent per year. However, equity premiums imply that marginal utility growths vary much more, by at least 50 percent per year. This means that marginal utility growths must be highly correlated across countries — international risksharing is better than you think. Conversely, if risks really are not shared internationally, exchange rates should vary more than they do — exchange rates are thus much too smooth. **Brandt**, **Cochrane**, and **Santa-Clara** calculate an index of international risksharing that formalizes this intuition in the context of both complete and incomplete capital markets. Their results suggest that risksharing is indeed very high across several pairs of countries.

Pástor and **Stambaugh** investigate whether market-wide liquidity is a state variable important for asset pricing. They find that expected stock returns are related cross-sectionally to the sensitivities of returns to fluctuations in aggregate liquidity. Their monthly liquidity measure, an average of individual-stock measures estimated with daily data, relies on the principle that order flow induces greater return reversals when liquidity is lower. Over a 34-year period, the average return on stocks with high sensitivities to liquidity exceeds that for stocks with low sensitivities by 7.5 percent annually, adjusted for exposures to the market return as well as size, value, and momentum factors.

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Higher Education

The NBER's Working Group on Higher Education, directed by Charles T. Clotfelter of NBER and Duke University, met in Cambridge on November 9. They discussed these papers:

Michael S. McPherson, Macalester University, and **Morton O. Schapiro**, Williams College, "Tracking the Impact of Academic 'Merit' on Need-Based and Non-Need-Based Financial Aid Grants" Discussant: Michael Rothschild, NBER and Princeton University

Mark C. Long, University of Michigan, "Race and College Admissions: An Alternative to Affirmative Action?" Discussant: Ronald G. Ehrenberg, NBER and Cornell University

Susan Dynarski, NBER and Harvard University, "Loans, Liquidity, and Schooling Decisions" Discussant: David Zimmerman, Williams College

Larry D. Singell, Jr., University of Oregon, "Come and Stay a While: Does Financial Aid Affect Enrollment and Retention at a Large Public University?" Discussant: Michele McLennan, Ursinus College

John F. Kain and **Daniel M. O'Brien**, University of Texas, "Hopwood and the Top 10 Percent Law: How They Have Affected the College Enrollment Decisions of Texas High School Graduates" Discussant: Sarah Turner, University of Virginia

Todd R. Stinebrickner, University of Western Ontario, and **Ralph Stinebrickner**, Berea College, "Peer Effects Among Students from Disadvantaged Backgrounds" Discussant: Bruce Sacerdote, NBER and Dartmouth College

McPherson and **Schapiro** look beyond the "merit" and "need" labels to provide empirical evidence on the sensitivity of aid awards to both "need" and "merit," understood as evidence of academic achievement or potential. As they show, a focus simply on dollars labeled as "merit" scholarships misses a good deal of the action regarding the responsiveness of grant awards to indicators of merit. Relatively few students receive awards that are explicitly labeled as "non-need-based" or "merit" awards (in the restricted sample they report on, for example, only 4 percent of undergraduates at public colleges and 15 percent at private colleges receive such awards from institutional funds — these figures exclude athletic scholarships), while many more receive "need-based" awards (22 percent at public colleges and 52 percent at private colleges). If these need-based grant awards are even moderately sensitive to "merit," then the impact on the overall distribution of aid may be considerable.

During the late 1990s, several states eliminated affirmative action admissions policies at their public colleges. Some of these states substituted a program that grants admission to the top-x percent of each high school's graduating class. These new programs were instituted in efforts to restore minority college enrollments to their prior levels. **Long** finds that the preferences given to minority applicants under affirmative action are large and that minority enrollment in top-tier institutions would fall substantially after eliminating these preferences. However, there are not sufficient numbers of minorities in the top-x percent of their high school for the expected recovery from an x-percent program to be very large. Furthermore, most minority beneficiaries would have been accepted by state universities without the program. As a result, x-percent programs are unable to replace traditional affirmative action and maintain the share of minority students.

During the 1999-2000 school year, students borrowed $36 billion through the federal loan program, double the volume in 1992-3. Despite the large size and rapid growth of the student loan market, it has been the subject of little economic analysis. Does the availability of government loans affect schooling decisions? Identifying the effect of loans is empirically challenging, because eligibility for federal loans is correlated with observed and unobserved determinants of schooling.

Dynarski exploits variation in loan eligibility induced by the Higher Education Amendments of 1992. She finds that loan eligibility has a positive effect on college attendance and a somewhat larger effect on the choice of college, with loans shifting students toward four-year public schools. The school choice results are consistent with a particularly sharp rise in the rate of subsidized borrowing at four-year public schools.

