NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

Reporter OnLine at: www.nber.org/reporter

WINTER 2000/2001

In This Issue

Program Report

International Trade and Investment

Robert C. Feenstra*

NBER's Program on International Trade and Investment (ITI) aims to cover all areas of research dealing with the movement of goods and factor inputs across borders, with an emphasis on empirical research. This report summarizes research conducted in the ITI Program since mid-1997. The starting point for such research is always the explanation of trade patterns: what causes countries to export some goods and import others, and how well can we explain these patterns? In addition, what is the impact of these trade patterns on the incomes earned by particular groups and on the country overall? After reviewing these topics, I turn to a discussion of the policies that countries use to limit international trade flows and the international organizations that govern these policies.

Explaining Trade Patterns

The Hecksher-Ohlin-Vanek (HOV) model, which links a country's endowments of land, labor, and capital to its exports and imports of these factors as embodied in goods, is the leading explanation for trade patterns. Past research has been marked by a series of successes (the HOV model predicts trade well) and failures (it does not predict much better than a coin toss), leading to yet another round of investigation. Three researchers in the ITI program extend the empirical investigation of the HOV model in new directions, resulting in more plausible explanations for trade patterns than have been obtained previously. Donald R. Davis and David E. Weinstein loosen the assumptions of the HOV model to allow for different technologies across countries, different factor prices across countries, and a more general struc-

* *Robert C. Feenstra is Director of the NBER's Program on International Trade and Investment and a professor of economics at the University of California, Davis.*

NBER Reporter

NATIONAL BUREAU OF ECONOMIC RESEARCH

ture of demand.[1] At the same time, they carefully construct datasets for the United States, Japan, and other countries that are consistent internally and with respect to external trade flows. The results of this research substantially close the gap between predicted trade flows (based on the factor endowment of countries) and actual trade flows (as measured by the factors embodied in trade). James Harrigan's work also confirms the importance of factor endowments in explaining trade patterns, while allowing for different technologies.[2]

One feature that is left out of the HOV model, but is surely important in many industries, is increasing returns to scale. The theoretical implications of increasing returns for international trade patterns have been known for some time, because of the work of Paul R. Krugman, Elhanan Helpman, and others. Recent empirical work has caught up to the theory and offers the first tests of the importance of increasing returns for trade patterns. One implication is that industries with particularly strong increasing returns to scale will want to "agglomerate," locating in the same region or country. This means that a country with strong demand for some product will attract industries producing it, and the country's demand-side bias will cause it to be an *exporter* rather than an *importer* of that good. Krugman calls this the "home market effect." Davis and Weinstein,[3] as well as James A. Markusen, Andrew K. Rose, and I[4] empirically investigate his theoretical prediction. We show that the home market effect can arise from models even without increasing returns to scale and that it is much more pronounced in industries producing differentiated rather than homogeneous goods. Other work on the geographical location of industries (across or within countries) has been done by Richard E. Baldwin[5] and by Gordon H. Hanson.[6]

The Gravity Equation

Closely related to the home market effect is the use of the "gravity equation" to explain trade patterns. The gravity equation states that the trade flow between two countries will be proportional to the product of their GDPs, so that countries of sizes ten and one (for example, the United States and Canada) should have roughly as much trade between them as do two countries of size 3.3 (such as Germany and England). This equation can be derived from an increasing returns trade model, but current research has shown that it can also be obtained from models with homogeneous goods.[7] One such justification, developed by Jonathan Eaton and Samuel S. Kortum, considers a Ricardian trade model with random technological differences across countries and transportation costs.[8] In this framework, there is a probability that any particular country will have the best technology in each good, and therefore will export it to neighboring countries. This gives rise to a gravity equation that incorporates country size as well as transportation costs and technological spillovers across countries.

The gravity equation represents a useful benchmark against which other explanations for international trade can be assessed. One alternative explanation explicitly takes account of *traders*: goods are exchanged only if two agents in different countries want to trade them. Considering that countries have such diverse languages, customs, and institutions, the process of "matching" buyers and sellers is bound to create some frictions. James E. Rauch has investigated this empirically, and finds that *ethnic networks* work to promote trade.[9] He developed the theoretical basis for these findings with Alessandra Casella.[10] In related work, Robert Z. Lawrence confirms the importance of information and search costs in the trade flows of multinationals and particularly in their response to changes in exchange rates.[11]

A final direction of current research on trade patterns is to use *plant-level* rather than *industry-level* data. This is important because of the abundant evidence that plants are not the same within each industry, but rather differ dramatically in their productivity. In particular, Andrew B. Bernard and J. Bradford Jensen have found that the most productive plants become exporters.[12] This finding is significant because it contradicts the idea that promoting exports might lead to more efficient firms; on the contrary, Bernard and Jensen find that productivity causes exports, but not the reverse, at the level of the plant. This empirical finding can be explained in Eaton and Kortum's theoretical model[13] in which firms have random productivities, or alternatively in Marc Melitz's model which allows for heterogeneous firms within each industry.[14] In Melitz's model, opening trade leads to a rationalization of plants (with the less efficient exiting), so that trade implies productivity gains at the level of the industry. Nina Pavcnik and James A. Levinsohn also have done work documenting the importance of firm heterogeneity.[15]

Immigration and Capital Flows

In addition to studying the movement of goods across borders, much research is devoted to explaining the movement of labor and capital. Hanson and Matthew J. Slaughter have investigated in detail the effects of cross-state migration in the United States and of immigration from Mexico.[16] They argue that cross-state flows of workers have relatively little impact on local wages but are absorbed mainly through changes in the mix of goods produced in that state. Whether this is also true for immigration from other countries, including Mexico, is an important policy question. Hanson investigates enforcement measures at the Mexican-U.S. border on wages in adjoining U.S. cities and finds a minimal impact.[17] In contrast, Daniel Trefler forcefully argues that immigration into the United States has had a significant downward effect on the wages of less-skilled workers, a topic to which we return below.[18]

Movements of capital between countries, or foreign direct investment (FDI), are explained by many of the same features that affect trade (factor endowments, transportation costs, and increasing returns). In addition, though, because FDI is defined as the ownership of capital abroad, there must be some reason that firms wish to own the facility used for production rather than simply exporting to the other country. Markusen has developed tractable models of the multinational enterprise[19] and applied data to test their main hypotheses.[20] One particularly interesting hypothesis looks at whether the activities of multinational enterprises mainly fit a "horizontal" model (with firms spreading into the same activities in other countries) or a "vertical" model (in which firms go abroad to invest in other, complementary production activities). At this time the evidence strongly supports the "horizontal" model.[21] Both Baldwin[22] and Joshua Aizenman[23] have developed other theoretical models of FDI.

In addition to determining the reason for FDI, we are also interested in its impact on local wages, employment, and trade. Bruce A. Blonigen uses information on foreign plants in the United States to study their local impact.[24] He finds that foreign plants: typically grow faster than U.S. plants of similar size; lead to a larger positive impact on local wages; and generate some shifts in local government

budgets away from public education and towards transportation and public safety. He also investigates the extent to which FDI and imports are substitutes (with inflows of capital reducing imports) or complements (with FDI leading to higher imports). He finds evidence to support both hypotheses,[25] as does Linda S. Goldberg using data from Latin America.[26]

The longest-standing contributions to our understanding of FDI have been made by Robert E. Lipsey, Director of NBER's New York office. His contributions were honored at a conference organized by Magnus Blomström and Goldberg and held at the Federal Reserve Bank of New York in December 1998.[27] Lipsey and his co-authors have used data from the United States,[28] Sweden,[29] Japan,[30] and other Asian[31] and developed[32] countries to explore the impact of FDI on production[33] and capital flows,[34] as well as on other policies affecting prices and wages.[35]

Globalization and Wages

Interest in the movement of goods and factors across borders is not just academic; it spills over into policy debates because these flows affect the wages earned in import-competing and export industries. While a decade of unbroken economic growth in the United States has raised the incomes of many, the less-skilled workers have gained less than others, and globalization (in addition to technological change) may well explain this. The impact of trade on wages was the subject of a conference held in February 1998 in Monterey, California.[36] The conference volume included contributions by many researchers in the ITI program,[37] and covered such topics as: changes in inter-industry wage differentials; the effect of offshore assembly on wages; the impact of international competition on technological change; and the effect of exchange rates on employment. One of the most intriguing findings from this work is that, while the wage gap between workers at the top and bottom 10 percent of incomes indeed increased in the United States on average between 1970 and 1990, its pattern was markedly different across various states. Bernard and Jensen find that states located around the Great Lakes have experienced *rising* inequality (like the national trend), but states in the Southeast have experienced *falling* wage inequality. Many of these state-level changes are larger than the national changes that have occurred, suggesting that the focus of most researchers on national changes may be missing an important part of the story.

Besides contributing to this conference volume, researchers in the ITI program have investigated many channels by which trade might affect wages. Using evidence from the United Kingdom and from the activities of U.S. multinationals,[38] Slaughter considers the effect of falling tariffs and transportation costs, the "sector bias" of technological change, and the effect of trade on the elasticity of labor demand. Pavcnik investigates the factors accounting for the shift toward more skilled labor in Chile and finds that plant-level measures of capital and investment, the use of imported materials, foreign technical assistance, and patented technology all have a positive influence on the relative demand for skilled workers.[39] Goldberg shows that wage sensitivity to exchange rates in U.S. industries rises with industry export orientation and declines with imported input use. These effects depend on the competitive structure of industries, as pricing-to-market studies would predict.[40] Eckhard Janeba goes on to consider the extent to which redistributive policies of education subsidies could be used to offset the income inequality caused by trade,[41] while Dani Rodrik investigates the desirability of international tax coordination.[42]

Theoretically, the impact of trade on wages depends very much on the model being used. In the conventional HOV model, trade has an impact only through changes in prices, and the evidence is that prices have not changed enough in the United States to explain the actual rise in the relative wage of skilled/unskilled workers since 1980.[43] Nevertheless, international trade still can have a substantial impact in other models. One intriguing channel, described by Michael Kremer and Eric Maskin, involves the hiring of low-skilled and high-skilled workers in a single firm.[44] Under certain assumptions about technology, this strategy will boost the wages of the less-skilled workers. But if the overall distribution of workers by skill *widens*, then firms instead can segregate high-skilled and low-skilled workers in different plants, which lowers the wages of the latter and increases wage *inequality*. Although Kremer and Maskin apply their model to a closed economy, the analysis is highly suggestive of foreign outsourcing, whereby firms in one country are able to send abroad the less skill-intensive activities in the production process. Extending the Kremer-Maskin analysis to an open economy is an important research priority. Gene M. Grossman and Giovanni Maggi have begun such research, but further work is needed.[45]

Another perspective on globalization can be obtained by using the long trends afforded by historical data. The claim is sometimes made that growth in world trade during the past three decades is, after all, no big deal: the "golden age" from early in the nineteenth century to World War I witnessed equally large, if not larger, growth in trade and

factor flows. Is this claim correct? Douglas A. Irwin and Richard Baldwin both point to a number of features that distinguish trade today from trade at the turn of the century, and that would allow us to consider the current period as remarkable.[46] Like Alan M. Taylor,[47] Irwin uses historical data to investigate the HOV model and a range of topics related to tariffs and "infant industry" protection.[48]

Gains from Trade

The debate over globalization and wages belies the more fundamental impact of trade on *incomes overall.* Few economists would doubt the beneficial effects of trade, despite the adverse impact on some groups. Yet the hard evidence supporting such gains from trade — in either a static or a dynamic sense — is surprisingly thin. Perhaps the reason for this is that it is difficult to control for the myriad other factors that influence a country's level of income and growth, and thus to isolate the effect of trade alone. This is the goal of the research by Dan Ben-David, who uses episodes including the entry of countries into free trade areas, or their statistical grouping with countries of similar incomes, to argue that trade raises per capita income.[49] His research has led to a debate over whether the "other factors" have been controlled for fully, and Slaughter argues that the data and statistical tests do not completely support the beneficial impact of trade.[50] Likewise, Ann Harrison and Hanson,[51] and Rodrik[52] question whether existing studies convincingly demonstrate the positive impact of trade on the growth rate of per capita income.

The dynamic effects of trade on growth depend crucially on the extent of technology transfer, or knowledge spillovers, across countries. That is the message of past research on "endogenous growth" models by Grossman and Helpman. Accordingly, current research focuses on quantifying the extent of knowledge spillovers. Helpman argues that these cross-country knowledge flows are substantial and that both trade and FDI are important channels of transmission.[53] Initial work by Wolfgang Keller suggests instead that the extent to which knowledge spillovers are related to international trade is not fully known yet.[54] His subsequent work does provide a partial answer, though, showing that bilateral trade patterns are important in determining the strength of knowledge spillovers when those patterns are strongly biased toward or away from technological leaders.[55] In other work, Keller confirms the finding of strong cross-country spillovers, especially in the same industry where the R and D spending occurs.[56] Using quite different sources of data, Lee G. Branstetter investigates the extent of knowledge spillovers at the firm level.[57] Focusing on Japan, he quantifies the impact of changes in Japanese patent law and of research consortia on the innovative activity of firms.

Trade Policies

We turn now from a discussion of trade patterns to the analysis of trade policies. A host of policies used worldwide aim to limit the inflow of goods. The application of tariffs has been regulated by international agreements under the General Agreement on Trade and Tariffs (GATT) and the World Trade Organization (WTO), but other more complex policies have sprung up in their place. One of the most commonly used is antidumping duties, which are applied contingent on the prices charged by foreign firms in the import market. While antidumping appears to be similar to tariffs, in practice it has a more pronounced anti-competitive effect, because foreign firms will charge higher prices to avoid the claim of dumping. Indeed, the dumping investigation itself (which has several distinct phases) raises import prices and reduces import values, while also changing the responses of import prices and values to exchange rates. These results, found by Blonigen and Thomas J. Prusa,[58] demonstrate the adverse impact of antidumping policy.

Another policy believed to have anti-competitive effects is "market access requirements" (MAR), by which an importing country (for example, Japan) has to accept a higher level of imports (perhaps semiconductors) than it otherwise would. MARs have been implemented to offset perceived barriers to imports, such as the *keiretsu* in Japan, although Barbara J. Spencer argues that such perception may well be misplaced.[59] The efficacy of MAR policies can be questioned, because they can lead domestic firms to *raise* their prices (thereby shifting demand toward imports). Whether this occurs or not depends on how the MAR is implemented. Kala Krishna and Marie C. Thursby argue that a MAR subsidy given to the *importing* firm may well have a pro-competitive rather than an anti-competitive effect.[60] Merger policy also is *directly* aimed at influencing competition, and Levinsohn investigates how that policy interacts with trade liberalization.[61]

Beyond asking how trade policies affect prices, and thus welfare, we wonder why the policies are enacted in the first place. Put simply: if economists find so many reasons to dislike trade policy, why is it used so frequently? One possible answer is that "strategic" trade policy, aimed at imperfectly competitive industries, may be in the national interest. That answer has been shown quite convincingly to be false,[62] although each new type of market structure and conduct needs to be investigated carefully.[63] A more promising avenue is to explore the political basis for trade

policies, as enacted in response to industry lobbying pressures balanced against consumer interests. This has been the subject of theoretical work by Grossman and Helpman,[64] as well as Maggi.[65] Now attention has turned to testing these theories empirically. Robert Baldwin provides a test for the United States drawing on congressional voting records,[66] while Slaughter also uses U.S. data to investigate the determinants of individuals' trade policy preferences.[67] In contrast, Branstetter and Feenstra apply the political economy framework to China. They use the willingness of different provinces to accept foreign investment to estimate the objective function of state planners.[68]

International Institutions

Finally, let us discuss the institutions that govern international trade policies. The contribution of such institutions is demonstrated theoretically by James E. Anderson, who examines models in which market exchange is alternately subject to opportunism[69] and to "predation."[70] Legal institutions can arise to limit this activity and therefore to support trade. Although these theoretical models are highly stylized, they are supported by empirical evidence, in the context of a gravity equation, which finds that corruption discourages trade.[71]

Turning to actual institutions, Kyle Bagwell and Robert W. Staiger examine in detail the economic rationale for the trading rules embodied in GATTand the WTO.[72] These rules include GATT's principle of reciprocity, whereby one country will agree to reduce its trade barriers in return for a reciprocal reduction by another country, and non-discrimination or the most-favored-nation (MFN) principle, whereby all GATT member countries should be treated equally. Bagwell and Staiger show that in a wide class of political economy models, these principles eliminate the incentives for manipulation of the terms-of-trade by member countries, and they ensure that efficient outcomes are obtained. This provides a quite general rationale for the GATT rules. John Whalley also examines the economic benefits of MFN rules in a computable general equilibrium model.[73] Krishna focuses on the "rules of origin" governing free trade areas, whereby goods cannot be shipped back and forth between countries duty-free unless some substantial production has occurred in the area.[74] These rules play a prominent role in the North American Free Trade Agreement, as Anne O. Krueger discusses.[75]

The inclusion of environmental concerns has been a relatively new feature of international negotiations. Bagwell and Staiger investigate whether the GATT rules need to be modified to accommodate such concerns.[76] Also focusing on the environment, Brian R. Copeland introduces this feature into trade models and uses his framework to examine global warming and the Kyoto Protocol.[77] Likewise, Whalley examines the outcomes when trade and environmental issues are linked in international negotiations.[78]

---

[1] *J. R. Bernstein and D. E. Weinstein, "Do Endowments Predict the Location of Production? Evidence from National and International Data," NBER Working Paper No. 6815, November 1998; D. R. Davis and D. E. Weinstein, "An Account of Global Factor Trade," NBER Working Paper No. 6785, November 1998.*

[2] *J. Harrigan, "Estimation of Cross-Country Differences in Industry," NBER Working Paper No. 6121, August 1997; J. Harrigan and E. Zakrajsek, "Factor Supplies and Specialization in the World Economy." NBER Working Paper No. 7848, August 2000.*

[3] *D. R. Davis, "The Home Market, Trade, and Industrial Structure," NBER Working Paper No. 6076, June 1997, and* American Economic Review, *(December 1998); D. R. Davis and D. E. Weinstein, "Economic Geography and Regional Production Structure: An Empirical Investigation," NBER Working Paper No. 6093, July 1997, and* European Economic Review *(February 1999); D. R. Davis and D. E. Weinstein, "Market Access, Economic Geography, and Comparative Advantage: An Empirical Assessment," NBER Working Paper No. 6787, November 1998.*

[4] *R. C. Feenstra, J. A. Markusen, and A. K. Rose, "Understanding the Home Market Effect and the Gravity Equation: The Role of Differentiating Goods," NBER Working Paper No. 6804, November 1998, and forthcoming in the* Canadian Journal of Economics.