Few studies have examined whether financial aid affects college retention. **Singell** models the decision to enroll and re-enroll in college, which yields a model that he estimates using detailed individual data from a large public university. The analysis uses institution-specific data to examine the effect of financial aid on the re-enrollment decision, and exploits the sequential college completion process to condition the re-enrollment probabilities for college selection. Thus, the implications are broader than is typical of a single-institution study. Overall, the results indicate that some types of need-based aid improve retention, but that merit-based aid has the largest retention effects, particularly for well-to-do enrollees.

Kain and **O'Brien** document changes in minority enrollment in

Texas public community colleges, colleges, and universities prior to Hopwood, after Hopwood but prior to the Top 10 Percent law, and after the Top 10 Percent law. Descriptive analyses demonstrate the substantial effect of ending affirmative action, and limited success of the Top 10 percent law. They demonstrate that the admissions advantage for minority students to selective public universities under affirmative action turned to a marked disadvantage after the Hopwood decision, and has yet to recover.

The paper by **Stinebrickner** and **Stinebrickner** complements the work of Sacerdote (1999) and Zimmerman (1999) by examining peer effects in a context in which many students are from the types of disadvantaged backgrounds that are often the focus of education policy. The paper finds strong evidence of peer effects for females and suggests that a net gain is likely to result from combining students from diverse backgrounds.

Corporate Finance

The NBER's Program on Corporate Finance met in Cambridge on November 16. Program Director Raghuram Rajan, NBER and University of Chicago, chose these papers for discussion:

Michael C. Jensen, Harvard University, "Paying People to Lie: The Truth About the Budget Process"
Discussant: Jeremy C. Stein, NBER and Harvard University

Mihir A. Desai, NBER and Harvard University; **C. Fritz Foley**, Harvard University; and **James R. Hines Jr.**, NBER and University of Michigan, "Dividend Policy Inside the Firm"
Discussant: Stewart C. Myers, NBER and MIT

David S. Scharfstein, NBER and MIT, and **Denis Gromb**, London Business School, "Entrepreneurial Activity in Equilibrium"
Discussant: Per J. Stromberg, University of Chicago

Robert Parrino, University of Texas; **Allen M. Poteshman**, University of Illinois; and **Michael S. Weisbach**, NBER and University of Illinois, "Measuring Investment Distortions when Risk-Averse Managers Decide Whether to Undertake Risky Projects"
Discussant: Peter Tufano, NBER and Harvard University

Luigi Zingales, NBER and University of Chicago; **Luigi Guiso**, University of Sassari, Ente "Luigi Einaudi"; and **Paola Sapienza**, Northwestern University, "The Real Effects of Local Financial Development"
Discussant: Andrei Shleifer, NBER and Harvard University

Heitor Almeida, New York University; **Renée B. Adams**, Federal Reserve Bank of New York; and **Daniel Ferreira**, University of Chicago, "Fallible Executives, Centralization of Decisionmaking, and Corporate Performance"
Discussant: Laurie Hodrick, Columbia University

Harrison Hong, Stanford University, and **Jeffrey D. Kubik**, Syracuse University, "Analyzing the Analysts: Career Concerns and Biased Earnings Forecasts"
Discussants: Bengt R. Holmstrom, MIT

Jensen analyzes the counterproductive effects associated with using budgets or targets in an organization's performance measurement and compensation systems. Paying people on the basis of how their performance relates to a budget or target causes people to "game" the system and, in doing so, to destroy value in two main ways: first, both superiors and subordinates lie in the formulation of budgets and therefore gut the budgeting process of the critical unbiased information that is required to coordinate the activities of disparate parts of an organization. Second, they game the realization of the budgets or targets, and in doing so destroy value for their organizations. Although most managers and analysts understand that budget gaming is widespread, few understand the huge costs it imposes on organizations and how to lower them. Jensen explains exactly how this happens and how managers and firms can stop this counterproductive cycle. Purely linear compensation formulas would provide no incentives to lie, or to withhold and distort information, or to game the system. Jensen believes that solving the problems could easily result in large productivity and value increases — sometimes as much as 50 to 100 percent improvements in productivity.

Desai, **Foley**, and **Hines** consider the determinants of dividend policies inside firms; they analyze dividend remittances by a large panel of foreign affiliates of U.S. multinational firms. Despite the controlling interests of U.S. parent companies, the foreign affiliates' dividend policies resemble those used by publicly held companies in paying dividends to diffuse common shareholders. Dividend policies of foreign affiliates are affected little by the dividend policies of their parent companies or by parent company exposure to public capital markets. Systemic differences in the payout behavior of affiliates that differ in organizational form, and those that face differing tax costs of paying dividends, indicate that dividend policy responds to relevant tax factors; nevertheless, dividend policies are not

determined solely by tax considerations. The absence of capital market considerations and the incompleteness of tax explanations together suggest that dividend policies largely are driven by the need to control managers of foreign affiliates. Parent firms are more willing to incur tax penalties by simultaneously investing funds while receiving dividends when their foreign affiliates are partially owned, located far from the United States, or in jurisdictions in which property rights are weak, all of which are implied by control theories of dividends.