[5] *R. E. Baldwin, "The Core-Periphery Model with Forward-Looking Expectations," NBER Working Paper No. 6921, February 1999; R. E. Baldwin and R. Forslid, "The Core-Periphery Model and Endogenous Growth: Stabilising and De-Stabilising Integration," NBER Working Paper No. 6899, January 1999; R. E. Baldwin, "Agglomeration and Endogenous Capital," NBER Working Paper No. 6459, March 1998, and* European Economic Review, *43 (2) (1999), pp.253–80; R. E. Baldwin, P. Martin, and G. I. P. Ottaviano, "Global Income Divergence, Trade and Industrialization: The Geography of Growth Take-Offs," NBER Working Paper No. 6458, March 1998.*

[6] *G. H. Hanson, "Market Potential, Increasing Returns, and Geographic Concentration," NBER Working Paper No. 6429, February 1998; G. H. Hanson, "North American Economic Integration and Industry Location," NBER Working Paper No. 6587, June 1998.*

[7] *S. J. Evenett and W. Keller, "On Theories Explaining the Success of the Gravity Equation," NBER Working Paper No. 6529, April 1998*

[8] *J. Eaton and S. Kortum, "Technology and Bilateral Trade," NBER Working Paper No. 6253, November 1997.*

[9] *J. E. Rauch and V. Trindade, "Ethnic Chinese Networks in International Trade," NBER Working Paper No. 7189, June 1999.*

[10] *J. E. Rauch and V. Trindade, "Information and Globalization: Wage Co-Movements, Labor Demand Elasticity, and Conventional Trade Liberalization," NBER Working Paper No. 7671, April 2000; J. E. Rauch and J. Watson, "Starting*

Small in an Unfamiliar Environment," NBER Working Paper No. 7053, March 1999; J. E. Rauch and A. Casella, "Overcoming Informational Barriers to International Resource Allocation: Prices and Group Ties," NBER Working Paper No. 6628, June 1998; A. Casella and J. E. Rauch, "Anonymous Market and Group Ties in International Trade," NBER Working Paper No. 6186, September 1997.

[11] *S. Rangan and R. Z. Lawrence, "Search and Deliberation in International Exchange: Learning from Multinational Trade About Lags, Distance Effects, and Home Bias," NBER Working Paper No. 7012, March 1999.*

[12] *A. B. Bernard and J. B. Jensen, "Exporting and Productivity," NBER Working Paper No. 7135, May 1999; A. B. Bernard and J. B. Jensen, "Exceptional Exporter Performance: Cause, Effect, or Both?," NBER Working Paper No. 6272, November 1997; A. B. Bernard and J. Wagner, "Export Entry and Exit by German Firms," NBER Working Paper No. 6538, April 1998; A. B. Bernard and J. B. Jensen, "Understanding the U.S. Export Boom," NBER Working Paper No. 6438, March 1998.*

[13] *A. B. Bernard, J. Eaton, J. B. Jenson, and S. Kortum, "Plants and Productivity in International Trade," NBER Working Paper No. 7688, May 2000.*

[14] *M. Melitz, "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," NBER Working Paper, forthcoming.*

[15] *N. Pavcnik, "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants," NBER Working Paper No. 7852, August 2000; J. A. Levinsohn and A. Petrin, "Estimating Production Functions Using Inputs to Control for Unobservables," NBER Working Paper No. 7819, August 2000; J. A. Levinsohn and A. Petrin, "When Industries Become More Productive, Do Firms?" NBER Working Paper No. 6893, January 1999.*

[16] *G. H. Hanson and M. J. Slaughter, "The Rybczynski Theorem, Factor-Price Equalization, and Immigration: Evidence from U.S. States," NBER Working Paper No. 7074, April 1999; K. F. Scheve and M. J. Slaughter, "Labor-Market Competition and Individual Preferences Over Immigration Policy," NBER Working Paper No. 6946, February 1999.*

[17] *G. H. Hanson, R. Robertson, and A. Spilimbergo, "Does Border Enforcement Protect U.S. Workers from Illegal Immigration?," NBER Working Paper No. 7054, March 1999; G. H. Hanson and A. Splimbergo, "Political Economy, Sectoral Shocks, and Border Enforcement," NBER Working Paper No. 7315, August 1999.*

[18] *D. Trefler, "Immigrants and Natives in General Equilibrium Trade Models," NBER Working Paper No. 6209, October 1997, in* The Immigration Debate: Studies on the Economic, Demographic, and Fiscal Effects of Immigration, *J. Smith, ed. Washington, D.C.: National Academy Press, 1998.,*

[19] *K. H. Zhang and J. A. Markusen, "Vertical Multinationals and Host-Country Characteristics," NBER Working Paper No. 6203, September 1997, and* Journal of Development Economies, *59 (1999), pp. 233–52; J. A. Markusen and A. J. Venables, "Foreign Direct Investment as a Catalyst for Industrial Development," NBER Working Paper No. 6241, October 1997, and* European Economic Review, *43 (1999), pp. 335–56; J. A. Markusen, "Contracts, Intellectual Property Rights, and Multinational Investment in Developing Countries," NBER Working Paper No. 6448, March 1998, and forthcoming in the* Journal of International Economics.

[20] *J. A. Markusen and K. E. Maskus, "Multinational Firms: Reconciling Theory and Evidence," NBER Working Paper No. 7163, June 1999; D. L. Carr, J. A. Markusen, and K. E. Maskus, "Estimating the Knowledge-Capital Model of the Multinational Enterprise," NBER Working Paper No. 6773, October 1998, and forthcoming in* American Economic Review.

[21] *J. A. Markusen and K. E. Maskus, "Discriminating Among Alternative Theories of the Multinational Enterprise," NBER Working Paper No. 7164, June 1999, in* Topics in Empirical International Economics, *M. Blömstrom and L. Goldberg, eds. Chicago: University of Chicago Press, 2000.*

[22] *R. E. Baldwin and G. I. P. Ottaviano, "Multiproduct Multinationals and Reciprocal FDI Dumping," NBER Working Paper No. 6483, March 1998, and forthcoming in the* Journal of International Economics.

[23] *J. Aizenman and S. Yi, "Controlled Openness and Foreign Direct Investment," NBER Working Paper No. 6123, August 1997, and* Review of Development Economics, *2 (1) (1998), pp. 1–10.*

[24] *B. A. Blonigen and K. Tomlin, "Size and Growth of Japanese Plants in the United States," NBER Working Paper No. 7275, July 1999, and forthcoming in the* International Journal of Industrial Organization; *D. N. Figlio and B. A. Blonigen, "The Effects of Direct Foreign Investment on Local Communities," NBER Working Paper No. 7274, July 1999, and forthcoming in the* Journal of Urban Economics.

[25] *B. A. Blonigen, "In Search of Substitution Between Foreign Production and Exports," NBER Working Paper No. 7154, June 1999, and forthcoming in the* Journal of International Economics

[26] *L. S. Goldberg and M. W. Klein, "International Trade and Factor Mobility: An Empirical Investigation.," NBER Working Paper No. 7196, June 1999, in* Festschrift in Honor of Robert Mundell, *G. Calvo, R. Dornbusch, and M. Obstfeld, eds. Cambridge, Mass: MIT Press, 2000.*

[27] Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey, *M. Blömstrom, and L. S. Goldberg, eds. Chicago: University of Chicago Press, 2000.*

[28] *R. E. Lipsey, "Foreign Production by U.S. Firms and Parent Firm Employment," NBER Working Paper No. 7357, September 1999; Z. Feliciano and R. E. Lipsey, "Foreign Ownership and Wages in the United States, 1987–1992," NBER Working Paper No. 6923, February 1999.*

[29] *R. E. Lipsey, E. D. Ramstetter, and M. Blömstrom, "Outward FDI and Parent Exports and Employment: Japan, the United States, and Sweden," NBER Working Paper No. 7623, March 2000; M. Blömstrom, D. Konan, and R. E. Lipsey, "FDI in the Restructuring of the Japanese Economy," NBER Working Paper No. 7693, May 2000; M. Blömstrom, G. Fors, and R. E. Lipsey, "Foreign Direct Investment and Employment: Home Country Experience in the United States and Sweden," NBER Working Paper No. 6205, October 1997, and* Economic Journal, *107, (445) (November 1997), pp. 1787–97.*

[30] *R. E. Lipsey, "Affiliates of U.S. and Japanese Multinationals in East Asian Production and Trade," NBER Working Paper No. 7292, August 1999, and in* The Role of Foreign Direct Investment in East Asian Economic Development, *T. Ito and A. O. Krueger, eds. EASE Vol. 9, forthcoming from University of Chicago Press.*

[31] *R. E. Lipsey, "The Location and Characteristics of U.S. Affiliates in Asia," NBER Working Paper No. 6876, January 1999, and in* Papers and Proceedings of

International Symposium: Foreign Direct Investment in Asia *(October 22-23, 1998), Tokyo, Department of Research Cooperation, Economic Research Institute, Economic Planning Agency, Government of Japan.*

[32] *R. E. Lipsey, "Interpreting Developed Countries' Foreign Direct Investment," NBER Working Paper No. 7810, July 2000; R. E. Lipsey, "Internationalized Production in Developed and Developing Countries and in Industry Sectors," NBER Working Paper No. 6405, February 1998.*

[33] *R. E. Lipsey, M. Blömstrom, and E. D. Ramstetter, "Internationalized Production in World Output," NBER Working Paper No. 5385, April 2000, and in* Geography and Ownership as Bases for Economic Accounting, *R. E. Baldwin, R. E. Lipsey, and J. D. Richardson, eds. Chicago: University of Chicago Press, 1998.*

[34] *R. E. Lipsey, "The Role of Foreign Direct Investment in International Capital Flows," in* International Capital Flows, *Martin Feldstein, ed. Chicago: University of Chicago Press, 1999.*

[35] *R. E. Lipsey and B. Swedenborg, "Wage Dispersion and Country Price Levels," NBER Working Paper No. 6039, March 2000, in* International and Interarea Comparisons of Income, Output, and Prices, *Studies in Income and Wealth, Vol. 61, A. Heston and R. E. Lipsey, eds. Chicago: University of Chicago Press, 1999.*

[36] *R. C. Feenstra, ed.* The Impact of International Trade on Wages, *NBER and University of Chicago Press, 2000.*

[37] *M. E. Lovely and J. D. Richardson, "Trade Flows and Wage Premiums: Does Who or What Matter?," NBER Working Paper No. 6668, July 1998; J. Harrigan, "International Trade and American Wages in General Equilibrium, 1967–1995," NBER Working Paper No. 6609, June 1998; M. J. Slaughter, "What Are the Results of Product-Price Studies and What Can We Learn From Their Differences?," NBER Working Paper No. 6591, June 1998; L. S. Goldberg and J. Tracy, "Exchange Rates and Local Labor Markets," NBER Working Paper No. 6985, February 1999; all published in* The Impact of International Trade on Wages, *Robert C. Feenstra, ed. NBER and University of Chicago Press, 2000.*

[38] *J. E. Haskel and M. J. Slaughter, "Have Falling Tariffs and Transportation Costs Raised U.S. Wage Inequality?," NBER Working Paper No. 7539, February 2000; J. E. Haskel and M. J. Slaughter, "Does the Sector Bias of Skill-Biased Technical Change Explain Changing Wage Inequality?," NBER Working Paper No. 6565, May 1998; M. J. Slaughter, "International Trade and Labor-Demand Elasticities," NBER Working Paper No. 6262, November 1997, and forthcoming in the* Journal of International Economics; *J. E. Haskel and M. J. Slaughter, "Trade, Technology and U.K. Wage Inequality," NBER Working Paper No. 6978, February 1999, and forthcoming in the* Economic Journal; *B. A. Blonigen and M. J. Slaughter, "Foreign-Affiliate Activity and U.S. Skill Upgrading," NBER Working Paper No. 7040, March 1999, and forthcoming in the* Review of Economics and Statistics.

[39] *N. Pavcnik, "What Explains Skill Upgrading in Less Developed Countries?," NBER Working Paper No. 7846, August 2000.*

[40] *J. Campa and L. S. Goldberg, "Employment versus Wage Adjustment and the U.S. Dollar," NBER Working Paper No. 6749, October 1998, and forthcoming in the* Review of Economics and Statistics.

[41] *E. Janeba, "Trade, Income Inequality, and Government Policies: Redistribution of Income or Education Subsidies?," NBER Working Paper No. 7485, January 2000.*

[42] *D. Rodrik and T. van Ypersele, "Capital Mobility, Distributive Conflict, and International Tax Coordination," NBER Working Paper No. 7150, June 1999.*

[43] *R. E. Baldwin, "Inferring Relative Factor Price Changes from Quantitative Data," NBER Working Paper No. 7019, March 1999, in* Topics in Empirical International Research: A Festschrift in Honor of Robert E. Lipsey, *M. Blömstom and L. S. Goldberg, eds., Chicago: University of Chicago Press, 2000.*

[44] *M. Kremer and E. Maskin, "Wage Inequality and Segregation by Skill," NBER Working Paper No. 5718, August 1996, and forthcoming in the* Quarterly Journal of Economics.

[45] *G. M. Grossman and G.Maggi, "Diversity and Trade," NBER Working Paper No. 6741, September 1998, and forthcoming in the* American Economic Review.

[46] *M. D. Bordo, B. Eichengreen, and D. A. Irwin, "Is Globalization Today Really Different than Globalization a Hundred Years Ago?," NBER Working Paper No. 7195, June 1999, and in* Brookings Trade Forum 1999, *S. Collins and R. Z. Lawrence, eds. Washington, D.C.: Brookings Institution, 1999; R. E. Baldwin and P. Martin, "Two Waves of Globalisation: Superficial Similarities, Fundamental Differences," NBER Working Paper No. 6904, January 1999, and in* Globalisation and Labour, *H. Siebert, ed. J.C.B. Mohr for Kiel Institute of World Economics, Tubingen, 1999.*

[47] *A. Estevadeordal and A. M. Taylor. "Testing Trade Theory in Ohlin's Time," NBER Working Paper, forthcoming, and in* Bertil Ohlin: A Centennial Celebration, 1899–1999, *R. Findlay, L. Jonung, and M. Lundahl, eds. Cambridge, MA: MIT Press, 2000; A. Estevadeordal and A. M. Taylor. "A Century of Missing Trade?" NBER Working Paper, forthcoming.*

[48] *D. A. Irwin, "Ohlin Versus Stolper-Samuelson?," NBER Working Paper No. 7641, April 2000, forthcoming, and in* Bertil Ohlin: A Centennial Celebration, 1899–1999, *R. Findlay, L. Jonung, and M. Lundahl, eds. Cambridge, MA: MIT Press, 2000; D. A. Irwin and P. Temin, "The Antebellum Tariff on Cotton Textiles Revisited," NBER Working Paper No. 7825, August 2000; D. A. Irwin, "Could the U.S. Iron Industry Have Survived Free Trade After the Civil War?," NBER Working Paper No. 7640, April 2000, and* Explorations In Economic History *37 (July 2000), pp. 278–99; D. A. Irwin, "Tariffs and Growth in Late Nineteenth Century America," NBER Working Paper No. 7639, April 2000, and forthcoming in* World Economy; *D. A. Irwin, "How Did the United States Become a Net Exporter of Manufactured Goods?," NBER Working Paper No. 7638, April 2000; D. A. Irwin, "Did Late Nineteenth Century U.S. Tariffs Promote Infant Industries? Evidence from the Tinplate Industry," NBER Working Paper No. 6835, December 1998, and* Journal Of Economic History 60 (June 2000), pp. 335–60; D. A. Irwin, "Higher Tariffs, Lower Revenues? Analyzing the Fiscal Aspects of the "Great Tariff Debate of 1888," NBER Working Paper No. 6239, October 1997, and the Journal of Economic History *(March 1998).*

[49] *D. Ben-David and D. H. Papell, "International Trade and Structural Change," NBER Working Paper No. 6096, July 1997, and* Journal of International Economics, *43, pp. 513–23; D. Ben-David and M. B. Loewy, "Free Trade, Growth, and Convergence," NBER Working Paper No. 6095, July 1997, and*

Journal of Economic Growth, *3, pp. 143–70; D. Ben-David and A. Kimhi, "Trade and the Rate of Income Convergence," NBER Working Paper No. 7642, April 2000.*

[50] *M. J. Slaughter, "International Trade and Per Capita Income Convergence: A Difference-in-Differences Analysis," NBER Working Paper No. 6557, May 1998.*

[51] *A. Harrison and G. H. Hanson, "Who Gains from Trade Reform? Some Remaining Puzzles," NBER Working Paper No. 6915, January 1999, and* Journal of Development Economics, *51 (1999), pp. 315–24.*

[52] *F. Rodriguez and D. Rodrik, "Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence," NBER Working Paper No. 7081, April 1999.*

[53] *E. Helpman, "R and D and Productivity: The International Connection," NBER Working Paper No. 6101, July 1997.*

[54] *W. Keller, "Are International R and D Spillovers Trade-Related? Analyzing Spillovers Among Randomly Matched Trade Partners," NBER Working Paper No. 6065, June 1997, and* European Economic Review, *42, pp. 1469–81.*

[55] *W. Keller, "How Trade Patterns and Technology Flows Affect Productivity Growth," NBER Working Paper No. 6990, March 1999, newly titled "Do Trade Patterns and Technology Flows Affect Productivity Growth?" in* World Bank Economic Review, *2000, pp. 17–47.*

[56] *W. Keller, "Trade and Transmission of Technology," NBER Working Paper No. 6113, July 1997; W. Keller, "Geographic Localization of International Technology Diffusion," NBER Working Paper No. 7509, January 2000.*

[57] *M. Sakakibara and L. G. Branstetter, "Do Stronger Patents Induce More Innovation? Evidence from the 1988 Japanese Patent Law Reforms," NBER Working Paper No. 7066, April 1999; L. G. Branstetter and M. Sakakibara, "Japanese Research Consortia: A Microeconometric Analysis of Industrial Policy," NBER Working Paper No. 6066, June 1997.*

[58] *B. A. Blonigen, "Tariff-Jumping Antidumping Duties," NBER Working Paper No. 7776, July 2000; T. J. Prusa, "On the Spread and Impact of Antidumping," NBER Working Paper No. 7404, October 1999; B. A. Blonigen and S. E. Haynes, "Antidumping Investigations and the Pass-Through of Exchange Rates and Antidumping Duties," NBER Working Paper No. 7378, October 1999; D. R. Kolev and T. J. Prusa, "Dumping and Double Crossing: The (In)Effectiveness of Cost-Based Trade Policy Under Incomplete Information," NBER Working Paper No. 6986, February 1999.*

[59] *B. J. Spencer and L. D. Qiu, "Keiretsu and Relationship-Specific Investment: A Barrier to Trade?" NBER Working Paper No. 7572, February 2000, and forthcoming in the* International Economic Review.

[60] *K. Krishna, S. Roy, and M. C. Thursby, "Can Subsidies for MARs be Procompetitive?," NBER Working Paper No. 7624, March 2000, and forthcoming in the* Canadian Journal of Economics; *K. Krishna, S. Roy, and M. C. Thursby, "Procompetitive Market Access," NBER Working Paper No. 6184, September 1997, and* Business and Economics for the 21st Century, *1 (1997), pp. 333–42.*

[61] *H. Horn and J. A. Levinsohn, "Merger Policies and Trade Liberalization," NBER Working Paper No. 6077, June 1997.*

[62] *In addition to past research, see G. M. Grossman and G. Maggi, "Free Trade vs. Strategic Trade: A Peek into Pandora's Box," NBER Working Paper No. 6211, October 1997, in* Global Integration and Competition, *R. Sato, R. V. Ramachandran and K. Mino, eds. Boston/Dordrecht/London: Kluwer Academic Publishers, 1998.*

[63] *For example: D. Zhou, B. J. Spencer, and I. Vertinsky, "Strategic Trade Policy with Endogenous Choice of Quality and Asymmetric Costs," NBER Working Paper No. 7536, Febrary 2000; K. Bagwell and R. W. Staiger, "Strategic Trade, Competitive Industries and Agricultural Trade Disputes," NBER Working Paper No. 7822, August 2000.*

[64] *E. Helpman and T. Persson, "Lobbying and Legislative Bargaining," NBER Working Paper No. 6589, June 1998*

[65] *G. Maggi and A. Rodriguez-Clare, "Import Penetration and the Politics of Trade Protection," NBER Working Paper No. 6711, August 1998.*

[66] *R. E. Baldwin and C. S. Magee, "Is Trade Policy for Sale? Congressional Voting on Recent Trade Bills," NBER Working Paper No. 6376, January 1998.*

[67] *K. F. Scheve and M. J. Slaughter, "What Determines Individual Trade Policy Preferences?," NBER Working Paper No. 6531, April 1998.*

[68] *L. G. Branstetter and R. C. Feenstra, "Trade and Foreign Direct Investment in China: A Political Economy Approach," NBER Working Paper No. 7100, April 1999.*

[69] *J. E. Anderson and L. Young, "Trade Implies Law: The Power of the Weak," NBER Working Paper No. 7702, May 2000.*

[70] *J. E. Anderson and D. Marcouiller, "Trade and Security, I: Anarchy," NBER Working Paper No. 6223, October 1997.*

[72] *J. E. Anderson and D. Marcouiller, "Trade, Insecurity, and Home Bias: An Empirical Investigation," NBER Working Paper No. 7000, March 1999.*

[72] *K. Bagwell and R. W. Staiger, "An Economic Theory of GATT," NBER Working Paper No. 6049, May 1997, and* American Economic Review *(March 1999); K. Bagwell and R. W. Staiger, "Multilateral Trade Negotiations, Bilateral Opportunism and the Rules of GATT," NBER Working Paper No. 7071, April 1999.*

[73] *M. Ghosh, C. Perroni, and J. Whalley, "The Value of MFN Treatment," NBER Working Paper No. 6461, March 1998.*

[74] *J. Ju and K. Krishna, "Firm Behavior and Market Access in a Free Trade Area with Rules of Origin," NBER Working Paper No. 6857, December 1998.*

[75] *A. O. Krueger, "Trade Creation and Trade Diversion Under NAFTA," NBER Working Paper No. 7429, December 1999.*

[76] *K. Bagwell and R. W. Staiger, "Domestic Policies, National Sovereignty and International Economic Institutions," NBER Working Paper No. 7293, August 1999, and forthcoming in the* Quarterly Journal of Economics;

[77] *W. Antweiler, B. R. Copeland, and M. S. Taylor, "Is Free Trade Good for the Environment?," NBER Working Paper No. 6707, August 1998; B. R. Copeland and M. S. Taylor, "Free Trade and Global Warming: A Trade Theory View of the Kyoto Protocol," NBER Working Paper No. 7657, April 2000.*

[78] *L. Abrego, C. Perroni, J. Whalley, and R. M. Wigle, "Trade and Environment: Bargaining Outcomes from Linked Negotiations," NBER Working Paper No. 6216, October 1997.*

Research Summaries

Interpreting Changes in Mental Health Expenditures: Minding Our Ps and Qs

Ernst R. Berndt, Susan H. Busch, and Richard G. Frank*

Interpreting growth trends in mental health spending can be puzzling. When mental health spending grows more rapidly than other health expenditures, is it because of provider price inflation? When mental health spending grows less rapidly than other health expenditures, is it because the mental health needs of our population increasingly are not being met?

A first step toward interpreting changes in mental health spending properly involves decomposing these expenditures into Ps and Qs: prices and quantities. But measuring the quantity of real output in the health care sector, particularly in mental health services, is complicated for a number of reasons. For example, questions about the effectiveness of treatments and the welfare losses from moral hazard in insurance have long created concern that the value of spending on mental health may be low relative to spending on other health services. Mental disorders frequently are chronic and recurring conditions, and mortality is not typically an appropriate measure of treatment outcome. Defining outcomes from various mental health treatments often relies on more subjective and difficult-to-measure constructs. Therefore, creating price indexes that account for the changing quality and effectiveness of mental health treatments poses significant measurement issues.

* *Berndt is Director of the NBER's Program on Productivity and Technological Change and the Louis B. Seley Professor of Applied Economics at MIT's Sloan School of Management. Busch is an assistant professor of health care policy at Yale University Medical School. Frank is a Research Associate in NBER's Programs on Health Care and Health Economics and the Margaret T. Morris Professor of Health Economics at Harvard University Medical School.*

Initial Methodology and Data

For some time, health economists have suggested that an appropriate treatment price index would be one based on defined episodes of treatment of selected illnesses and conditions. It would incorporate technological and institutional innovations that change the mix of inputs to treat the condition and would include any effects on changed medical outcomes. Anne A. Scitovsky was the first to implement this type of approach in 1967. She examined changes in the costs of treating episodes for six specific medical conditions at the Palo Alto Medical Research Foundation between 1951 and 1965.[1] In the health-related producer price indexes (PPIs) constructed and published by the Bureau of Labor Statistics (BLS), by contrast, variations in treatment outcomes are not taken into account, nor are major treatment substitutions, for example between pharmacotherapy and psychotherapy.

Over the last four years, we have undertaken a research program at the NBER that builds on the treatment episode tradition begun by Scitovsky and extends it to the most prevalent and costly of the mental disorders, major depression. We report here on how this research has progressed and how findings have evolved as we developed more refined measures of treatment episodes and outcomes.

In the past two decades, new treatment technologies have been introduced, indicating the potential for changes in outcomes in treatment for depression. Treatment input patterns have shifted within treatment classes (for example, from older to more recently developed pharmacotherapies, particularly the selective serotonin reuptake inhibitors, or SSRIs) and between treatment classes (for example, to less intensive psychotherapy and more intensive pharmacotherapy). Fundamental organizational changes, such as the growth of managed care and specialty mental health and pharmacy "carve-outs," also may have affected prices of and treatment choices for depression.

In our work, we use quantities and prices of outpatient treatment for depression that are based on retrospective medical claims data from MedStat's publicly available MarketScan™ database. These data consist of 1991–6 enrollment records and medical claims from four large self-insured employers offering more than 25 health plans to their 400,000 plus employees and their dependents. These data include inpatient, outpatient, and pharmaceutical claims. The health benefits offered to enrollees in this database are quite generous relative to the general market for private health insurance in the United States.

To implement a price index for

treatment episodes, we combine individual claims using patient identifiers, diagnostic information, and dates of services rendered. For depression, a chronic disease, defining an acute episode requires extensive knowledge of the disorder, its course, and the administration of treatments in practice. At numerous times, therefore, we benefited from consultations with clinicians about these issues.

To match our medical claims with clinical data, we identify all ambulatory claims associated with either single or recurrent episodes of major depression, as defined by the International Classification of Diseases. When the claims data indicate that psychotherapeutic drugs were prescribed, we consider the number of days of treatment provided by the prescription as the time period over which an individual received care. We define an episode of depression as new if the diagnosis is preceded by a period of at least eight weeks without treatment. We eliminate episodes if the entire episode is not observed or if we do not observe eight weeks both before and after an acute phase episode. As a control for severity and because of a lack of information on the details of treatment, we exclude patients with psychiatric hospitalizations.

Using information on procedures (for example, a 20- or 50-minute psychotherapy visit, or whether a drug was prescribed) available in the medical claims data, we describe the composition of treatment that occurred within a treatment episode. Prescription drug treatment is based on the national drug codes (NDCs) reported on the claim. The NDC classification reveals the use of seven older-generation tricyclic antidepressants, three SSRIs, two other serotonin-related drugs, and various other drugs used to treat depression, including monoamine oxidase (MAO) inhibitors, anxiolytics, and heterocyclics. We calculate direct medical spending for each treatment episode using actual transaction data. All insurer payments made to the provider and any cost-sharing assigned to the patient (for example, patient out-of-pocket copayment for prescription drugs) are summed to a nominal dollar total for each treatment episode. Thus, the treatment price indexes we construct are analogous to the PPI (supply side) rather than to the consumer price index or CPI (demand side). This process yields 10,368 identified episodes of depression between 1991 and 1995 in the claims data.

In our initial research, we used results from published treatment guidelines and our review of the clinical trial literature[2] to develop a set of "treatment bundles" grouping therapies into what we interpreted as similar groups for treatment of acute phase major depression. Our five treatment bundles vary in mix and length of psychotherapeutic drug treatment and/or number of psychotherapy visits, but they have similar *ex ante* expected outcomes. All bundles are confined to at most six months of treatment (the "acute" phase). The assumption in this methodology is that obtaining therapeutically similar outcomes from alternative bundles provides a useful approximation to achieving similar expected utility levels. However, an additional implicit assumption is that the production function for treatment of depression has a step-function form. For example, an individual receiving six psychotherapy sessions (barely meeting treatment guidelines) is treated as receiving "effective" treatment, although an individual receiving four or five visits (slightly less than treatment guidelines) is viewed as receiving "ineffective" treatment. The proportion of identified episodes receiving "effective" care was only 50.1 percent in our data.

When we limit our treatment episodes that meet guideline criteria in this way and aggregate over treatment bundles using 1991 fixed quantity weights (analogous to the BLS's use of a Laspeyres price index), we obtain a treatment price index of 100 in 1991 and 68.4 in 1995, observing a negative average annual growth rate (AAGR) of 9.1 percent. Similar time patterns result when we use alternative index number aggregation formulas. Over this same time period, the official PPI (not based on episodes of treatment) for antidepressant drugs grew at an AAGR of 3.8 percent, while the PPI for physicians' services increased at one percent per year.

Next, we extended this research by reconstructing episodes to identify missing psychotherapy procedure codes, by adding two additional treatment bundles, and by incorporating episodes that involved longer treatment (but only including the first six months of treatment for such individuals).[3] With this expanded set of episodes and bundles, the Laspeyres-type treatment price index was essentially flat between 1991 and 1995, falling from 100 to 97.6, or –0.6 percent per year. This still represents considerably less growth than the official PPIs shows.

The Next Phase

One major problem with all of our initial research, in addition to the restrictive step-function production assumption, is that by confining our analyses to those treatment episodes that meet guideline criteria, we ignore about 50 percent of delivered care. The share of episodes treated with guideline care in this claims database only increased from 35 percent to 55 percent between 1991 and 1995. Therefore, we wanted to relax the step-function production assumption and to make use of a great deal of clinical and medical information that is now known, as well as to incorporate treatments that reflect the

real-world environment but do not meet guideline standards. So, in the next phase of our research, we incorporated two major changes. First, we classified a broader set of episodes, including those that did not meet guideline criteria, according to two dimensions: type of patient and type of treatment. In that way, we identified about 200 patient treatment cells. When we eliminated treatment cells having fewer than 30 patients between 1991 and 1996, we were left with 120 patient treatment cells.

Next, we convened an expert panel of ten clinicians and researchers and elicited from them the outcomes they would expect for each of the 120 patient treatment cells. More specifically, we asked the expert panel members: of 100 patients meeting specific criteria for depression at initial visits, what number would fully respond to treatment after 16 weeks of treatment, what number would evidence a significant but partial response, and what number would not evidence any medically significant response? We also asked the panel to assess what number would remit or respond without any treatment (we called this the "waiting list"). Using a modified Delphi procedure, our expert panel assessment process converged in two steps. This process allowed us to infer outcome information for a wider range of treatment types and quantities than was available in our initial research, and it allowed us to integrate knowledge concerning the efficacy and effectiveness of real-world treatments with the MedStat retrospective claims data.

The results from this second phase of our research are reported in two recent papers.[4] Without making any adjustment for variations in expected outcomes, the Laspeyres-type treatment episode price index fell from 100 in 1991 to 95 in 1996, an AAGR of minus one percent. Since some individuals improve without receiving any treatment, outcomes are best incorporated as expected mental health improvements over and above no treatment (that is, as price per incremental full remission or price per incremental partial remission). From 1991–6, the Laspeyres-type price index per incremental partial remission increased from 100 to 103.9 (an AAGR of 0.8 percent), while the index per incremental full remission increased slightly less, from 100 to 103.4 (AAGR of 0.7 percent). Indexes based on other weighting formulas revealed similar trends. Hence, from 1991–6, the total treatment cost of attaining an expected incremental partial or full remission from depression (including the costs of those treatments that were not likely to have been effective) increased by less than 1 percent per year.

Over this same period of time, however, increased levels of management were exercised over mental health benefits. This implies that the patient population may have been changing along with the mix of treatment bundles, thereby affecting both expected outcome and cost. Because our expected outcomes are assigned based on both treatment and patient type, changes in the mix of patients will affect the price per incremental remission. For example, the expert panel rated patients with comorbid substance abuse to have lower expected outcomes than patients without comorbid substance abuse receiving the same treatment. These changes in the patient mix over time in our MedStat claims database are not incorporated in the price index calculations described above.

To account for the effect of changing patient mix on computed price indexes, we delineate eight patient categories (whether medical comorbidity is present, whether male, if female whether over age 50, and whether there is comorbid substance abuse.) Then we estimate hedonic price equations for the price per expected full remission. The dependent variable is the natural log of spending for each of the 8,187 treatment episodes; the regressors are the probability of a full remission associated with the patient's treatment and type, dummy variables for seven of the eight patient categories, and annual dummy variables. As expected, variations in patient categories have significant and substantial effects on treatment costs, and the coefficient on remission probability is positive and highly significant. The resulting price index falls from 100 in 1991 to 87.2 in 1996, implying an AAGR of –2.7 percent. The differences between this hedonic and the previous set of price indexes reflect the changing and increasingly complex mix of patients, along with changes in treatment bundles, over the six-year period.

Conclusion

In summary, our analysis suggests that between 1991 and 1996, based on our preferred price index and adjusting both for expected outcomes from changing treatments and from varying patient mixes, the cost of treatment for depression has declined 2.7 percent per year. This contrasts with a price increase of 2.6 percent per year when we use BLS-like methods with these same data. The source of increased expenditures on treatment for depression since 1991 is the increased quantity of treatments and remissions, not increases in their prices. Since roughly half of spending on mental health involves treatment for depression, our results imply that much of the recent increase in spending on mental health care has been driven by increased productivity and expanded quantities of care, a result that is contrary to much conventional wisdom. Therefore, decomposing expenditures into their P and Q components is critical in interpreting expenditure variations.

This research suggests that while

constructing episode-based, outcomes-adjusted price indexes is a complex and cumbersome task, it is critically important for informed policy discussions. Although it may not be sensible or practical for the BLS to produce such an index on a monthly basis, it is important that policy analysts use episode-based, outcomes-adjusted price indexes when evaluating sources of expenditure variation in the National Health Accounts.

[1] *A. A. Scitovsky, "Changes in the Costs of Treatment of Selected Illnesses, 1951–65,"* American Economic Review, *57 (5) (December 1967), pp. 1345–57.*

[2] *R. G. Frank, S. H. Busch, and E. R. Berndt, "Measuring Prices and Quantities of Treatment for Depression,"* American Economic Review, *88 (2) (May 1998), pp. 106–11; R. G. Frank, E. R. Berndt, and S. H. Busch, "Price Indexes for the Treatment of Depression," NBER Working Paper No. 6417, February 1998, and in* Measuring the Prices of Medical Treatments, *J. E. Triplett, ed. Washington, D.C.: The Brookings Institution, pp. 72–102.*

[3] *E. R. Berndt, S. H. Busch, and R. G. Frank, "Treatment Price Indexes for Acute Phase Major Depression," NBER Working Paper No. 6799, November 1998, forthcoming in* Medical Care Output and Productivity, *D. M. Cutler and E. R. Berndt, eds. Chicago: University of Chicago Press; S. H. Busch, E. R. Berndt, and R. G. Frank, "Creating Price Indexes for Measuring Productivity in Mental Health Care," forthcoming in* Frontiers in Health Policy Research, *vol. 3, A. M. Garber, ed. Cambridge, MA: MIT Press.*

[4] *S. H. Busch, E. R. Berndt, and R. G. Frank, "Creating Price Indexes for Measuring Productivity in Mental Health Care," forthcoming in* Frontiers in Health Policy Research, *vol. 3, A. M. Garber, ed. Cambridge, MA: MIT Press; E. R. Berndt, A. Bir, S. H. Busch, R. G. Frank, and S. T. Normand, "The Medical Treatment of Depression, 1991–6: Productive Inefficiency, Expected Outcome Variations, and Price Indexes," NBER Working Paper No. 7816, July 2000.*

International Trade and National Factor Markets

Donald R. Davis*

Trade, Wages, and Unemployment

Of primary concern in international trade policy is the impact of trade on national factor markets. Such concerns have sharpened as the extent of international integration has risen both among OECD countries and between these countries and poorer non-OECD nations. How does trade affect unemployment, we wonder, or wages? Does it matter that countries have very different labor market institutions?

Davis is a Research Associate in the NBER's Program on International Trade and Investment and a Professor of Economics at Columbia University. His "Profile" appears later in this issue.

For the analyst, these questions raise both theoretical and empirical issues. What theoretical framework is appropriate for thinking about these issues? Is there a model of international exchange and national factor markets with enough empirical support to give us confidence in the comparative static assessments that we make? These questions have motivated my work in recent years.

One strand of this work explicitly focuses on the analytics of trade, wages, and unemployment when countries have different labor market institutions. This work is motivated by the contrast between the experience of the Anglo-American economies and that of many Continental European economies. In the Anglo-American economies after 1980 there was a large decline in the relative wages of unskilled workers, yet relatively low unemployment. In contrast in many of the European economies at that time, relative wages of the unskilled did not decline, but unemployment reached very high levels. The contrast in experience has been noted by many other researchers, and differences in the flexibility of factor market institutions often were cited as an important contributing factor.