Gromb and **Scharfstein** compare the financing of new ventures in start-ups (entrepreneurship) and in established firms (intrapreneurship). Intrapreneurship allows established firms to use information on failed intrapreneurs to redeploy them into other jobs. Failed entrepreneurs instead must seek other jobs in an imperfectly informed external labor market. While this is inefficient ex post, it provides entrepreneurs with high-powered incentives ex ante. The authors show that two types of equilibriums can arise (and sometimes coexist). In a low (high) entrepreneurship equilibrium, the market for failed entrepreneurs is thin (deep). Internal (external) labor markets thus are particularly valuable, which favors intrapreneurship (entrepreneurship). The authors also show that there can be too little or too much entrepreneurial activity. There can be too much because entrepreneurs do not take into account their positive effect on the quality of the labor market. There can be too little because a high quality labor market is bad for entrepreneurial incentives.

Parrino, **Poteshman**, and **Weisbach** estimate the distortions in corporate investment caused by changes in firm risk. They present a dynamic model in which a self-interested, risk-averse manager makes the investment decisions for a levered firm. Using empirical data from public firms, they estimate the distortions in investment decisions. Despite the wealth transfer effect, managers compensated with equity prefer safe projects to risky ones, even under the assumption of risk neutrality. Important factors in this decision are the changes in the values of future tax shields and bankruptcy costs when firm risk changes. The authors also evaluate the extent to which this effect varies with firm leverage, managerial risk aversion, managerial non-firm wealth, project size, debt duration, and the structure of management compensation packages.

Guiso, **Sapienza**, and **Zingales** construct a new indicator of financial development by estimating a regional effect on the probability that, ceteris paribus, a household is shut off from the credit market. By using this indicator, they explore the real effects of regional differences in financial development. They find that financial development: enhances the probability an individual will start his own business; favors entry; increases competition; and promotes growth of firms. As predicted by the theory, these effects are weaker for larger firms, which can raise funds more easily outside of the local area. Overall, the results suggest that local financial development is an important determinant of the economic success of an area.

Adams, **Almeida**, and **Ferreira** explore some possible consequences for firm performance of fallibility in managerial decisionmaking. Based on Sah and Stiglitz (1991), they develop the hypothesis that, if managers are fallible, firm performance will be more variable as the number of managers participating in decisionmaking decreases; that is, as the firm becomes more centralized. Using characteristics of the Executive Office to develop a proxy for the number of executives participating in top decisionmaking, they argue that if the Chairman of the Board is not the CEO, decisionmaking in the firm will be more decentralized: the Chairman also will participate in decisionmaking. They find that the evidence is consistent with their hypothesis. Firm performance (measured by Tobin's Q, stock returns, and ROA) is significantly more variable for firms with greater values of their centralization index. The results are consistent across various tests designed to detect differences in variability.

Hong and **Kubik** examine the career concerns of security analysts. They relate long histories of earnings forecasts to job separations. They find that relatively accurate past forecasts lead to favorable career outcomes, such as remaining at or moving up to a high status (large, prestigious) brokerage house. Controlling for accuracy, optimistic forecasts relative to the consensus increase the chances of favorable job separations. Job separations depend much less on accuracy for analysts who cover stocks that are underwritten by their brokerage houses. Such analysts also are much more likely to be rewarded for optimistic forecasts than other analysts. Furthermore, job separations are much less sensitive to accuracy, and somewhat more sensitive to optimism, during the stock market mania of the late 1990s. These findings suggest that the well-documented analyst-forecast-optimism bias is likely attributable to incentives to promote stocks.

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Market Microstructure

The NBER's Working Group on Market Microstructure met in Cambridge on November 30. Organizers Bruce Lehmann, NBER and University of California at San Diego; Andrew W. Lo, NBER and MIT; Matthew Spiegel, Yale University; and Avanidhar Subrahmanyam, University of California at Los Angeles, chose these papers for discussion:

Hendrik Bessembinder, University of Utah, and **Kumar Venkataraman**, Southern Methodist University, "Does an Electronic Stock Exchange Need an Upstairs Market?"
Discussant: Elizabeth Odders-White, University of Wisconsin, Madison

Tim Bollerslev, NBER and Duke University, and **Hao Zhou**, Federal Reserve Board, "Order Flow, Market Risk, and Daily Stock Returns"
Discussant: S. Viswanathan, Duke University

Gunter Strobl, University of Pennsylvania, "On the Optimal Allocation of New Security Listings to Specialists"

Discussant: Kathleen Hagerty, Northwestern University

Joel Hasbrouck and **Gideon Saar**, New York University, "Limit Orders and Volatility in a Hybrid Market: The Island ECN"
Discussant: B. Swaminathan, Cornell University

Tarun Chordia, Emory University, "Liquidity and Returns: The Impact of Inclusion into the S&P 500 Index"
Discussant: Amber Anand, Syracuse University

Bessembinder and **Venkataraman** investigate the costs and benefits of using an "upstairs" market, in which trades are facilitated through search and negotiation, to execute large equity transactions. The Base de Donnees de Marche (BDM) database from the Paris Bourse identifies upstairs-facilitated trades and trades in the "downstairs" (electronic limit order) market. Using data on 92,170 block transactions in a broad cross-section of firms from the Paris Bourse, the authors test several theoretical predictions about upstairs trading and investigate the effect of market structure on trading costs. They find that the upstairs market at the Paris Bourse is an important source of liquidity for large transactions. These results support the hypothesis that the role of an upstairs broker is to lower the risk of adverse selection in the upstairs market by certifying a block order as being uninformed. In addition, for the subset of stocks with less restrictive crossing rules (eligible stocks), the authors find that a very high proportion of the upstairs trades are executed at prices near the quotes. These results suggest that market participants closely monitor the liquidity in the downstairs markets, and the right to execute away from the quotes is used only sparingly, and for the largest orders. For the U.S. markets, these results imply that less restrictive crossing rules may not result in worse execution for the block participants.

Bollerslev and **Zhou** explain individual daily stock returns with a fundamental ICAPM component and an idiosyncratic liquidity component. Guided by a theoretical market microstructure model which directly links the liquidity premium to the noise trading risk, the informational trading risk, and the systematic volatility risk, they find that: 1) explicitly incorporating the idiosyncratic liquidity component almost doubles the explanatory power of the standard ICAPM; 2) the liquidity premium is almost exclusively compensating for idiosyncratic volatility risk as opposed to market wide volatility risk; and 3) the signed order flow and, to a lesser degree, the signed trades are both informative about the idiosyncratic liquidity risk, while standard raw volume-based measurements are not.

Strobl addresses the question of how securities with correlated payoffs should be optimally allocated to dealers in a specialist system. Using an adverse selection model with risk-averse traders, he compares different market-making scenarios and derives equilibrium prices in closed form. He demonstrates that specialists are always better off when their assets are highly correlated and provides conditions under which investors will prefer such a situation as well. Intuitively, this is the case when the investors' expected endowment shocks are large, specialists are sufficiently risk averse, and competition between specialists is weak.

Hasbrouck and **Saar** present an empirical analysis of trading activity on the Island ECN, an alternative trading system for U.S. equities that is organized as an electronic limit order book. They focus on a cross-sectional investigation of the relations between different forms of volatility and various Island trading measures. They find that higher volatility is associated with: a lower proportion of limit orders in the incoming order flow; a higher probability of limit order execution; shorter expected time to execution; and lower depth in the book. In addition, Island's market share for a given firm is related positively to the overall level of Nasdaq trading in the firm. The authors document substantial use of hidden limit orders (for which the submitter has opted to forgo display of the order). Finally, over one quarter of the limit orders submitted to Island are canceled (unexecuted) within two seconds or less. The extensive use of these "fleeting" orders is at odds with the view that limit order traders (like dealers) are patient providers of liquidity.

Chordia takes an event study approach to the cross-sectional relationship between returns and liquidity to obtain strong results. The event is the inclusion of a firm into the S&P 500 index. Because the inclusion decision is unpredictable, the inclusion provides a clean natural experiment.

Chordia documents a statistically and economically significant increase in liquidity when a stock is included in the index. Moreover, stock returns in the three-year or the one-year period after the inclusion date are significantly lower than in the corresponding period before the inclusion date. This supports the notion that investors demand a premium for buying illiquid securities. The result is also consistent with Merton's investor base hypothesis. The price pressure hypothesis is not supported.

Risks of Financial Institutions

The NBER's Project on Risks of Financial Institutions met in Cambridge on November 30. Mark Carey, Federal Reserve Board, and René Stulz, NBER and Ohio State University, organized this program:

Torben G. Andersen, NBER and Northwestern University; **Tim Bollerslev**, NBER and Duke University; **Francis X. Diebold**, NBER and University of Pennsylvania; and **Paul Labys**, University of Pennsylvania, "Modeling and Forecasting Realized Volatility" (NBER Working Paper No. 8160)

Discussant: Til Schuermann, Federal Reserve Bank of New York

William Fung, London School of Business, and **David Hsieh**, Duke University, "The Risk in Hedge Fund Strategies: Theory and Evidence from Fixed Income Traders"
Discussant: Barry Schachter, Caxton Associates, LLC

James R. Barth, Auburn University, **Gerard Caprio, Jr.**, World Bank, and **Ross Levine**, University of Minnesota, "Bank Regulation and Supervision: What Works Best?"