One key question that had not been addressed, though, is how the costs borne by each of these country-types were affected by the fact that these countries trade in a unified global goods market. I address that question in a series of papers. The first paper considers a benchmark case between a stylized America and Europe, where the countries are

identical except for one institutional difference: America has fully flexible wages while Europe targets an unskilled wage higher than what would prevail without intervention.[1] If the countries are in isolation, the resulting difference in outcomes is straightforward. Flexible labor markets allow America to have full employment, but at the cost of lower wages for the unskilled. Europe attains its higher target wage for the unskilled, but at the cost of high unemployment.

The outcome changes radically, though, when America and Europe trade freely. The key is the link between wages and goods' prices. If Europe is to achieve a high wage for unskilled labor, it must also target a high price for the good that uses that labor relatively intensively, since wages and prices move in lockstep. But it now must maintain this price not only in Europe, but also internationally, since the price is common. Trade with America incipiently lowers this goods price, and the target unskilled wage will be achieved only if ever greater quantities of unskilled labor are cast into unemployment. Since the benchmark assumes that America and Europe are structurally identical except for labor market institutions, we can be precise about the extent to which European unemployment rises. In this case, European unemployment must double to achieve the same high unskilled wage that it had in isolation. For this stylized Europe, this represents a pure deadweight loss. The results in America are strikingly different. Because of the common prices of international goods, it achieves the same high wage outcome as in Europe. However, because of its flexible labor markets, it bears none of the unemployment cost of achieving that wage. The paper I have just described began by asking the question: Does European unemployment prop up America wages? Within this framework, the answer is unambiguously "yes."

The same paper then goes on to establish the robustness of these results under a variety of economic shocks and modifications to the benchmark model. It also develops, as an example, a simple calibration exercise to identify the extent to which European unemployment rose as the joint result of migration from developing to developed countries and the difference in the flexibility of labor market institutions within a freely trading world. These examples show that without South–North migration from 1970 to 1990, Europe could have achieved the same wages with one-eighth to one-quarter less unemployment. While the magnitudes arising from such a calibration exercise should be treated with proper caution, they do suggest that the impact of the differences in labor market institutions within an open trading system may have been substantial.

This first paper set out the basic model and considered comparative statics such as increased openness to trade, exogenous factor accumulation, entry to world markets of an unskilled South, and migration from South to North. However, a good deal of the literature examining these labor market developments instead emphasized the role of technical change. Indeed, this was a significant point of discussion between such researchers as Edward E. Leamer[2] and Paul R. Krugman.[3] Therefore, I incorporated a consideration of technical change into my broader framework,[4] providing an intuitive account of the impact of a wide variety of technological shocks, both local and global, on relative wages and unemployment in the stylized America and Europe. I found that in a number of cases, the impact of technology differed palpably, though sensibly, from what would occur in the flexible wage cases that had dominated discussion. I therefore provided a mapping to explain what patterns and geographical extent of the technology shocks could account for various stylized facts that have appeared in the literature.

The final paper in this series extends the basic model to consider the case of endogenous human capital accumulation.[5] Since some of the labor market patterns of interest concern changes over decades, it is important to consider how labor responds to the evolving incentives. Also, ignoring the endogenous response of human capital accumulation may make it difficult to identify the source of the key shocks.

Endowments, Technology, and Trade Patterns

The work sketched above assumes an economic model suitable to the problem and draws out the consequences of these assumptions. An alternative approach that I describe now asks whether our models have sufficient empirical support in their key predictions to inspire confidence in them when applied to policy questions.

Differences across regions or countries in the relative availability of factors will lead to differences in factor prices or goods prices in autarky. This in turn will motivate trade. This simple but deep insight formed the basis for Bertil Ohlin's 1977 Nobel Prize. Jaroslav Vanek in 1968 provided a relatively robust formulation of the theory focusing on the exchange of services of factors.[6] The Heckscher-Ohlin-Vanek (HOV) theory has been a central focus of empirical research in international trade ever since.

Yet, the most serious prior empirical efforts to verify HOV (and variants) have yielded only "paradox" and "mystery." The list of failed efforts to confirm the theory is both

impressive and daunting. The Leontief "paradox" described in 1953 — that the United States is an importer of capital services and an exporter of labor — is well known.[7] In a widely cited 1987 paper, Harry P. Bowen, Leamer, and Leo Sveikauskas noted that if you want to know which factor services a country will export on net, you will get no more information from measured factor abundance than from a coin flip.[8] More recently, work by Daniel Trefler identified a series of anomalies in the data including the "mystery of the missing trade:" that measured factor service trade is an order of magnitude smaller than predicted based on factor endowments.[9] The HOV theory thus appeared to be a resounding empirical failure.

What was wrong? In a joint paper with David E. Weinstein, Scott C. Bradford, and Kazushige Shimpo, we start with a belief that the conventional assumption of factor price equalization (FPE) for the world as a whole is a major stumbling block for empirical implementation.[10] Our strategy was to sidestep this problem by focusing on the net factor trade of a subset of the world for which the assumption of FPE is more plausible: regions of Japan. The rub is that the HOV theory is one of world — not just national — equilibrium. Hence, we had to consider what HOV predicts when only a subset of the world shares FPE, integrating the international data in an appropriate manner.

Our empirical results both helped us make sense of prior failures and indicated directions required to get HOV to work. We provided the first test of the production side of the HOV model on international data, demonstrating that an important reason for the failure of prior efforts was the assumption of identical techniques of production. We went on to show that even if one restricted attention to the data for Japanese regions, but continued to assume world FPE, we would obtain all of the anomalies identified in earlier studies, including the "mystery of the missing trade." We then showed that if you abandon FPE for the world as a whole, the results improve dramatically. Regions of Japan export the services of abundant factors and they do so in approximately the right magnitude. This represented the first true empirical success for the HOV theory of factor service trade.

Our attention then turned to the question of whether we could get HOV to work on an international sample. Here it was clear that it would no longer be possible to sidestep the issues surrounding the failure of FPE — these would have to be confronted directly. Weinstein and I began by noting that the major efforts to test HOV on international data have considered two principal amendments to the simple model.[11] The first contemplates cross-country technological differences. The second considers departures from the conventional model of absorption. These prior efforts have a major drawback, though. Although the proposed amendments concern technological differences and alterations to the model of absorption, the data the studies employ typically have a single observation on technology (the United States) and no observations at all on absorption. As a result, it is difficult to be sure whether even the minor statistical improvements in measures of fit achieved have a structural interpretation in terms of the economic fundamentals of interest.

As an alternative, we bring a wealth of new data to bear on the problem of testing HOV on international data. For a sample of ten OECD countries we are able to test hypotheses about the nature of technological differences and the structure of the production model directly on the data of interest. Similarly, we are able to examine the absorption model directly on the relevant data. Having selected the best models of international technology differences and absorption patterns, we then impose the estimates on the data on production and trade. We show step by step how the introduction of our principal hypotheses yield corresponding improvements in measures of model fit. The result is a very striking confirmation of the HOV theory, suitably amended. Various checks for robustness yield a common conclusion. Countries export their abundant factors and they do so in approximately the right magnitude. The "mystery of the missing trade" is almost entirely resolved.

The most exciting feature of this paper is the simple and unified picture it draws of the global economy. The departures from the standard theory are simple, plausible, and confirmed directly in the relevant data. And they allow the amended model of factor service trade to match the international data surprisingly closely.

---

[1] *D. R. Davis, "Does European Unemployment Prop Up American Wages? National Labor Markets and Global Trade," NBER Working Paper No. 5620, June 1996, and* American Economic Review, *88 (3) (June 1998), pp. 478–94.*

[2] *E. E. Leamer, "In Search of Stolper-Samuelson Effects between Trade and U.S. Wages," mimeo, Yale and UCLA.*

[3] *P. R. Krugman, "A Growing World Trade: Causes and Consequences," mimeo, Stanford University, prepared for the Brookings Panel on Economic Activity, April 6–7, 1995.*

[4] *D. R. Davis, "Technology, Unemployment, and Relative Wages in a Global Economy," NBER Working Paper No. 5636, June 1996, and* European Economic Review, *42 (9) (November 1998), pp. 1613–33.*

[5] *D. R. Davis and T. A. Reeve, "Human Capital, Unemployment, and Relative Wages in a Global Economy," NBER Working Paper No. 6133, August 1997; forthcoming in* Globalisation and Labor Markets, *D. Greenaway, ed. New York: MacMillan.*

[6] *J. Vanek, "The Factor Proportions Theory: The N-Factor Case," Kyklos, 24 (1968), pp. 749–56.*

[7] *W. Leontief, "Domestic Production and Foreign Trade: The American Capital Position Re-Examined,"* Proceeding of the American Philosophical Society, *97 (1953), pp. 332–49.*

[8] *H. P. Bowen, E. E. Leamer, and L. Sveikauskas, "Multifactor, Multicountry Tests of the Factor Abundance Theory,"* American Economic Review, *77 (December 1987), pp. 791–809.*

[9] *D. Trefler, "The Case of the Missing Trade and Other Mysteries,"* American Economic Review, *85 (5) (December 1995), pp. 1029–46.*

[10] *D. R. Davis, D. E. Weinstein, S. C. Bradford, and K. Shimpo, "Using International and Japanese Regional Data to Determine When the Factor Abundance Theory of Trade Works," NBER Working Paper No. 5625, June 1996, and* American Economic Review, *87 (3) (June 1997), pp. 421–46.*

[11] *D. R. Davis and D. E. Weinstein, "An Account of Global Factor Trade," NBER Working Paper No. 6785, November 1998.*

Foreign Direct Investment and the Operations of Multinational Firms

Robert E. Lipsey*

Foreign direct investment (FDI) flows and the operations of multinational firms have attracted increased research attention in recent years. This is partly because FDI has grown in importance as a form of capital flow and partly because FDI seems a more reliable form of finance for developing countries than portfolio investment or short-term lending in light of the recent Asian experience. Perhaps the most important reason is the emergence of a popular view that multinational firms control much of the world's economy.

In fact, the share of direct investment in the world's capital outflows has grown substantially since the early 1970s to reach about 25 percent in the early 1990s.[1] That share dropped in 1996 and again in 1997, with a surge in portfolio capital and short-term lending. But as portfolio and short-term capital flows declined after the start of the Asian crisis, FDI flows rebounded to 30 percent of the total world capital flows.

Despite this growth in FDI flows, the resulting production is still a small part of the world's total output: about 7 or 8 percent in 1995, compared with about 4.5 percent in 1970.[2] The petroleum sector was the most internationalized in 1970, but the internationalized share fell sharply afterwards, especially in developing countries where important operations were nationalized. Manufacturing is now the most internationalized sector, at over 16 percent of output, but apart from these two sectors, internationalized production remains under 4 percent of the world total.

In the past, FDI flows to individual countries were less volatile than other international capital flows: they changed direction less frequently and the range of fluctuations around their mean was smaller. That characteristic of FDI flows was demonstrated in the Latin American crises of the early 1980s. It was confirmed in the Mexican crisis of 1994, when direct investment inflows quickly regained their previous level, while other forms of capital inflow remained far below their peaks. And the pattern was further confirmed in the Asian crises of 1997, when direct investment inflows into developing Asia as a whole hardly paused in their rapid growth, while portfolio and other forms of investment either dried up or turned negative on net balance.[3]

Over a longer horizon, the economies of East Asian countries have been transformed, and FDI has played an important role in most of the transformations. The industry structure of production and of exports has changed drastically. In 1977 almost two-thirds of East Asian manufactured exports were in foods, textiles and apparel, and miscellaneous manufactures, but in 1995 this percentage had dropped to one-third.[4] Over the same period, the exports of East Asian machinery industries grew from 17 to 44 percent of the total.

Much of that shift in export composition was propelled by direct investment in these countries, mainly from Japan and the United States. Foreign firms supplied technology and links to other parts of their production and trade networks. These links, added to the local resources, fueled rapid export growth and changes in export composition. Frequently, affiliates were established mainly for export production, but over time their output shifted toward production for local markets. That change was accompanied by growth in production by nonaffiliated host-country firms in the same or related industries.

The developing countries are almost all net recipients of direct

investment. It is clear that foreign firms bring not only scarce capital, but also superior technologies and new industries to these countries. They sometimes also bring about drastic changes in the variety of industries and the composition of production.

Among developed countries, though, FDI flows seem to play a different role. While they are much larger than flows to developing countries, they typically do not radically change the composition of host-country production. Inflows often are matched by outflows in the same country in the same period.[5] The flows among the developed countries mainly seem to reshuffle the ownership of productive assets, moving them to owners who want them more than their current owners and who are willing to pay the most for them. Presumably, capital flows move assets from less efficient to more efficient owners, or from owners who are technologically or commercially backward in their industries to firms that are technological leaders. Or, capital flows may bring relief to owners who have found more attractive uses for their capital than their current industries. In none of these cases do such flows necessarily change the location of the production, assets, or employment of these industries, though.

One possible indication of the advantages of multinationals relative to other firms in their host countries is that, in every host country, multinationals pay higher wages than their locally owned counterparts. That is the case even in the United States, often thought of as the world's technological leader. Much of the foreign-firm wage premium in the United States is related to the larger size of foreign-owned establishments and to their choice of industries and locations. A study based on the recently published matched data from the Census Bureau and the Bureau of Economic Analysis found that all of the foreign establishment premium in manufacturing, but not in other industry groups, could be explained by these characteristics.[6] A larger foreign presence in an industry in a state had no effect on average wages in manufacturing once establishment size, industry, and location were taken into account, but it did raise average nonmanufacturing wages, and even wages in domestically-owned nonmanufacturing establishments.

Spillovers from foreign-owned to domestically-owned establishments are one possible source of host-country gains from inward FDI beyond the gains from higher productivity of the foreign-owned establishments themselves. One study using individual establishment data for Indonesian manufacturing[7] found higher productivity not only in foreign-owned establishments but also in domestically-owned establishments as the foreign participation in the industry increased. The extent of such spillovers was not affected by the degree of foreign ownership of individual plants.

Even if outward direct investment does not necessarily involve a reduction in a home country's production, or in home-country production by a country's multinationals, it may involve a reallocation of production or of certain aspects of production. These could affect home-country labor markets in various ways depending on the nature of the reallocation. In U.S. multinationals, there has not been any aggregate shift of production or employment to foreign locations, even in relative terms, since the late 1970s, except in manufacturing. There was some reduction in U.S. multinationals' share of manufacturing production and employment in the United States. However, that reduction was offset almost entirely by an increase in the shares of foreign multinationals, leaving the total production and employment share of multinationals virtually unchanged.[8]

In U.S. multinationals, a higher level of production in developing countries is associated with lower parent employment at home per unit of parent home-production. This implies that U.S. multinationals have allocated the more labor-intensive parts of their production to developing countries and retained their more capital-intensive and skill-intensive operations at home. There is some weak evidence that higher levels of foreign production also are associated with higher wages at home, but the higher wages do not seem to be related in particular to production in developing countries.

A comparison of home labor market effects in Swedish and U.S. multinationals[9] found that, in contrast to U.S. firms, Swedish multinationals with higher shares of employment abroad had higher employment, particularly blue-collar employment, per unit of output in the parent company at home. That suggests that Swedish firms allocate the more capital-intensive production to their foreign affiliates, most of which are located in advanced countries. A three-way comparison among U.S., Swedish, and Japanese multinationals found that Japanese parent firms behave more like Swedish than U.S. parent firms.[10] A Japanese parent's employment at home, given its level of home production, was found to be higher as its production abroad by the firm's foreign affiliates increased. Since Japanese firms probably would

*Lipsey is a Research Associate in the NBER's Programs on International Finance and Macroeconomics, International Trade and Investment, and Productivity, and Professor of Economics, Emeritus, at The City University of New York.

not be allocating labor-intensive processes to their high-wage home operations, their need for additional employment at home for supervision and other ancillary activities likely outweighs any allocation of labor-intensive operations to developing countries.

Japan is a smaller participant in outward direct investment than the United States, relative to its size, and is much smaller as a host to inward FDI.[11] However, Japanese outward FDI did help Japanese firms maintain market shares in some declining industries by shifting production to lower cost locations. Since the 1980s, Japan has been catching up, and the industry pattern of Japanese FDI has come to resemble that of the United States, especially in the importance of electrical machinery industries. Deregulation or liberalization in service sectors also may raise the level of inward FDI production, which is still unusually low among OECD countries.

Future work in this area will attempt to draw stronger inferences about the effects of FDI on host countries by using panel data for individual firms and establishments. Work is beginning on such studies for foreign investment in the United States, concentrating on takeovers of U.S.-owned firms by foreigners, and on foreign investment in Indonesia, with a focus on labor market issues.