Discussant: Charles W. Calomiris, NBER and Columbia University

Jeremy Berkowitz, University of California at Irvine, and **James O'Brien**, Federal Reserve Board, "How Accurate are Value-at-Risk Models at Commercial Banks?"
Discussant: Kenneth Froot, NBER and Harvard University

A. Sinan Cebenoyan, Hofstra University, and **Philip E. Strahan**, Boston College, "Risk Management, Capital Structure, and Lending at Banks"
Discussant: Mark Flannery, University of Florida

Andersen, **Bollerslev**, **Diebold** and **Labys** provide a general framework for integration of high-frequency intraday data into the measurement, modeling, and forecasting of daily and lower frequency volatility and return distributions. They formally develop the links between the conditional covariance matrix and the concept of realized volatility. Next, using continuously recorded observations for the deutschemark/dollar and yen/dollar spot exchange rates covering more than a decade, they find that forecasts from a simple long-memory Gaussian vector autoregression for the logarithmic daily realized volatilities perform admirably compared to popular daily ARCH and related models. Moreover, the vector autoregressive volatility forecast, coupled with a parametric lognormal-normal mixture distribution implied by the theoretically and empirically grounded assumption of normally distributed standardized returns, gives rise to well-calibrated density forecasts of future returns, and correspondingly accurate quantile estimates. Their results hold promise for practical modeling and forecasting of the large covariance matrices relevant in asset pricing, asset allocation, and financial risk management applications.

Fung and **Hsieh** provide a general classification of hedge fund strategies. First, they classify funds by the exposure to major market risk factors, such as stocks, bonds, currencies, and commodities. Directional funds have non-zero net exposure to these major risk factors, while non-directional funds do not. Second, they distinguish between static versus dynamic strategies. Static strategies keep relatively constant exposure to underlying risk factors, while dynamic strategies change exposures with the underlying risk factors. Their paper applies this classification structure to fixed-income funds. The majority of funds use non-directional strategies, which include static as well as dynamic exposures to spread factors (defined in such a way to capture the relative price movements of standard fixed-income securities). Most of these funds, however, are exposed to extreme changes in credit market conditions.

Barth, **Caprio**, and **Levine** draw on a new database for 107 countries to assess different governmental approaches to bank regulation and supervision and to evaluate the efficacy of specific policies. They assess two broad and competing theories of government regulation: the helping-hand approach, according to which governments regulate to correct market failures, and the grabbing-hand approach, according to which governments regulate to support political constituencies. Then, they consider the impact of an extensive array of specific regulatory and supervisory practices on banking-

sector development and fragility. These policies include: regulations on bank activities and the mixing of banking and commerce; regulations on domestic and foreign bank entry; regulations on capital adequacy; deposit insurance system design features; supervisory power, independence, resources, loan classification stringency, provisioning standards, diversification guidelines, and prompt corrective action powers; regulations on information disclosure and fostering private-sector monitoring of banks; and government ownership of banks. The results raise a cautionary flag regarding reform strategies that place excessive reliance on a country's adhering to an extensive checklist of regulatory and supervisory practices that involve direct government oversight of and restrictions on banks. The findings, which are much more consistent with the grabbing-hand view than the helping-hand view of regulation, suggest that regulatory and supervisory

practices that force accurate information disclosure, empower private-sector corporate control of banks, and foster incentives for private agents to exert corporate control work best to promote bank performance and stability.

In recent years, the trading accounts at large commercial banks have grown substantially and become progressively more diverse and complex. **Berkowitz** and **O'Brien** provide descriptive statistics on the trading revenues from such activities and on the associated Value-at-Risk (VaR) forecasts internally estimated by banks. For a sample of large bank holding companies, the authors evaluate the performance of banks' trading risk models by examining the statistical accuracy of the VaR forecasts. Although a substantial literature has examined the statistical and economic meaning of Value-at-Risk models, this article is the first to provide a detailed analysis of the performance of models actually in use.

Cebenoyan and **Strahan** test how active management of bank credit risk exposure through the loan sales market affects capital structure, lending, profits, and risk. They find that banks that rebalance their commercial and industrial loan portfolio exposures by both buying and selling loans — that is, banks that use the loan sales market for risk management purposes rather than to alter their holdings of loans — hold less capital than other banks; they also make more risky loans (loans to businesses) as a percentage of total assets than other banks. Holding constant size, leverage, and lending activities, banks active in the loan sales market have lower risk and higher profits than other banks. The authors conclude that increasingly sophisticated risk management practices in banking are likely to improve the availability of bank credit but not to reduce bank risk.

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International Trade and Investment

Members and guests of the Program on International Trade and Investment met at the Bureau's California office on December 7-8. Program Director Robert C. Feenstra of NBER and University of California, Davis, organized the meeting. These papers were discussed:

Donald R. Davis and **David Weinstein**, NBER and Columbia University, "Bones, Bombs, and Break Points: The Geography of Economic Activity" (NBER Working Paper No. 8517)

Carolyn L. Evans and **James Harrigan**, Federal Research Bank of New York, "Distance, Time, and Specialization"

James E. Rauch, NBER and University of California at San Diego, and **Joel Watson**, University of California at San Diego, "Entrepreneurship in International Trade"

Bruce Blonigen, NBER and University of Oregon, and **Jee-Hyeong Park**, Wayne State University, "Dynamic Pricing in the Presence of Anti-Dumping Policy: Theory and Evidence"

Eric Edmonds, Dartmouth College, and **Nina Pavcnik**, NBER and Dartmouth College, "Does Globalization Increase Child Labor?"

Jonathan Eaton and **Sam Kortum**, NBER and Boston University, and **Francis Kramarz**, CREST-INSEE, "An Anatomy of International Trade: Evidence from French Films"

Thomas J. Prusa, NBER and Rutgers University, "Survival of the Largest: Examining and Duration of U.S. Import Suppliers"

Peter Debaere and **Hongshik Lee**, University of Texas at Austin, "Does International Trade Theory Explain a Country's Terms of Trade?"

Davis and **Weinstein** consider the distribution of economic activity within a country in light of three leading theories: increasing returns, random growth, and locational fundamentals. They examine the distribution of regional population in Japan from the Stone Age to the modern era, and consider the Allied bombing of Japanese cities in WWII as a shock to relative city sizes. Their results support a hybrid theory in which locational fundamentals establish the spatial pattern of relative regional densities, but increasing returns may help to determine the degree of spatial differentiation. One implication of these results is that even large temporary shocks to urban areas have no long-run impact on city size.

Evans and **Harrigan** argue that the interaction of time, technology, and distance can make distance matter more, not less, in equilibrium. They use a unique dataset which includes product-level information from a major U.S. retailer, detailed bilateral trade policy measures, and international trade flows in apparel to confirm the predictions of the model. In their model, firms face uncertain demand over the course of each year, with the degree of uncertainty differing across firms. Firms can choose to produce in a faraway low-cost location, or in a closer but more costly location. Because of the extra time required to ship output from the faraway location, only firms located nearby can revise production in response to news about demand. In equilibrium, firms with low demand variability will produce in the low-cost location, while firms with high demand variability will locate nearby where costs are higher. When technology improves so that more firms potentially can take advantage of nearby locations, the resulting increased relative demand for labor in nearby locations leads to a steeper wage gradient with distance. The authors test their model with detailed data on the changing pattern of U.S. apparel imports. Products are classified according to whether or not they are re-ordered throughout the year, using confidential data from a major U.S. retailer. Controlling for trade policy with a comprehensive dataset on tariffs and bilateral apparel quotas, they find that imports of frequently re-ordered products have grown most rapidly from countries close to the United States.

Motivated by evidence on the importance of incomplete information and networks in international trade, **Rauch** and **Watson** investigate the supply of "network intermediation." They hypothesize that the agents who become international trade intermediaries first accumulate networks of foreign contacts while working as employees in production or sales, then become entrepreneurs who sell access to and use of the networks they accumulated. The authors report supportive results regarding this hypothesis from a pilot survey of international trade intermediaries. They then build a simple general equilibrium model of this type of entrepreneurship and use it for comparative statics and welfare analysis. One welfare conclusion is that intermediaries may have inadequate incentives to maintain or expand their networks, suggesting a rationale for the policies followed by some countries to encourage large-scale trading companies that imitate the Japanese sogo shosha.

Antidumping (AD) duties are calculated as the difference between the foreign firm's product price in the export market and some definition of "normal" or "fair" value, often the foreign firm's product price in its own market. Additionally, AD laws allow for recalculation of these AD duties over

time in what are known as an administrative review process. **Blonigen** and **Park** examine for the first time the resulting dynamic pricing problem of a foreign firm that faces such an AD trade protection policy in its export market. When AD duties are certain for any dumping that occurs, they obtain the surprising result that dumping and AD duties should increase over time toward a stationary equilibrium value. Adding uncertainties prevalent in AD enforcement into their analysis changes these conclusions substantially and leads to more realistic testable implications. Firms with ex ante expectations that the probability of AD enforcement is low, or with expectations that the probability of a termination/VER (instead of AD duties) is high, will decrease their dumping and AD duties over time in the administrative review process once they face AD duties. Using detailed data from U.S. AD investigations filed from 1980-95, the authors find evidence consistent with these hypotheses stemming from their analysis with uncertain AD enforcement; they also provide empirical evidence consistent with James Anderson's domino dumping hypothesis.