---

[1] *R. E. Lipsey, "The Role of Direct Investment in* International Capital Flows," *in International Capital Flows, M. Feldstein, ed. Chicago: University of Chicago Press, 1999.*

[2] *R. E. Lipsey, "Internationalized Production in Developed and Developing Countries and in Industry Sectors," NBER Working Paper No. 6405, February 1998.*

[3] *R. E. Lipsey, "Foreign Direct Investment in Three Financial Crises," NBER Working Paper No. 8084, January 2001.*

[4] *R. E. Lipsey, "Affiliates of U.S. and Japanese Multinationals in East Asian Production and Trade," in* The Role of Foreign Direct Investment in East Asian Economic Development, *EASE Volume 9, T. Ito and A. O. Krueger, eds. Chicago: University of Chicago Press, 2000.*

[5] *R. E. Lipsey, "Interpreting Developed Countries' Foreign Direct Investment," NBER Working Paper No. 7810, July 2000.*

[6] *Z. Feliciano and R. E. Lipsey, "Foreign Ownership and Wages in the United States, 1987–92," NBER Working Paper No. 6923, February 1999.*

[7] *M. Blomström and F. Sjöholm, "Technology Transfer and Spillovers: Does Local Participation with Multinationals Matter?," NBER Working Paper No. 6816, November 1998, and* European Economic Review, *43 (4–6) (April 1999), pp. 915–23.*

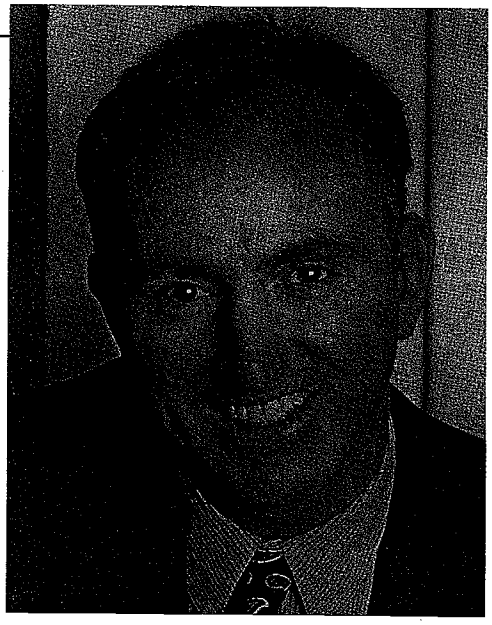
[8] *R. E. Lipsey, "Foreign Production by U.S. Firms and Parent Firm Employment," NBER Working Paper No. 7357, September 1999; forthcoming in* Multinational Firms and Impacts on Employment, Trade, and Technology, *R. E. Lipsey and J. Mucchielli, eds. Harwood Academic Publishers.*

[9] *M. Blomström, G. Fors, and R. E. Lipsey, "Foreign Direct Investment and Employment: Home Country Experience in the United States and Sweden,"* Economic Journal, *107 (445) (November 1997), pp. 1787–97.*

[10] *R. E. Lipsey, E. D. Ramstetter, and M. Blomström, "Outward FDI and Parent Exports and Employment: Japan, the United States, and Sweden," NBER Working Paper No. 7623, March 2000.*

[11] *M. Blomström, D. E. Konan, and R. E. Lipsey, "FDI in the Restructuring of the Japanese Economy," in* Japan's New Economy: Continuity and Change in the 21st Century, *M. Blomström, B. Gangnes, and S. La Croix, eds., forthcoming from Oxford University Press.*

NBER Profile: *Donald R. Davis*

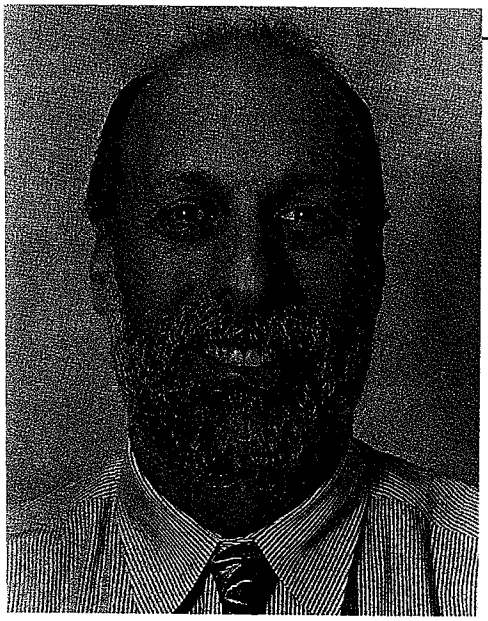


Donald R. Davis is a professor of economics at Columbia University and a Research Associate of the National Bureau of Economic Research. He received his B.A. in Philosophy from the University of California, Berkeley in 1981 and his Ph.D. in Economics from Columbia University in 1992.

Davis was an assistant professor in Harvard University's economics department from 1992–6 and an associate professor there from 1996–9. He joined the Columbia faculty as a professor of economics in 1999. His fields of interest are international trade and economic development in the open economy.

Davis's research has been published in a number of journals, such as the *American Economic Review* and the *Journal of Political Economy*, including one paper selected for the book "Outstanding Contributions in Economics: International Trade." He also serves as associate editor of the *Journal of International Economics*.

Davis spends his free time with his six-year-old daughter, Olivia, who instructs him in the ways of the world.



NBER Profile: *Richard G. Frank*

Richard G. Frank is the Margaret T. Morris Professor of Health Economics in the Department of Health Care Policy at Harvard Medical School and a Research Associate of the National Bureau of Economic Research. He received his B.A. degree from Bard College and his Ph.D. in economics from Boston University.

Dr. Frank's research falls into three general areas: 1) the economics of mental health care; 2) the economics of the pharmaceutical industry; and 3) the organization and financing of physician group practices. In addition to his research and teaching, he serves on the Advisory Council of the Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services and on the Biobehavioral Sciences Board of the Institute of Medicine. He also advises several state mental health and substance abuse agencies on issues related to managed care and financing of care.

Dr. Frank is a member of the Institute of Medicine and served as a Commissioner on the Maryland Health Services Cost Review Commission from 1989 to 1994. He was also a member of President Clinton's Health Care Reform Task Force in 1993.

Frank lives in Lexington, Massachusetts. He is married and has two sons, ages 12 and 14. He is an avid skier and soccer player, he coaches youth soccer, and he collects primitive art, an interest acquired during his Peace Corps service in Botswana.

Conferences

Economic and Financial Crises in Emerging Market Economies

As part of the NBER's Project on Economic and Financial Crises in Emerging Market Economies, NBER President Martin Feldstein organized a conference that brought together a group of distinguished individuals from the United States and other countries who have been key participants in the resolution of such crises. On October 20 and 21 in Woodstock, Vermont, they convened to discuss their experiences and share their thoughts.

The motivation for the discussion was provided by six background papers covering different aspects of the prevention and management of the crises. These papers, currently available at "Books in Progress" at **www.nber.org**, by topic and author are:

Exchange Rate Regimes – Sebastian Edwards, NBER and University of California at Los Angeles

Financial Policies – Frederic Mishkin, NBER and Columbia University

Industrial Country Policies – Jeffrey Frankel, NBER and Harvard University, and Nouriel Roubini, NBER and New York University

IMF Stabilization Programs – Anne O. Krueger, NBER and Stanford University

IMF Structural Programs – Morris Goldstein, Institute for International Economics

Creditor Relations – William Cline, Institute of International Finance

The conference itself was organized into six sessions, which dealt with these topics. Each session began with prepared remarks by three individuals who have been government or private sector participants in the crisis management or have had key positions in affected countries. Some of the current and former U.S. officials who spoke at the conference were: former U.S. Treasury Secretary Robert Rubin; current U.S. Treasury Secretary Lawrence Summers; and former Chairman of the Federal Reserve Board of Governors Paul Volcker.

The international financial agencies were represented at the conference by, among others, Andrew Crockett, General Manager of the Bank for International Settlements; Stanley Fischer, First Deputy Managing Director of the IMF; and Nicholas Stern, Chief Economist of The World Bank.

The current and former officials of foreign nations included: Montek Singh Ahluwalia, Chairman of India's Planning Commission and former chief economist for the Indian government; Domingo F. Cavallo, former Minister of Finance of Argentina; Arminio Fraga, Governor of the Central Bank of Brazil; Jacob Frenkel, former Governor of the Bank of Israel and former Chief Economist of the International Monetary Fund; Paul Keating, former Finance Minister and Prime Minister of Australia; Mervyn King, Deputy Governor of the Bank of England; and Guillermo Ortiz, Governor of the Bank of Mexico.

Among those who participated coming from private financial institutions were: E. Gerald Corrigan, Goldman Sachs and Co.; John Crow, J&R Crown, Inc.; David Lipton, Moore Capital Strategy Group; Roberto Mendoza, Goldman Sachs International; George Soros, Soros Fund Management; and Lin See Yan, LIN Associates.

Other participants included: Caroline Atkinson, Timothy Geithner, and Edwin Truman of the U.S. Treasury Department; Jack Boorman, International Monetary Fund; Charles Dallara, Institute of International Finance; Peter Garber, Deutsche Bank; Takatoshi Ito, Ministry of Finance, Japan; Karen Johnson, Federal Reserve Board of Governors; Paul Krugman, NBER and Princeton University; John Langlois, Center for International Political Economy; John McHale, Harvard University; Manuel Montes, The Ford Foundation; Yung Chul Park, Korea University; Jeffrey Sachs, NBER and Harvard University; Ammar Siamwalla, Thailand Development Research Institute; and Martin Wolf, *The Financial Times*.

A summary of the conference discussion as well as the 17 formal remarks and the background papers will appear in a University of Chicago Press volume edited by Feldstein. Prior to its publication, these papers and a summary of the discussion are available on the NBER's web site, **www.nber.org**, under "Books in Progress."

This conference was part of a larger project organized jointly by Feldstein and Frankel. In the future as part of that project, there will be scientific conferences on "Reducing the Risk of Currency Crises," organized by Frankel and Edwards, and "Managing Currency Crises," organized by Frankel and Dooley. Five one-day meetings over the last few years have looked at developments in specific countries: Mexico, Thailand, Korea, Indonesia, and Brazil. The project is supported by the Ford Foundation, the Mellon Foundation, and the Center for International Political Economy.

Changes in Real Exchange Rates

An NBER-Universities Research Conference on "Changes in Real Exchange Rates: Causes and Consequences" took place in Cambridge on December 8 and 9. Alan C. Stockman, NBER and University of Rochester, organized this two-day program:

Mario J. Crucini, Vanderbilt University, **Christopher I. Telmer,** Carnegie Mellon University, and **Marios Zachariadis,** Louisiana State University, "Cross-Sectional Variation in European Real Exchange Rates"

Discussant: Kenneth S. Rogoff, NBER and Harvard University

Masanaga Kumakura, University of Cambridge, "Exchange Rates and Dynamics of Traded Goods Prices: Does Exchange Rate Uncertainty Matter?"

Discussant: Joshua Aizenman, NBER and Dartmouth College

David Cook, Hong Kong University of Science and Technology, and **Michael B. Devereux,** University of British Columbia, "The Macroeconomic Effects of International Financial Panics"

Discussant: Andres Velasco, NBER and Harvard University

Margarida Duarte, Federal Reserve Bank of Richmond, "Why Don't Macroeconomic Quantities Respond to Exchange Rate Variability? Comparing Fixed and Floating Exchange Rate Systems"

Discussant: Enrique G. Mendoza, NBER and Duke University

Gianluca Benigno, Bank of England, "Real Exchange Rate Persistence and Monetary Policy Rules"

Discussant: Alex Wolman, Federal Reserve Bank of Richmond

Michael W. Klein, NBER and Tufts University, and **Scott Schuh** and **Robert K. Triest,** Federal Reserve Bank of Boston, "Job Creation, Job Destruction, and the Real Exchange Rate" (NBER Working Paper No. 7466)

Discussant: Pierre-Olivier Gourinchas, NBER and Princeton University

Marianne Baxter, NBER and Boston University, and **Michael A. Kouparitsas,** Federal Reserve Bank of Chicago, "What Causes Fluctuations in the Terms of Trade?" (NBER Working Paper No. 7462)

Discussant: Jaume Ventura, NBER and MIT

David C. Parsley, Vanderbilt University, and **Shang-Jin Wei,** NBER and Harvard University, "Explaining the Border Effect: The Role of Exchange Rate Variability, Shipping Costs, and Geography" (NBER Working Paper No. 7836)

Discussant: Charles M. Engel, NBER and University of Wisconsin

Using a panel of over 5,000 local currency prices of retail goods and services sold in the capital cities of Europe in 1975, 1985, and 1990, **Crucini, Telmer,** and **Zachariadis** characterize the behavior of average relative prices — "real exchange rates" — as well as the dispersion around those averages. They find that the averages are surprisingly close to what purchasing power parity (PPP) would suggest. In other words, the averages of foreign-to-domestic price ratios (across goods for a particular pair of countries) provide relatively accurate predictions of most nominal cross-rates. However, variation around the averages is large and related to economically meaningful characteristics of goods, such as measures of international tradeability, the importance of nontraded inputs in production, and the competitive structure of the markets in which the goods are sold. Using data on product brands, the authors also find that product heterogeneity is at least as important as geography in explaining relative price dispersion.

Empirical floating exchange rates tend to exhibit substantial volatility and persistent misalignments. **Kumakura** discusses how the instability and the consequent uncertainty of floating rates can affect the relationship between exchange rates and import/export prices. He suggests the possibility that currency instability influences the dynamic relationship between exchange rates and prices in subtle but important ways. His models also can explain many empirical puzzles about traded goods prices.

Cook and **Devereux** explore the macroeconomic effects of capital market panics in a small open economy. Their model arises out of the sudden and dramatic capital outflows from East Asian economies in 1997-8, which led to sharp exchange rate depreciations, and were followed by a collapse in the real economy and a large reversal in the position of the current account. The authors' interpretation of this event follows the literature on "financial fragility," which points to the problems of the maturity mismatch between short-term borrowing and long-term investment projects giving rise to the risk of capital market panics. However, Cook and Devereux go beyond this literature by constructing a complete macro model that can reproduce many of the quantitative features of the Asian crisis.

Empirical studies comparing fixed and flexible exchange rate regimes document that countries moving from

pegged to floating systems experience a systematic and dramatic rise in the variability of the real exchange rate. However, there is very little evidence that the behavior of other macroeconomic variables varies systematically with the regime. **Duarte** seeks to resolve this puzzle. She examines the effects of the exchange rate regime in a dynamic general equilibrium model with incomplete asset markets and nominal goods prices set in the buyers' currency. The model predicts a sharp increase in the volatility of the real exchange rate when moving from pegged to floating rates, while this pattern is not observed for other variables. The model also predicts a higher co-movement of variables across countries under fixed rates than under flexible rates, a prediction that accords with recent empirical studies.

Benigno analyzes the effects of alternative monetary rules on real exchange rate persistence. Using a two-country stochastic dynamic general equilibrium model, with nominal price stickiness and local currency pricing, he shows how the persistence of PPP deviations can be related to a monetary theory of these deviations. There is no proportionality found between the time during which prices remain sticky and the persistence of the response of the real exchange rate. That is, high nominal price rigidity is not sufficient to generate any persistence following a monetary shock.

Klein, Schuh, and **Triest** demonstrate a statistically significant and economically relevant effect of the real exchange rate on job creation and job destruction in U.S. manufacturing industries from 1973 to 1993. The responsiveness of these gross job flows to the real exchange rate reflects pervasive heterogeneity with respect to international conditions across firms, even within narrowly defined industries. The authors show that the responsiveness of job flows to movements in the real exchange rate varies with the industry's openness to international trade. They also show an asymmetry in the responsiveness of job flows to the real exchange rate; appreciations play a significant role in job destruction, but job flows do not respond significantly to dollar depreciations.

Fluctuations in the terms-of-trade — the price of a country's exports relative to the price of its imports — are a source of perennial concern to policymakers in developing and industrialized nations alike. **Baxter** and **Kouparitsas** decompose a country's terms of trade volatility into a "goods price effect," which stems from differences in the composition of import baskets and export baskets, and a "country price effect," which results from cross-country differences in the price of a particular class of goods. They then ask whether the decomposition depends on country characteristics, for example, developed versus less-developed, or exporter of manufactured goods versus exporter of fuels or other commodities.

Parsley and **Wei** exploit a three-dimensional panel dataset of prices on 27 traded goods over 88 quarters and across 96 cities in the United States and Japan. They show that a simple average of goods-level real exchange rates tracks the nominal exchange rate well, suggesting strong evidence of sticky prices. Focusing on dispersion in prices between city-pairs, the authors find that crossing the U.S.–Japan border is equivalent to adding as much as 43,000 trillion miles to the cross-country volatility of relative prices. The authors find that distance, unit-shipping costs, and exchange rate variability, collectively, explain a substantial portion of the observed international market segmentation. Relative wage variability, on the other hand, has little independent impact on segmentation.

Thirteenth Annual NBER-CEPR-TCER Conference

The NBER held its Thirteenth Annual NBER-CEPR-TCER conference, on the topic of unemployment, in Tokyo on December 15 and 16. Yoshio Higuchi, Keio University; Takeo Hoshi, TCER and University of California, San Diego; and Sadao Nagaoka, TCER and Hitotsubashi University, organized the program and chose these papers for discussion:

David G. Blanchflower, NBER and Dartmouth College, "Unemployment, Well-being and Wage Curves in Eastern Europe"
Discussant: Yoshio Higuchi

Yuji Genda, TCER and Gakushuin University, and **Masako Kurosawa**, Meijigakuin University, "Transition from School to Work in Japan"
Discussant: Kuramitsu Muramatsu, Nanzan University

John M. Abowd, NBER and Cornell University; **Francis Kramarz**, CEPR and INSEE-CREST; **David N. Margolis**, Université de Paris; and **Kenneth R. Troske**, University of Missouri, Columbia, "The Relative Importance of Employer and Employee Effects on Compensation: A Comparison of France and the United States"
Discussant: Isao Ohashi, Hitotsubashi University

Eugene Kandel, Hebrew University, and **Neil D. Pearson**, University of Illinois, Champaign-Urbana, "Flexibility versus Commitment in Personnel Management"
Discussant: Hideshi Itoh, Hitotsubashi University

Takao Kato, Colgate University, "The End of 'Lifetime Employment' in Japan? Evidence from National Surveys and Field Research"
Discussants: Masanori Hashimoto, Ohio State University, and Jennifer Corbett, CEPR and Oxford University

Michèle Belot and **Jan C. van Ours**, Tilberg University, "Unemployment and Labor Market Institutions: An Empirical Analysis"
Discussants: Shin-Ichi Fukuda, TCER and University of Tokyo, and Yuji Genda

Masahiro Abe, Dokkyo University, and **Souichi Ohta**, Nagoya University, "Industry Characteristics and Unemployment Fluctuations"
Discussants: Hiroshi Fujiki, Bank of Japan, and Masanori Hashimoto

Blanchflower studies the labor markets of 21 Eastern European countries using survey data on over 200,000 individuals for 1990–7. Using a variety of attitudinal measures, he finds that East Europeans report being less contented than their West European counterparts. Men, the young, the most educated, students, and the employed, particularly the self-employed, most strongly support the changes that have occurred in Eastern Europe. Support for market reforms actually dropped from the early 1990s to the mid-1990s; by 1997, it had risen somewhat but not returned its high levels of the early 1990s. Generally, job satisfaction levels in Eastern Europe are lower than in Western Europe, but the gap has closed slightly.

Using retrospective data on work experiences for youth in Japan, **Genda** and **Kurosawa** find that the labor market conditions when the workers first entered the laborforce after leaving school have a significant and lasting impact on the employment experiences of workers in their teens and twenties. An increase in the unemployment rate at the time of labor market entry reduces the probability of getting full-time regular jobs and raises the probability of workers leaving employers because of lower quality job matches. The vocational guidance or recommendations that future workers receive at school can be effective in raising job match quality, though. Finally, the adverse effect of the initial unemployment rate on job opportunities is observed most profoundly among female college graduates.

Abowd, Kramarz, Margolis, and **Troske** compare the French and U.S. pay systems. They find that for France, individual characteristics and establishment effects explain more of the variability in compensation than in the United States. The relationship between individual and establishment compensation and firm performance—including value-added per worker, sales per worker, and profit per unit of capital—exhibits important similarities and differences between the two countries. In general, higher paid workers—either because of individual characteristics or establishment effects—are employed in firms that are more productive. In France, higher pay as a result of enterprise heterogeneity is associated with higher profitability. In the United States, it is associated with lower profitability.

Kandel and **Pearson** compare HR policies in Japan and the United States and model the trade-off between the flexibility to adjust the labor force and the higher productivity that stems from a firm's commitment to its employees. They assume two types of employment contracts: a permanent contract, which precludes dismissal at will and a temporary contract, with higher labor cost per unit of output, which allows the flexibility to adjust the firm's labor force during downturns

in demand. The results of their model are consistent with the stylized facts in the literature. Also, after estimating the value of flexibility for a firm, they suggest that adopting long-term contracts in the "wrong" environment can significantly reduce the firm value.