Edmonds and **Pavcnik** consider the impact of liberalized trade policy on child labor in a developing country. From 1993 to 1997, the government of Vietnam gradually relaxed its rice export quota. During this period, the average domestic price of rice increased 29 percent relative to the consumer price index. The authors exploit regional and intertemporal variation in the real price of rice to examine the relationship between these price fluctuations and the economic activities of children. They use a panel of Vietnamese households that spans the period of quota change. Although 1/4 of all children work in agriculture, the authors find that

reductions in child labor increase with rice prices. Declines in child labor are largest for girls of secondary school age; there is a corresponding increase in school attendance for this group. Overall, rice price increases can account for almost half of the decline in child labor that occurs in Vietnam in the 1990s. Greater market integration, at least in this case, appears to be associated with less child labor. These results suggest that the use of trade sanctions to eradicate child labor is not likely to yield the desired outcome.

Eaton, **Kortum**, and **Kramarz** look beneath bilateral trade data by examining the exports and imports of individual French manufacturing firms. One striking finding is that variation in trade volumes across sources and destinations is much more the consequence of variation in the number of firms participating than in how much each one buys or sells. At the same time, the variation in trade volumes across firms is much more the consequence of variation in amounts sold to or bought from a given number of trading partners rather than in the number of trading partners. Also striking is the heterogeneity of firm participation. A vast majority of purchases or sales are tiny, while a tiny fraction of firms account for most trade. If they trade at all, most firms export to or import from only one country, but most trade is accounted for by firms that export and import widely.

Prusa studies the dynamics of U.S. import trade, using survival analysis to study the duration of U.S. imports. First, he finds that trade relationships often are of very short duration. Over half of U.S. import trade observations are for a single year; 80 percent are for four years (or less). The Kaplan-Meier estimate of the survivor function indicates that the median duration of exporting a product to the United

States is very short, anywhere between two and four years. Second, Prusa finds that about 25 percent of trading relationships have more than "one spell" of selling a product to the United States. That is, a country supplies to the United States, exits, and then reappears. Third, the hazard rate declines monotonically over time. Comparing these findings across more aggregated import data indicates that the results are not driven by the highly disaggregated nature of the dataset. Finally, there is evidence that the product cycle model can explain at least some features of the duration of trade.

Changes in a country's terms of trade have a direct impact on its welfare: improving terms of trade enable a country to buy more imports for the same amount of exports; decreasing terms of trade, on the other hand, cut a nation's purchasing power on international markets. **Debaere** and **Lee** explicitly link the analysis of the terms of trade to a core question in international trade: How is production distributed internationally, and what determines that distribution? Different views on the distribution of production generate very different hypotheses about how terms of trade will evolve: In a world in which countries produce different goods, output growth will worsen a country's terms of trade. However, in a diversified world, in which all countries are able to produce the same products, changes in the terms of trade critically depend on the export or import bias of the expansion. The authors test the first hypothesis as they model a world with complete specialization. They contrast the analysis with a model of a diversified economy for which they take to the data the famous Bhagwati-Johnson hypothesis about sector-biased economic growth and how it affects a country's terms of trade.

Productivity

The NBER's Program on Productivity met in Cambridge on December 7. Mark J. Roberts, NBER and Pennsylvania State University, organized this program:

Tor Jakob Klette, University of Oslo, and **Arvind Raknerud**, Statistics Norway, "How and Why Do Firms Differ?"
Discussant: Nadia Soboleva, University of Toronto

Johannes Van Biesebroeck, University of Toronto, "Productivity Dynamics with Technology Choice: An Application to Automobile Assembly"
Discussant: David Ackerberg, NBER and University of California at Los Angeles

Plutarchos Sakellaris and **Daniel J. Wilson**, University of Maryland, "The Production Side Approach to Estimating Embodied Technological Change"
Discussant: Russell Cooper, NBER and Boston University

John Abowd, NBER and Cornell University; **John Haltiwanger**, NBER and University of Maryland; **Julia Lane**, Urban Institute; and

Kristin Sandusky, U.S. Census Bureau, "Within and Between Firm Changes in Human Capital, Technology, and Productivity"
Discussant: Eli Berman, NBER and Boston University

John Haltiwanger; Lucia Foster, U.S. Census Bureau; and **C.J. Krizan**, Fannie Mae, "The Link Between Aggregate and Micro Productivity Growth: Evidence from Retail Trade"
Discussant: Thomas Holmes, University of Minnesota

How do firms differ, and why do they differ even within narrowly defined industries? **Klette** and **Raknerud** show that the non-transient differences in sales, materials, labor costs, and capital across firms can be summarized largely by a single, firm-specific, dynamic factor, which they label efficiency in light of a structural model. The structural model suggests that this measure is linked tightly to profitability, but unrelated to labor productivity. The authors' second task is to understand the origin and evolution of the persistent differences in efficiency. They find that among firms born within a period of 24 years, intrinsic (time-invariant) efficiency differences dominate differences generated by firm-specific, cumulated innovations. The authors' conclusions are based on evidence from six high-tech, manufacturing industries.

During the 1980s, all Japanese automobile producers opened assembly plants in North America. Industry analysts and previous research claim that these transplants are more productive than incumbent plants and that they produce with a substantially different production process. **Van Biesebroeck** compares the production processes by estimating a model that allows for heterogeneity in tech-

nology and productivity, both of which are intrinsically unobservable. Based on a panel of assembly plants, and controlling for capacity utilization and price effects, he finds that the more recent technology uses capital more intensively and has a higher elasticity of substitution between labor and capital. For the new technology, Hicks-neutral productivity growth is lower, while capital-biased (labor-saving) productivity growth is higher. He then decomposes industry-wide productivity growth and finds that plant-level changes in lean plants are the most important contributor. Further decomposing plant-level productivity growth reveals the importance of capital-biased productivity growth, increases in the capital-labor ratio, and returns to scale.

Sakellaris and **Wilson** estimate the rate of embodied technological change directly from plant-level manufacturing data on current output and input choices along with histories on their vintages of equipment investment. The estimates range between 8 and 17 percent for the typical U.S. manufacturing plant during the years 1972-96. Any number in this range is substantially larger than is conventionally accepted, with some important implications. First, the role of investment-specific technological change as

an engine of growth is even larger than previously estimated. Second, existing producer durable prices indexes do not adequately account for quality change. As a result, measured capital stock growth is biased. Third, if accurate, the Hulten and Wykoff (1981) economic depreciation rates may primarily reflect obsolescence.

Abowd, **Haltiwanger**, **Lane**, and **Sandusky** exploit newly created longitudinal matched employer-employee data at the U.S. Bureau of the Census LEHD project to explore the evolution of human capital within and between businesses. First they develop measures of human capital for individual workers based upon their observed and unobserved characteristics. Then they create measures of the human capital at individual businesses by linking the workers to the business which employs them. The authors construct these measures for the universe of businesses and then track the evolution of human capital at the businesses over time. Characterizing and analyzing the nature of the changes in human capital within an industry — whether the changes occur within firms or between firms via entry and exit — they find that the observed overall increase in mean human capital in the 1990s is attribut-

able to both within firm and between firm effects. The between firm effects are generated from the finding that new businesses employ workers with greater human capital than exiting businesses. The authors also find that the level and change in the human capital at businesses is connected closely to observed indicators of advanced technology use (for example, computers) at the business.

Foster, **Haltiwanger**, and **Krizan** use establishment-level data to examine the relationship between microeconomic productivity dynamics and aggregate productivity growth for the retail trade sector. The retail trade sector offers a rich area for exploration and has some important features that contrast significantly with manufacturing. The typical establishment in retails is much smaller than that in manufacturing, and the entry and exit of establishments occur at very high rates relative to those in manufacturing. Moreover, the retail trade sector has been undergoing fundamental structural changes in the last decade or so, given the revolution in information technology. The authors find that continuing establishments exhibit virtually no productivity growth over the 1990s but that aggregate productivity growth for retail trade is robust. These findings are reconciled by the fact that virtually all of the increase in productivity in retail trade is accounted for by more productive entering establishments displacing less productive exiting establishments. In exploring the dominant role of net entry, the authors find that both selection and learning effects play a large role in the productivity dynamics of an entering cohort of businesses.

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Bureau Books

Innovation Policy and the Economy, Volume 2

Innovation Policy and the Economy, edited by Adam B. Jaffe, Josh Lerner, and Scott Stern, is available from the MIT Press for $25.00 in paperback or $58.00 clothbound. This volume is the second in an annual series that presents research on the interactions between public policy — particularly as it affects the ability of an economy to achieve scientific and technological progress and thus economic growth — and the innovation process. The topics in this volume include: some economic aspects of antitrust analysis in dynamically competitive industries; when intellectual property is the best incentive system; Israeli lessons on government support for commercial R and D; prospects for an information technology-led surge in productivity; and whether we have a "new macroeconomy."

Jaffe, Lerner, and Stern are all members of the NBER's Program in Productivity and Technological Change. Jaffe is also chair of the economics department at Brandeis University; Lerner is a professor of business administration at the Harvard Business School; and Stern is an associate professor at the Kellogg School of Management, Northwestern University.

This volume can be ordered directly from the MIT Press at Five Cambridge Center, Cambridge, MA 02142; or by phone to 617-625-8569 or 1-800-356-0343; or by email to mit-press-orders@mit.edu. The MIT Press also has a web site: **http://mit-press.mit.edu/**.

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