Using survey data and field research, **Kato** shows that, despite popular rhetoric on "the end of lifetime employment" (or implicit long-term employment contracts for the regular workforce) in Japan, the celebrated practice endures. Specifically, he finds little evidence for any major decline in the job retention rates of Japanese employees from the period prior to the burst of the bubble economy in the late 1980s to the post-bubble period. Instead, large firms in Japan have been doing everything they can to avoid laying off workers. However, the measured job retention rates may overstate the importance of long-term employment in recent years. Finally, Kato finds that the burden of downsizing appears to fall disproportionately on young workers and on middle-aged workers with shorter tenure.

The development of the unemployment rate differs substantially among OECD countries. **Belot** and **van Ours** investigate to what extent these differences are related to labor market institutions. In their analysis, they use data from 18 OECD countries over the period 1960–94 and show that the way in which institutions interact is important.

Through the 1990s, the Japanese employment situation grew steadily worse. **Abe** and **Ohta** investigate the causes of this increasing unemployment using individual data on male workers over the 12 years from 1988 to 1999. The authors find that the declining inflow probabilities in the construction, service, and manufacturing industries greatly affected the deteriorating state of the macro-unemployment rate. They also find that fluctuations in the unemployment rate depend a great deal on the crowding effect in unemployment. One reason for this strong crowding effect is that unemployed people seek employment in the same industry, and movement across industries is difficult. Finally, although the recent advancements in technology cannot explain it, the inflow probability for less educated and part-time workers and for people who are not working improved in the late 1990s.

These papers will appear in a special edition of the *Journal of Japanese and International Economies.*

Economic Reform in India

On December 18–20, 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 to discuss the current economic scene in India. **Raghuram G. Rajan**, NBER and University of Chicago, organized the conference jointly with **Subir Gokarn** of NCAER.

The U.S. participants were: Kaushik Basu, Cornell University; Eli Berman, NBER and Boston University; Jagdish Bhagwati, NBER Director and Columbia University; Kathleen Cooper, NBER Director and Exxon Corporation; Mihir Desai, Martin Feldstein, Andrei Shleifer, and David Wise, NBER and Harvard University; Anne Krueger, NBER and Stanford University; Andrew Samwick, NBER and Dartmouth College; and Luigi Zingales, NBER and University of Chicago.

After introductory remarks by NBER President Feldstein and Rakesh Mohan of NCAER, the participants discussed: the world trade order; current issues in public finance; the concept of fiscal federalism; current issues in corporate finance; the analysis, management, and regulation of risk; corporate governance; and social security.

Bureau News

Economic Fluctuations and Growth

The fall research meeting of the NBER's Program on Economic Fluctuations and Growth took place in Chicago on October 27. Steven J. Davis, NBER and University of Chicago, and Peter J. Klenow, Federal Reserve Bank of Minneapolis, organized the program and chose the following papers for discussion:

George-Marios Angeletos, Jeremy Tobacman, and **Stephen Weinberg,** Harvard University; **David I. Laibson,** NBER and Harvard University; and **Andrea Repetto,** University of Chile, "The Hyperbolic Buffer Stock Model: Calibration, Simulation, and Empirical Evaluation"

Discussants: Jonathan A. Parker, Princeton University, and David E. Altig, Federal Reserve Bank of Cleveland

Francesco Caselli, NBER and Harvard University, and **Wilbur J. Coleman II,** Duke University, "The World Technology Frontier" (NBER Working Paper No. 7904)

Discussants: Per Krusell, University of Rochester, and Jaume Ventura, NBER and MIT

K. Daron Acemoglu, NBER and MIT; **Simon Johnson,** MIT; and **James A. Robinson,** University of California, Berkeley, "The Colonial Origins of Comparative Development: An Empirical Investigation" (NBER Working Paper No. 7771)

Discussants: Kenneth K. Sokoloff, NBER and University of California, Los Angeles, and Robert E. Hall, NBER and Stanford University

Jeffrey R. Campbell, NBER and University of Chicago, and **Jonas D. M. Fisher,** Federal Reserve Bank of Chicago, "Idiosyncratic Risk and Aggregate Employment Dynamics" (NBER Working Paper No. 7936)

Discussants: John C. Haltiwanger, NBER and University of Maryland, and Richard Rogerson, NBER and University of Pennsylvania

Andrew G. Atkeson and **Patrick J. Kehoe,** Federal Reserve Bank of Minneapolis, "The Transition to a New Economy"

Discussants: Peter Howitt, Brown University, and Robert J. Gordon, NBER and Northwestern University

Judith A. Chevalier and **Anil K Kashyap,** NBER and University of Chicago, and **Peter E. Rossi,** University of Chicago, "Why Don't Prices Rise During Periods of Peak Demand? Evidence from Scanner Data" (NBER Working Paper No. 7981)

Discussants: Julio J. Rotemberg, NBER and Harvard University, and Valerie A. Ramey, NBER and University of California, San Diego

Laboratory and field studies of time preference find that discount rates are much greater in the short run than in the long run. Hyperbolic discount functions capture this property. In their paper, **Angeletos, Tobacman, Weinberg, Laibson,** and **Repetto** present simulations of the savings and asset allocation choices of households with hyperbolic preferences. They compare the behavior of the "hyperbolic households" to that of "exponential households." The authors find that the hyperbolic households hold relatively more illiquid wealth and relatively less liquid wealth. The hyperbolic households also exhibit greater comovement between consumption and income and experience a greater drop in consumption around retirement. The hyperbolic simulations match observed consumption and balance sheet data much better than the exponential simulations do.

Caselli and **Colemann** define a country's technology as a trio of efficiencies: one for unskilled labor, one for skilled labor, and one for capital. The authors then find that the efficiency of unskilled labor and the efficiencies of skilled labor and capital are negatively correlated across countries. They interpret this as evidence of a "world technology frontier." On this frontier, increases in the efficiency of unskilled labor come at the cost of declines in the efficiency of skilled labor and capital. Caselli and Colemann estimate a model in which firms in each country optimally choose their technology subject to a technology frontier. The optimal choice of technology depends on the country's endowment of skilled and unskilled labor, so that the model is one of appropriate technology. The estimation allows for country-specific technology frontiers, attributable to barriers to technology adoption. The authors find that poor countries disproportionately tend to be inside the world technology frontier.

Acemoglu, Johnson, and **Robinson** argue that Europeans adopted very different policies on

colonization with distinct associated institutions in their various colonies. The choice of colonization strategy was determined, at least in part, by whether Europeans could settle in the colony. In places where Europeans faced high mortality rates, they could not settle, and they were thus more likely to set up extractive institutions. These early institutions have persisted to this day. By exploiting differences in mortality rates faced by soldiers, bishops, and sailors in the seventeenth, eighteenth, and nineteenth century colonies as an instrument for current institutions, the authors estimate that these institutions have large effects on per capita income. The estimates imply that differences in institutions explain approximately three-quarters of the per capita income differences across former colonies. After controlling for the effect of institutions, the authors find that countries in Africa, or closer to the equator, do *not* have lower incomes.

Campbell and **Fisher** study how producers' idiosyncratic risks affect an industry's aggregate dynamics in an environment in which certainty equivalence fails. In the model, producers can place workers in two types of jobs, organized and temporary. Workers are less productive in temporary jobs, but creating organized jobs requires the irreversible investment of managerial resources. Increasing productivity risk raises the value of an unexercised option to create an organized job. Losing this option is one cost of immediate organized job creation, so an increase in its value induces substitution toward cheaper temporary jobs. Because these jobs are costless to create and destroy, a producer using temporary jobs can be more flexible, responding more to both idiosyncratic and aggregate shocks. If all of an industry's producers adapt to heightened idiosyncratic risk in this way, then the industry as a whole can respond more to a given aggregate shock. This insight helps to explain the observation from the U.S. manufacturing sector that groups of plants displaying high idiosyncratic variability also have large aggregate fluctuations.

During the Second Industrial Revolution, from 1860–1900, a large number of new technologies, including electricity, were invented. These inventions launched a transition to a new economy: 70 years of ongoing rapid technical change. However, following this revolution, there was a delay of several decades before growth in both output and productivity rose to new levels. Historians hypothesize that this delay was caused by the slow diffusion of the new technologies that were embodied in the design of new plants, combined with the ongoing learning in plants after they had adopted the new technologies. Motivated by these hypotheses, **Atkeson** and **Kehoe** build a quantitative model of this transition and show that it implies both slow diffusion and a delay in growth similar to that in the data.

Chevalier, Kashyap, and **Rossi** examine the retail and wholesale prices of a large supermarket chain in Chicago over seven and a half years. They show that prices tend to fall during the seasonal demand peak for a product and that changes in retail margins account for most of those price changes. This research adds to the growing body of evidence that markups are countercyclical. The pattern of margin changes is consistent with "loss leader" models, such as the Lal and Matutes (1994) model of retailer pricing and advertising competition. Other models of imperfect competition are less consistent with retailer behavior. The authors find that manufacturer behavior plays only a limited role in the countercyclicality of prices.

Public Economics

The NBER's Program on Public Economics met in Cambridge on November 2–3. Program Director James M. Poterba of MIT served as organizer and chose the following papers for discussion:

Shlomo Yitzhaki, NBER and Hebrew University, "A Public Finance Approach to Assessing Poverty Alleviation"

Discussant: Holger Sieg, NBER and Duke University

Karen E. Dynan, Federal Reserve Board, **Jonathan S. Skinner,** NBER and Dartmouth College, and **Stephen P. Zeldes,** NBER and Columbia University, "Do the Rich Save More?" (NBER Working Paper No. 7906)

Discussant: Christopher D. Carroll, NBER and John Hopkins University

Louis Kaplow, NBER and Harvard University, "A Framework for Assessing Estate and Gift Taxation" (NBER Working Paper No. 7775)

Discussant: Antonio Rangel, NBER and Stanford University

Julie B. Cullen, NBER and University of Michigan, **Steven D. Levitt,** NBER and University of Chicago, and **Brian Jacob,** University of Chicago, "The Impact of School Choice on Student Outcomes: An Analysis of the Chicago Public Schools" (NBER Working Paper No. 7888)

Discussant: Cecelia E. Rouse, NBER and Princeton University

Francesco Caselli, NBER and Harvard University, and **Massimo Morelli,** University of Minnesota, "Bad Politicians"

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

Aaron Yelowitz, NBER and University of California, Los Angeles, "Public Housing and Labor Supply"

Discussant: Mark G. Duggan, NBER and University of Chicago

Roger H. Gordon, NBER and University of Michigan, and **Young Lee,** University of Maryland, "Do Taxes Affect Corporate Debt Policy? Evidence from U.S. Corporate Tax Return Data" (NBER Working Paper No. 7433)

Discussant: Mihir A. Desai, NBER and Harvard University

Yitzhaki compares cost-benefit analysis and tax reform. He shows that both concepts can be handled by the same method: in both, there is a need to define social distributional weights and to evaluate the marginal efficiency of public funds. He suggests that the social distributional weights be derived from popular indexes of inequality. This would enable the decomposition of the impact of tax reform on growth and redistribution, allowing one to evaluate the trade-off between the two.

The issue of whether households with higher lifetime incomes save a larger fraction of their income is important to the evaluation of tax and macroeconomic policy. **Dynan, Skinner,** and **Zeldes** consider the various ways in which life-cycle models can generate differences in saving rates by income groups: by changing Social Security benefits, time preference rates, non-homothetic preferences, bequest motives, uncertainty, and consumption floors. They find a strong positive relationship between personal saving rates and lifetime income. The data do not support theories relying on time preference rates, non-homothetic preferences, or variations in Social Security benefits. Instead, the evidence is consistent with models in which precautionary saving and bequest motives drive variations in saving rates across income groups. Finally, the authors illustrate how models that assume a constant rate of saving across income groups can yield erroneous predictions.

Whether and how estates and gifts should be taxed has long been a controversial subject, and the approach to estate and gift taxation varies among developed countries. **Kaplow** examines the conceptual basis for various arguments for and against the current estate and gift tax regime and proposed alternatives. He then considers the integration of policy analysis of transfer taxation with analysis of the rest of the tax system, notably, the income tax. How would it be optimal to tax transfers if they are viewed simply as one of many forms of expenditure by donors? And, how do the distinctive features of gifts and bequests alter the conclusions? Kaplow discusses the importance of different transfer motives and reconsiders the analysis in light of the importance of: human capital in intergenerational transfers; differences between inter vivos transfers and bequests; differences between gifts to individuals and gifts to charitable institutions; differences among gifts to donees having varying relationships to the donor; and the possibility that transfers are not explained by maximizing behavior.

Cullen, Jacob, and **Levitt** explore the impact of school choice through the open enrollment program of the Chicago Public Schools (CPS). Roughly half of the students within the CPS opt out of their assigned high school to attend other neighborhood schools or special career academies and magnet schools. Students who opt out are more likely to graduate than observationally similar students who remain at their assigned schools. However, except for those attending career academies, the gains appear to be driven by the fact that the more motivated students are disproportionately likely to opt out. Students with easy geographical access to a

range of schools, other than career academies, are no more likely to graduate on average than students in more isolated areas. Open enrollment apparently benefits those students who take advantage of having access to vocational programs without harming those who do not.

Caselli and Morelli present a simple theory of the quality of elected officials. Quality has (at least) two dimensions: competence and honesty. Voters prefer competent and honest policymakers, so high-quality citizens have a greater chance of being elected to office. But low-quality citizens have a "comparative advantage" in pursuing elective office because their market wages are lower than the market wages of high-quality citizens (competence), and/or because they reap higher returns from holding office (honesty). In the political equilibrium, the average quality of the elected body depends on the structure of rewards from holding public office. Under the assumption that the rewards from office increase with the average quality of office holders, there can be multiple equilibriums in quality. Under the assumption that incumbent policymakers set the rewards for future policymakers, there can be path dependence in quality.

Yelowitz explores how public housing rules affect the work behavior of female-headed households. The public housing program's generosity varies by metropolitan area. It also varies over time, through year-to-year changes in the subsidy and income eligibility limit. And, unlike other welfare programs, the housing benefits vary based on the sex composition of the children. For example, a family with one boy and one girl gets a three-bedroom apartment or voucher, while a family with two boys or two girls gets a two-bedroom apartment or voucher. Yelowitz finds that the public housing rules induce labor supply distortions. Among female-headed households, a one-standard deviation increase in the subsidy reduces labor force participation by 3.6–4.2 percentage points from a baseline participation rate of 70–75 percent.

Using data on all U.S. corporations, **Gordon** and **Lee** estimate the effects of changes in corporate tax rates on the debt policies of firms of different sizes. Small firms face very different tax rates than larger firms, and relative tax rates also have changed frequently over time, providing substantial information to identify tax effects. Their results suggest that taxes have had a strong and statistically significant effect on debt levels. For example, cutting the corporate tax rate by 10 percentage points (for example, from 46 percent to 36 percent) and holding personal tax rates fixed will reduce the fraction of assets financed with debt by around 3.5 percent. Since small firms normally rely much more heavily on debt finance yet face much lower tax incentives to use debt, the estimated effect of taxes would be strongly biased downwards if there were no controls for firm size.

Asset Pricing

The NBER's Program on Asset Pricing met in Cambridge on November 3. Jacob Boudoukh, NBER and New York University, and Jiang W. Wang, NBER and MIT, organized the program and chose the following papers for discussion:

John Y. Campbell and **Luis M. Viceira**, NBER and Harvard University, and **Lewis Chan**, Hong Kong University of Science and Technology, "A Multivariate Model of Strategic Asset Allocation"

Discussant: Anthony Lynch, New York University

Joao F. Gomes, Leonid Kogan, and **Lu Zhang**, University of Pennsylvania, "Equilibrium Cross Section of Returns"

Discussant: Jonathan Berk, NBER and University of California, Berkeley

Qiang Dai, New York University, "From Equity Premium Puzzle to Expectations Puzzle: A General Equilibrium Production Economy of Stochastic Habit Formation"

Discussant: John H. Cochrane, NBER and University of California, Los Angeles

Nicholas C. Barberis, NBER and University of Chicago, and **Ming Huang**, Stanford University, "Mental Accounting, Loss Aversion, and Individual Stock Returns"

Discussant: John Heaton, NBER and University of Chicago

Erzo G. J. Luttmer and **Thomas Mariotti**, London School of Economics, "Subjective Discounting in an Exchange Economy"

Discussant: Stanley Zin, NBER and Carnegie Mellon University

Michael W. Brandt, NBER and University of Pennsylvania, **Qi Zeng**, University of Pennsylvania, and **Lu Zhang**, "Equilibrium Stock Return Dynamics under Alternative Rules of Learning about Hidden States"

Discussant: Pietro Veronesi, University of Chicago

Campbell, **Chan**, and **Viceira** show how the predictability of asset returns can affect the portfolio choices of long-lived investors who value wealth not for its own sake but for the consumption it can support. The authors develop an approximate solution method for the optimal consumption-and-portfolio-choice

problem of an infinitely-lived investor with Epstein-Zin utility who faces a set of asset returns described by a vector autoregression in returns and state variables. Their empirical estimates, based on long-run annual and postwar quarterly U.S. data, suggest that the predictability of stock returns greatly increases the optimal demand for stocks. Nominal bonds have only a small role in optimal long-term portfolios. The authors extend the analysis to consider long-term inflation-indexed bonds and find that extremely conservative investors should hold large positions in these bonds when they are available.

Gomes, **Kogan**, and **Zhang** explicitly link expected stock returns to firm characteristics—such as firm size and book-to-market (B/M) ratio—in a dynamic general equilibrium production economy. Although stock returns in the model are characterized by an intertemporal Capital Asset Pricing Model (CAPM) with the market portfolio as the only factor, both size and B/M play separate roles in describing the cross section of returns. These two firm characteristics appear to predict stock returns because they are correlated with the true conditional market beta of returns. These cross-sectional relations can persist even after controlling for a typical empirical estimate of market beta. This supports the view that the documented ability of size and B/M to explain the cross section of stock returns is not necessarily inconsistent with a single-factor conditional CAPM.

Dai develops a general equilibrium model for a representative agent production economy with stochastic internal habit formation. The model Dai describes has a scale-independent economy with a unique stochastic investment opportunity set. Local correlation between the stochastic interest rate and the time-varying market price of risk can be determined endogenously and leads to correct predictions of the sign and magnitude of several major empirical puzzles in both equity and bond markets. Dai shows that the equity premium puzzle, the risk-free rate puzzle, and the expectations puzzle are completely resolved under reasonable parameter values. Thus, he establishes the inextricable link between the equity and bond markets, both theoretically and empirically.

Barberis and **Huang** study equilibrium asset prices in a model where investors are loss averse, paying particular attention to what they are loss averse about. The authors consider two possibilities, which correspond to different assumptions about how people do mental accounting or about how they evaluate their investment performance. In one case, investors track their performance stock by stock and are loss averse over individual stock fluctuations. In the other case, they measure their performance at the portfolio level, and are loss averse only over portfolio fluctuations. The authors find that loss aversion over individual stock fluctuations helps to explain a wide range of empirical facts, both in the time series and in the cross section. In simulated data, individual stock returns have a high mean excess volatility, and are slightly predictable in the time series. There are also large "value" and "size" premiums in the cross section. Investor loss aversion in terms of portfolio fluctuations is less successful in explaining the facts: individual returns are insufficiently volatile and excessively correlated, while the premiums for value and size largely disappear.

Luttmer and **Mariotti** describe the equilibrium of a discrete-time exchange economy in which consumers with arbitrary subjective discount factors and quasi-homothetic period utility functions follow linear Markov consumption and portfolio strategies. The authors provide an analytically convenient continuous-time approximation and show how subjective rates of time preference affect risk-free rates but not instantaneous risk-return trade-offs. They also examine the quantitative effects of hyperbolic discounting in an economy in which log endowments are subject to temporary and permanent shocks that are governed by a Feller (1951) square-root process. They find that hyperbolic and quasi-hyperbolic discount factors can significantly increase the volatility of aggregate wealth and raise the expected excess return on aggregate wealth.

Brandt, **Zeng**, and **Zhang** examine the properties of equilibrium stock returns in an incomplete information economy in which the agents need to learn the hidden state of the endowment process. They consider the case of optimal Bayesian learning and suboptimal learning, including near-rational learning, over- or underconfidence, optimism or pessimism, adaptive learning, and limited memory. They find that Bayesian learning can quantitatively explain long-run mean-reversion, predictability, volatility clustering, and leverage effects in stock returns. However, it cannot generate enough short-run momentum because any uncertainty about the state is resolved too quickly (that is, agents learn too fast). Among the suboptimal learning rules, only overconfidence can marginally improve some aspects of the model (that is, introduce short-run momentum) without substantially deteriorating other aspects.

Labor Studies

The NBER's Program on Labor Studies met in Cambridge on November 3. Program Director Richard B. Freeman and NBER Research Associate Lawrence F. Katz, both of Harvard University, chose these papers for discussion:

Aaron Yelowitz, NBER and University of California, Los Angeles, "Public Housing and Labor Supply" (see "Public Economics" for a description of this paper)

Joshua D. Angrist, NBER and MIT, "Economic and Social Consequences of Imbalanced Sex Ratios: Evidence from America's Second Generation"

Charles C. Brown, NBER and University of Michigan, "Relatively Equal Opportunity in the Armed Forces: Impacts on Children of Military Families"

Orley C. Ashenfelter, NBER and Princeton University, and **David Card**, NBER and University of California, Berkeley, "How Did the Elimination of Mandatory Retirement Affect Faculty Retirement?"

Steven J. Davis, NBER and University of Chicago, and **Paul Willen**, University of Chicago, "Occupation-Level Income Shocks and Asset Returns: Their Covariance and Implications for Portfolio Choice" (NBER Working Paper No. 7905)

Brian J. Hall, NBER and Harvard University, and **Kevin J. Murphy**, University of Southern California, "Stock Options for Undiversified Executives"

A combination of changing migration patterns and U.S. immigration restrictions resulted in a shift in the male-female balance in many ethnic groups in the early twentieth century. **Angrist** asks how this change in sex ratios affected the children of immigrants. He finds that higher sex ratios, defined as the number of men per woman, had a large positive impact on the likelihood of marriage for females. More surprising, perhaps, marriage rates among second-generation males were also an increasing function of immigrant sex ratios. This suggests that higher sex ratios also raised male earnings and the incomes of parents with young children. Changes in extended family structure associated with changing sex ratios complicate the interpretation of these findings. On balance, though, the results are consistent with theories in which higher sex ratios increase male competition in the marriage market.

Equal opportunity policy and market forces have made the military a distinctive institution in U.S. society. Blacks are well represented in the military, compared to the civilian sector. Integration of both work groups and housing started earlier and proceded more rapidly in the military. And, unlike many civilian jobs, the military provides medical care for both soldiers and dependents. While one might look for impacts of such relatively equal opportunities on a number of child outcomes, **Brown** focuses on the test scores of children in eighth grade. Data from the National Assessment of Educational Progress suggests that, while white children from military families score slightly higher than do their civilian counterparts, black children from military families do significantly better than their counterparts. The test score gap is about 40 percent smaller in the military than in civilian schools. Moreover, a variety of evidence suggests that this is not primarily attributable to enlistment policies that determine who is able to enter the armed forces.

Using information on retirement flows between 1986 and 1996 among older faculty at a large sample of four-year colleges and universities, **Ashenfelter** and **Card** attempt to measure the effect of the elimination of mandatory retirement. Comparisons of retirement rates before and after 1994, the year most institutions were forced to eliminate mandatory retirement, suggest that the abolition of compulsory retirement led to a dramatic drop in retirement rates for faculty aged 70 and 71. Comparisons of retirement rates in the early 1990s between schools that were still enforcing mandatory retirement and those that were forced to stop by state laws lead to the same conclusion. In the era of mandatory retirement, fewer than 10 percent of 70-year-old faculty were still teaching two years later. After the elimination of mandatory retirement, this fraction has risen to 50 percent. These findings suggest that most U.S. colleges and universities will experience a significant rise in the fraction of older faculty in the coming years.

Davis and **Willen** develop and apply a simple graphical approach to portfolio selection that accounts for covariance between asset returns and an investor's labor income. The authors apply the approach to occupation-level components of innovations in individual income estimated from the CPS and characterize several properties of these innovations, including their covariance with aggregate equity returns, long-term bond returns, and returns on several other assets. They find that aggregate equity returns are not correlated with the occupation-level

income innovations. A portfolio based on firm size is significantly correlated with income innovations for several occupations, though, as are selected industry-level equity portfolios. Applying their theory to the empirical results yields large predicted levels of risky asset holdings compared to observed levels, considerable variation in optimal portfolio allocations over the life cycle, and large departures from the two-fund separation principle.

Hall and **Murphy** use a certainty-equivalence framework to analyze the cost and value of, and pay/performance incentives provided by, nontradable options held by undiversified, risk-averse executives. They derive "Executive Value" lines — the risk-adjusted analogues to Black-Scholes lines — and distinguish between "executive value" and "company cost." Their findings suggest that the divergence between the value and cost of options explains or provides insight into virtually every major issue regarding stock option practice, including: executive views about Black-Scholes measures of options; tradeoffs between options, stock, and cash; exercise price policies; connections between the pay-setting process and exercise price policies; institutional investor views regarding options and restricted stock; option repricings; early exercise policies and decisions; and the length of vesting periods.

Behavioral Finance

The NBER's Working Group on Behavioral Finance met on November 10 in New Haven. Robert J. Shiller, NBER and Yale University, and Richard H. Thaler, NBER and University of Chicago, organized this program.

Nicholas C. Barberis, NBER and University of Chicago, and **Andrei Shleifer,** NBER and Harvard University, "Style Investing" (NBER Working Paper No. 8039)

Discussant: Sanford J. Grossman, NBER and University of Pennsylvania

Anna Scherbina, Northwestern University, "Stock Prices and Differences of Opinion: Empirical Evidence that Prices Reflect Optimism"

Discussant: Richard H. Thaler

Joseph Chen and **Harrison Hong,** Stanford University, and **Jeremy C. Stein,** NBER and Harvard University, "Breadth of Ownership and Stock Returns"

Discussant: Jeffrey A. Wurgler, Yale University

Brad M. Barber and **Terrance Odean,** University of California, Davis, and **Lu Zheng,** University of Michigan, "The Behavior of Mutual Fund Investors"

Discussant: William N. Goetzmann, NBER and Yale University

Louis K. C. Chan, University of Illinois, **Jason J. Karceski,** University of Florida, and **Josef Lakonishok,** NBER and University of Illinois, "The Level and Persistence of Growth Rates"

Discussant: Cliff Asness, AQR Capital Management, LLC

Jeffery S. Abarbanell, University of North Carolina, and **Reuven Lehavy,** University of California, Berkeley, "Biased Forecasts or Biased Earnings? The Role of Earnings Management in Explaining Apparent Optimism and Inefficiency in Analysts' Earnings Forecasts"

Discussant: Jay Patel, Boston University

Barberis and **Shleifer** study asset prices in an economy in which some investors classify risky assets into different styles and move funds back and forth between these styles depending on relative performance. News about one style can affect the prices of other apparently unrelated styles; assets in the same style will move together too much, while assets in different styles co-move together too little; and high average returns on a style will be associated with common factors unrelated to risk. These assumptions imply that style momentum strategies will be very profitable. The authors use their model to shed light on a number of puzzling features of the data.

Scherbina investigates how differences in opinions regarding stock valuations influence prices. She finds that stock prices are driven by investors with an optimistic outlook whenever market and institutional frictions prevent pessimistic investors from expressing their opinion. As a result, market prices are more likely to be higher than consensus valuations when there are substantial differences

of opinion. Using data on analysts' forecasts, Scherbina divides stocks into portfolios based on the dispersion in earnings forecasts and finds that portfolios containing stocks with highly dispersed forecasts on average earn 0.82 percent lower returns per month than portfolios with low-dispersion stocks. The difference in returns is more prominent for the low book-to-market and small stocks. She also documents that consensus forecasts are more upwardly biased the higher the dispersion in the underlying forecasts. This bias arises because the more pessimistic analysts choose not to issue a forecast for fear of jeopardizing their relationship with the management.

Chen, Hong, and **Stein** develop a model of stock prices in which there are differences of opinion among investors and constraints on short sales. Breadth of ownership is a valuation indicator in the model. When breadth is low—that is, when few investors have long positions in the stock — this is a signal that the short-sales constraint is tightly binding. It implies that prices are high relative to fundamentals and that expected returns therefore are low. Reductions (increases) in breadth thus should forecast lower (higher) returns. Another prediction of the model is that changes in breadth should be positively correlated with other variables that forecast increased risk-adjusted returns. Using quarterly data on mutual fund holdings over the period 1979–98, the authors find evidence supportive of both of these predictions.

Barber, Odean, and **Zheng** analyze the mutual fund purchase and sale decisions of over 30,000 households with accounts at a large U.S. discount broker for the six years ending in 1996. They document three primary results. First, investors buy funds with strong past performance; over half of all fund purchases occur in funds ranked in the top quintile of past annual returns. Second, investors sell funds with strong past performance and are reluctant to sell their losing fund investments. Investors are twice as likely to sell a winning mutual fund than a losing mutual fund. Thus, nearly 40 percent of fund sales occur in funds ranked in the top quintile of past annual returns. Third, investors are sensitive to the form in which fund expenses are charged. Although investors are less likely to buy funds with high transaction fees (for example, broker commissions or front-end load fees), their purchases are relatively insensitive to a fund's operating expense ratio. Given evidence on the persistence of mutual fund performance, the purchase of last year's winning funds seems rational. However, the authors argue that selling winning fund investments and neglecting a fund's operating expense ratio when purchasing a fund is clearly counterproductive.

Chan, Karceski, and **Lakonishok** analyze historical long-term growth rates across a broad cross-section of stocks using a variety of indicators of operating performance. They ask whether it is possible to predict which firms will achieve high future growth using attributes such as past growth, industry affiliation (technology versus nontechnology), book-to-market ratio, past return, and security analysts' long-term forecasts. Historically, some firms have attained very high growth rates, but this is relatively rare. Only about 5 percent of surviving firms do better than a growth rate of 29 percent per year over ten years. Moreover, there is very limited ability to identify beforehand which firms will be able to generate such high long-term growth in the future. The historical patterns thus raise strong doubts about the sustainability of many stocks' valuations. Looking forward, the past growth record does not suggest a high expected return on stocks in general.

Abarbanell and **Lehavy** demonstrate that relatively small numbers of large optimistic and small pessimistic errors in analysts' forecasts have a disproportional impact on the statistical measure relied on in the earlier literature for drawing inferences about analysts' incentives and their proclivity to issued biased findings. The authors indicate that there is a common empirical source that underlies evidence of bias and inefficiency in distributions of analysts' forecasts, two phenomena that previously have been analyzed as separate manifestations of analyst irrationality. Also, the authors find that analysts do not account completely for systematic forms of earnings management intended to create accounting reserves or to beat market earnings expectations slightly. Taken together, these findings provide a challenge to researchers to refine the existing judgment and the incentive-based explanations for systematic analyst forecast errors in order to account for the role of unusual reported earnings realizations. The results also raise the possibility that systematic "errors" characterize equilibriums in which analysts are completely rational and face symmetric incentives.

Corporate Finance

The NBER's Program on Corporate Finance met on November 10 in Cambridge. Rene M. Stulz, NBER and Ohio State University, chose these papers for discussion:

Luigi Guiso, University of Sassari, **Paola Sapienza,** Northwestern University, and **Luigi G. Zingales,** NBER and University of Chicago, "The Role of Social Capital in Financial Development" (NBER Working Paper No. 7563)

Discussant: Tarun Khana, Harvard University

Charles P. Himmelberg and **Inessa Love,** Columbia University, and **R. Glenn Hubbard,** NBER and Columbia University, "Investor Protection, Ownership, and Investments: Some Cross-Country Empirical Evidence"

Discussant: David S. Scharfstein, NBER and MIT

Julie Wulf, University of Pennsylvania, "Internal Capital Markets and Firm-Level Compensation Incentives for Division Managers"

Discussant: Antoinette Schoar, MIT

Michael J. Barclay, NBER and University of Rochester, **Clifford G. Holderness,** Boston College, and **Dennis P. Sheehan,** Pennsylvania State University, "The Block Pricing Paradox"

Discussant: Karen H. Wruck, Ohio State University

Brett Trueman, M. H. Franco Wong, and **Xiao-Jun Zhang,** University of California, Berkeley, "The Eyeballs Have It: Searching for the Value in Internet Stocks"

Discussant: Jay R. Ritter, University of Florida

Eugene F. Fama, University of Chicago, and **Kenneth R. French,** NBER and MIT, "The Equity Premium"

Discussants: G. William Schwert, NBER and University of Rochester, and Andrei Shleifer, NBER and Harvard University

To identify the effect of social capital on financial development, **Guiso, Sapienza**, and **Zingales** exploit the well-known differences in social capital and trust across different areas of Italy. In regions with high levels of social trust, households invest less in cash and more in stock, use more checks, have higher access to institutional credit, and make less use of informal credit. The effect of social capital is stronger where legal enforcement is weaker and among less-educated people. These results are not driven by omitted environmental variables, because the authors also show that the behavior of people who move is still affected by the level of social capital in the province where they were born.

Himmelberg, Love, and **Hubbard** investigate the effect of investor protection on corporate investment, emphasizing the endogeneity of ownership structure as one means of identifying firms operating under weak legal protections. Building on the idea that a weak legal environment increases the cost of external financing, the authors derive a model of investment in which changes in the marginal cost of capital are identified by changes in leverage and by the interactions of leverage with the concentration of inside equity ownership. Using firm-level data for a broad sample of 39 countries, they confirm that weaker legal protection empirically predicts higher concentrations of inside equity ownership. They also find that the marginal cost of capital is more sensitive to changes in leverage when inside equity ownership is highly concentrated. These results provide evidence that weak investor protection inhibits the efficient allocation of capital.

Using Compustat financial data and compensation data from a proprietary survey, **Wulf** finds that compensation and investment incentives are substitutes: firms that more strongly link firm performance to incentive compensation for division managers also provide weaker investment incentives through the capital budgeting process. Specifically, as the proportion of incentive pay for division managers that is based on firm performance increases, division investment is less responsive to division profitability. These findings are consistent with a model of influence activities by division managers and the implied relative weights placed on imperfect, objective signals (that is, accounting measures) versus distortable, subjective signals (that is, manager recommendations) in interdivisional capital allocation decisions.

Barclay, Holderness, and **Sheehan** examine the disparity in prices of large traded blocks of stock. On average, block trades are priced at an 11 percent premium to the post-announcement exchange price, while private placements are priced at a 19 percent discount. This paradox cannot be resolved by obvious considerations such as block size or liquidity. According to the authors, resolution comes from what happens after the transactions. Most block-trade purchasers become involved in management, suggesting that their premiums reflect anticipated private benefits from control. Most private-placement purchasers remain passive: firm value declines, and there are few acquisitions and little management turnover.

This suggests that discounts on private placements reflect implicit compensation for helping to entrench management, not for monitoring, or for providing certification.

Trueman, Wong, and **Zhang** show how the market uses limited accounting information and measures of Internet usage to value Internet firms. The authors do not find a significant association between bottom-line net income and their sample firms' market prices; this is consistent with some investors' claims that financial statement information is of very limited use in the valuation of Internet stocks. However, they do find that gross profits are positively and significantly associated with prices. In addition, they find that unique visitors and page views, as measures of Internet usage, provide incremental explanatory power for stock prices, over and above net income and its components. They also find significant differences in valuation between e-tailers and portal and content/community firms with respect to their financial data and measures of Internet usage.

Fama and **French** compare estimates of the equity premium for 1872–1999 from realized returns and the Gordon constant dividend growth model. The two approaches produce similar estimates of the real equity premium for 1872–1949, about 4 percent per year. But for 1950-99, the Gordon estimate of 3.4 percent per year is about 40 percent of the estimate from realized stock returns of 8.28 percent. The authors suggest that the difference between the two estimates for 1950–99 is largely attributable to unexpected capital gains, the result of a decline in discount rates to unusually low values at the end of the sample period. They conclude that the unconditional expected stock return of the last half-century is a lot lower than the realized average return.

Higher Education

The NBER's Working Group on Higher Education met in Cambridge on November 10. Charles T. Clotfelter, NBER and Duke University, organized the meeting at which the following papers were discussed:

Kelly Dugan, Charles Mullin, and **John Siegfried,** Vanderbilt University, "Undergraduate Financial Aid and Subsequent Alumni Giving Behavior"

Discussant: Bruce I. Sacerdote, NBER and Dartmouth College

Christopher Cornwell, David B. Mustard, and **Deepa Sridhar,** University of Georgia, "The Enrollment Effects of Merit Aid: Evidence from Georgia's HOPE Scholarship Program"

Discussant: Caroline M. Hoxby, NBER and Harvard University

Jerry G. Thursby, Purdue University, and **Marie C. Thursby,** NBER and Purdue University, "Who's Selling the Ivory Tower? Sources of Growth in University Licensing" (NBER Working Paper No. 7718)

Discussant: Paula E. Stephan, Georgia State University

Amy E. Schwartz, New York University, and **Benjamin P. Scafidi,** Georgia State University, "What's Happened to the Price of College? Quality Adjusted Price Indexes for Four-Year Colleges"

Discussant: A. Abigail Payne, University of Illinois

Todd R. Stinebrickner and **Ralph Stinebrickner,** University of Western Ontario, "The Importance of Nontuition Factors in Determining the Family Income–Schooling Relationship: Evidence from a Liberal Arts College with a Full Tuition Subsidy Program"

Discussant: Susan M. Dynarski, NBER and Harvard University

Michelle McLennan, Ursinus College, and **Susan L. Averett,** Lafayette College, "Black and White Women: Differences in College Attendance, Does the Rate of Return Matter?"

Discussant: Bridget T. Long, Harvard University

Dugan, Mullin, and **Siegfried** use data on 2,822 Vanderbilt University graduates to investigate alumni giving behavior during the eight years after graduation. They first estimate the likelihood of making a contribution and then the average gift size, conditional on contributing. They find that the type of financial aid received as an undergraduate has a greater influence on subsequent alumni generosity than the amount received. Adding some scholarship to a loan-only package, or eliminating all loans from a mixed loan-grant package, increases the likelihood of a subsequent contribution. Increasing the total size of the package, or altering the proportions of an already mixed package, appears to be inconsequential for future donations. The authors also find that students who receive small merit scholarships contribute more as alumni than students who receive either no merit scholarship or a large merit scholarship.

Georgia's lottery-funded HOPE Scholarship allows high-school students graduating with a "B" average to qualify for scholarships at degree-granting public or private colleges. Since HOPE's inception, more that $1 billion in scholarship funds have been disbursed to over a half million students. Exploiting HOPE as a natural experiment, **Cornell**, **Mustard**, and **Sridhar** contrast enrollment rates in Georgia with those in a set of control-group states from 1988–97. They find that HOPE has led to about an 8 percentage point increase, or an 11 percent rise, in the first-time-freshmen enrollment rate in Georgia. The 8 percentage point effect for all first-time freshmen is concentrated in four-year schools and roughly evenly split between public and private colleges. HOPE has induced increases of at least 10 and 20 percent, respectively, in the enrollment rates of four-year public and private schools. Finally, these results support the view that HOPE has served primarily to influence college choice, rather than to expand access.

Historically, the commercial use of university research has been viewed in terms of spillovers. But there has been a dramatic increase recently in technology transfer through licensing as universities attempt to appropriate the returns from faculty research. This change has prompted concerns regarding the source of the growth — specifically, whether it suggests a change in the nature of university research. **Thursby** and **Thursby** examine the extent to which the growth in licensing is attributable to the productivity of observable inputs or driven by a change in the propensity of faculty and administrators to engage in commercializing university research. They use survey data from 65 universities to calculate total factor productivity (TFP) growth in each stage of research. They augment the productivity analysis with survey evidence from businesses who license in university inventions. Their results suggest that increased licensing is primarily attributable to an increased willingness by faculty and administrators to license and to an increased business reliance on external R and D rather than a shift in faculty research.

According to estimates from the consumer price index (CPI), the "sticker" or "list price" of a college education in the United States has risen significantly faster since the earlier 1980s than the overall rate of inflation. This has raised considerable concern among policymakers, parents, and students that college attendance was becoming less and less affordable even as it was becoming more and more important for economic success in the job market. For the CPI, the government does not adjust the sticker price of college (tuition and fees) for scholarships awarded, discounts given, or for changes in the quality or characteristics of the services provided, such as attributes of the faculty, course offerings, or facilities. Thus, the estimated price indexes reflect changes in quality and characteristics of college as well as changes in prices. **Schwartz** and **Scafidi**, by contrast, develop and explore the construction of aid- and quality-adjusted price indexes for U.S. colleges, based on the estimation of hedonic models of the consumer price of college. They find that adjusting for financial aid and quality of services results in a net price increase of college costs over this time period that is 45 percent below the price increase in the current "college tuition and fees" price index in the CPI.

Researchers have long sought to better understand why a strong relationship between family income and educational attainment exists at virtually all levels of schooling. In part because of a recent increase in the disparity between the wages of college graduates and the wages of individuals with less than a college degree, researchers now want to know exactly why individuals from low-income families are less likely to graduate from college. Using unique new data obtained directly from a liberal arts school that maintains a full tuition subsidy program, **Stinebrickner** and **Stinebrickner** show that non-tuition reasons are very important. Their findings have implications for expensive policy programs such as the full tuition subsidy program recently approved by California.

McLennan and **Averett** focus on the college attendance decisions of women by race, and specifically whether they respond to the rate of return. Their results suggest that both black and white women are likelier to attend college if they are faced with higher rates of return. Further, early childbearing reduces the probability of attending college for both white and black women, even after controlling for family and individual background characteristics.

Health Care

The NBER's Program on Health Care met on November 17 at the Bureau's headquarters in Cambridge. Program Director Alan M. Garber of Stanford University presided over a day-long discussion of these topics:

"Economic Consequences of Health Insurance Reform"—Presentations and Roundtable Discussion

David M. Cutler, NBER and Harvard University, **Jonathan Gruber**, NBER and MIT, and **Mark B. McClellan**, NBER and Stanford University

"Is Health Insurance Affordable for the Uninsured?"

M. Kate Bundorf, NBER and Stanford University, and **Mark V. Pauly**, NBER and University of Pennsylvania

"Incentives in HMOs"

Martin S. Gaynor, NBER and Carnegie Mellon University, **James B. Rebitzer**, NBER and Case Western Reserve, and **Lowell J. Taylor**, Carnegie Mellon University

"Association between Intensity of Treatment and Mortality in Cohorts of Medicare Beneficiaries"

Elliott S. Fisher and **Therese A. Stukel**, Dartmouth College, and **David E. Wennberg**, Maine Medical Center

In the first of the day's discussions, **Gruber** analyzed the economic consequences of a national health insurance plan based on a structured approach to competition among private health plans, tax credits to subsidize health insurance purchase among low-income Americans, and other features to promote near-universal coverage. **McClellan** presented an analysis of a similar plan, and **Cutler** led a discussion of several issues in the valuation and costs of national health insurance financing proposals that incorporate competition among private insurance plans.

In their paper, **Bundorf** and **Pauly** investigate the meaning of the term "affordability" in the context of the purchase of health insurance. After proposing a definition and estimating the proportion of those currently uninsured who, by this definition, are unable to afford coverage, they find that health insurance actually was affordable for anywhere from 24 to 55 percent of the uninsured in 1998.

Gaynor, Rebitzer, and **Taylor** use unique proprietary data from an HMO network to analyze the effect of financial and other incentives on medical costs and quality. They report three findings: 1) costs fall as financial incentives for physicians to control costs increase; 2) nonfinancial features of the incentive system (notably peer pressure and mutual monitoring among physicians) may also influence costs; and 3) incentives can be structured so that cost control need not have a negative impact on quality. Indeed, the authors find that panels of physicians who controlled costs most effectively also had the highest score on quality indicators.

Studies of variations in regional medical practice find marked disparities in the amount of medical care provided to Medicare enrollees. **Fisher, Stukel,** and **Wennberg** ask whether the more intensive practice pattern observed in some regions results in improved health outcomes. They study the relationship between intensity of treatment and mortality in three groups of Medicare enrollees and find that Medicare enrollees residing in high-intensity regions have no better survival than those residing in regions where enrollees use less health care. After the initial episode of care, enrollees who lived in the highest intensity region received approximately 60 percent more care during the follow-up period than those in the lowest intensity regions. Yet, higher intensity treatment was not associated with improved survival. In fact, the authors observed slightly increased mortality as the intensity of medical practice increased.

Monetary Economics

Members and guests of the NBER's Program on Monetary Economics met in Cambridge on November 17. Program Director Ben S. Bernanke, also of Princeton University, organized this program.

Chang-Tai Hsieh, Princeton University, and **Christina D. Romer**, NBER and University of California, Berkeley, "Was the Federal Reserve Fettered? Devaluation Expectations in the 1932 Monetary Expansion"

Discussant: Richard Grossman, Wesleyan University

Glenn D. Rudebusch, Federal Reserve Bank of San Francisco, "Term Structure Evidence on Interest Rate Smoothing and Monetary Policy Inertia"

Discussant: Brian Sack, Federal Reserve Board

Lars E. O. Svensson, NBER and Stockholm University, and **Michael Woodford**, NBER and Princeton University, "Indicator Variables for Optimal Policy" (NBER Working Paper No. 7953)

Discussant: James Bullard, Federal Reserve Bank of St. Louis

James A. Kahn, Margaret M. McConnell, and **Gabriel Perez-Quiros**, Federal Reserve Bank of New York, "The Reduced Volatility of the U.S. Economy: Policy or Progress?"

Discussant: Jean Boivin, Columbia University

Esteban Jadresic, International Monetary Fund, "Can Staggered Price Setting Explain Short-Run Inflation Dynamics?"

Discussant: John Roberts, Federal Reserve Board

Aaron Tornell, NBER and University of California, Los Angeles, "Robust H-infinity Forecasting and Asset Pricing Anomalies" (NBER Working Paper No. 7753)

Discussant: James Stock, NBER and Harvard University

Hsieh and **Romer** consider the $1 billion expansionary open market operation undertaken in the spring of 1932 as a crucial case study of the link between monetary expansion and expectations of devaluation. They use data on forward exchange rates to measure expectations of devaluation during this episode but find little evidence that the large monetary expansion led investors to believe that the United States would devalue. The financial press and the records of the Federal Reserve System also show little evidence of expectations of devaluation or fear of a speculative attack. The authors find that a flawed model of the effects of monetary policy and conflict among the 12 Federal Reserve banks, rather than concern about the gold standard, led the Fed to suspend the expansionary policy in the summer of 1932.

A number of studies have used quarterly data to estimate monetary policy rules or reaction functions. These rules seem to imply a very slow adjustment of the policy interest rate: about 20 percent of the target per quarter. The conventional wisdom is that this gradual adjustment reflects policy inertia or interest rate smoothing behavior by central banks. However, **Rudebusch** notes that such slow quarterly adjustment implies predictable future variation in the policy rate at horizons of several quarters. In contrast, evidence from the term structure of interest rates suggests that there is no information about such changes in financial markets. Rudebusch provides an alternative interpretation: the large lag coefficients in the estimated policy rules may reflect persistent special factors that cause the central bank to deviate from the policy rule in unpredictable ways.

Svensson and **Woodford** derive and interpret the optimal weights on indicators in models with partial information about the state of the economy and forward-looking variables, for equilibriums under discretion and under commitment. They consider an example of optimal monetary policy with a partially observable potential output and a forward-looking indicator. The ideal response to the optimal estimate of potential output displays certainty-equivalence, while the optimal response to the imperfect observation of output depends on the noise in this observation.

The U.S. economy has experienced a dramatic decline in the volatility of both inflation and output since the early 1980s. **Kahn**, **McConnell**, and **Queros** examine two competing explanations for this. The first is the popular view that improved Fed policy since the late 1970s is chiefly responsible. The second view asserts that improvements in information technology have stabilized aggregate output variability, primarily through their effects on inventory behavior. The authors model the joint determination of output, inflation, and policy in an optimizing framework and argue that the technology story plays the primary role in explaining the relative stability of the last two decades.

While staggered price setting models are increasingly popular in macroeconomics, recent empirical studies question their ability to explain short-run inflation dynamics. **Jadresic** shows that a staggered price setting model that allows for a flexible distribution of price durations can replicate the persistence of inflation found in the data. The model also can explain the empiri-

cal regularity that, although inflation surprises are followed by a period of slow output growth, booms in output growth are followed by a period of high inflation. The distribution of price durations that yields these results, estimated from aggregate data on prices and other variables, is consistent with the microeconomic evidence suggesting that the duration of prices and wages is about a year on average, but that there is a great deal of heterogeneity across individual prices and wages.

Tornell presents an alternative expectation formation mechanism that helps rationalize well-known asset pricing anomalies, such as the predictability of excess returns, excess volatility, and the equity-premium puzzle. As with rational expectations (RE), the expectation formation mechanism that Tornell considers is based on a rigorous optimization algorithm that does not presume *misperceptions* — it simply departs from some of the implicit assumptions that underlie RE. The new element is that uncertainty cannot be modeled via probability distributions. Tornell considers an asset pricing model in which uncertainty is represented by unknown disturbance sequences, as in the H-infinity–control literature. Agents must filter the "persistent" and "transitory" components of a sequence of observations to make consumption and portfolio decisions. Tornell finds that H-infinity forecasts are more sensitive to news than RE forecasts and that equilibrium prices exhibit the anomalies previously mentioned.

Macroeconomics and Individual Decisionmaking

As part of the NBER's Project on Behavioral Macroeconomics, there was a meeting on "Macroeconomics and Individual Decisionmaking" in Cambridge on November 18. Project Directors George A. Akerlof, University of California, Berkeley, and Robert J. Shiller, NBER and Yale University, set the following agenda:

Xavier Gabaix, MIT, and **David I. Laibson**, NBER and Harvard University, "The 6D Bias and the Equity Premium Puzzle"

Discussant: Karen E. Dynan, Federal Reserve Board of Governors

George A. Akerlof, and **William T. Dickens** and **George L. Perry**, Brookings Institution, "Near-Rational Wage and Price Setting and the Long-Run Phillips Curve"

Discussant: Robert J. Shimer, NBER and Princeton University

Steven N. Durlauf, NBER and University of Wisconsin, "A Framework for the Study of Individual Behavior and Social Interactions"

Discussant: Russell W. Cooper, NBER and Boston University

Roland J. Benabou, NBER and Princeton University, and **Jean Tirole**, Universite des Sciences Sociales, Toulouse, "Willpower and Personal Rules"

Discussant: Botond Koszegi, University of California, Berkeley

Sendhil Mullainathan, NBER and MIT, "Thinking through Categories: A Model of Cognition"

Discussant: Edward D. O'Donoghue, Cornell University

David E. Lebow, **Raven E. Saks**, and **Beth Anne Wilson**, Federal Reserve Board of Governors, "Downward Nominal Wage Rigidity: Evidence from the Employment Cost Index"

Discussant: Shulamit Kahn, Boston University

If decision costs lead agents to update consumption only every D periods, then high-frequency data will exhibit an unusually low correlation between equity returns and consumption growth. **Gabaix** and **Laibson** characterize the dynamic properties of an economy composed of consumers who delay updating in this way. Using a Mehra-Prescott procedure, an econometrician would infer a coefficient of relative risk aversion biased upward by a factor of 6D. With quarterly data, if agents adjust their consumption every D = 4 quarters, the imputed coefficient of relative risk aversion will be 24 times greater than the true value. High levels of risk aversion implied by the equity premium and violations of the Hansen-Jaganathan bounds cease to be puzzles. The neoclassical model with delayed adjustment explains the consumption behavior of shareholders. Once limited participation is taken into account, the model matches the high-frequency properties of aggregate consumption and equity returns.

In their paper, **Akerlof**, **Dickens**, and **Perry** question the basic assumptions about how expectations of inflation are used. From evidence about how people actually use information in making decisions, they develop an alternative to the natural-rate model based on more realistic, near rational behavior. They find that rather than having a unique natural rate, the economy exhibits a range of sustainable unemployment rates consistent with low rates of inflation. The lowest sustainable unemployment rate is well below the natural rate as usually estimated and is associated with inflation rates moderately above zero.

Recent work in economics has

begun to integrate sociological ideas into the modeling of individual behavior. In particular, this new approach emphasizes how social context and social interdependency influence the ways in which individuals make choices. **Durlauf** provides an overview of an approach to integrating the theoretical and empirical analysis of such environments. His analysis is based on a framework in Brock and Durlauf (2000). In this paper, he assesses empirical evidence on behalf of this perspective and explores some of its policy implications.

Benabou and **Tirole** study internal commitment mechanisms or "personal rules" (diets, exercise regimens, resolutions, moral or religious precepts, and so on) through which people attempt to achieve self-discipline. The basic idea, which builds on Ainslie (1992), is that rules cause lapses to be interpreted as precedents, resulting in a loss of self-reputation that has an adverse impact on future self-control. The authors model the behavior of individuals who are unsure of their willpower, and they characterize rules as self-reputational equilibriums in which impulses are held in check by the fear of "losing faith in oneself." They then examine how equilibrium conduct is affected by opportunistic distortions of memory or inference, such as finding excuses for one's past behavior. The authors show that excessively rigid rules—anorexia, workaholism—can be understood as costly forms of self-signaling. In equilibrium, individuals are so afraid of appearing weak to themselves that every decision becomes a test of their willpower, even when the stakes are minor or when self-restraint is not desirable. The authors' results show that "salience of the future" is not only consistent with, but actually generated by, present-oriented preferences.

Mullainathan presents a model in which people use categories to think about the world around them. Faced with data, they first pick a category that best matches it. To make predictions, they ask how representative an outcome would be of the chosen category. This simple model unifies many of the experimentally documented biases: the law of small numbers, the hot hand, representativeness, and the conjunction fallacy. Moreover, the model provides enough structure that it results in readily testable out-of-sample predictions regarding these biases.

Lebow, **Saks**, and **Wilson** examine the extent of downward nominal wage rigidity using the microdata underlying the Bureau of Labor Statistics's employment cost index. This dataset has two significant advantages over those used previously. It is extensive, nationally representative, and based on establishment records. Thus it is free from much of the reporting error that has plagued work using the Panel Study of Income Dynamics and Current Population Survey. It also contains detailed information on benefit costs, allowing a first look at the rigidity of total compensation — arguably the more relevant measure from the firm's perspective. In general, the authors find significantly stronger evidence of downward nominal wage rigidity than did studies using panel data on individuals. Total compensation appears somewhat more flexible than wages and salaries. However, this increased flexibility does not seem to reflect the deliberate attempt by firms to use benefits to circumvent wage and salary rigidity.

Productivity and Technological Change

The NBER's Program on Productivity and Technological Change met at the Bureau's offices in Cambridge on December 1 to discuss "Technological Change and Institutional Structure." Manuel Trajtenberg, NBER and Tel Aviv University, organized the meeting. These papers were presented:

Philippe Aghion, Harvard University, **Christopher J. Harris**, King's College, Cambridge, **Peter Howitt**, Brown University, and **John Vickers**, All Souls College, Oxford, "Competition, Imitation, and Growth with Step-by-Step Innovation"

Ricardo J. Caballero, NBER and MIT, and **Mohamad L. Hammour**, CEPR and Delta, "Creative Destruction and Development: Institutions, Crises, and Restructuring" (NBER Working Paper No. 7849)

George P. Baker, NBER and Harvard University, and **Thomas N. Hubbard**, NBER and University of Chicago, "Make versus Buy in Trucking: Asset Ownership, Job Design, and Information"

Erik Brynjolfsson, MIT, and **Shinkyu Yang**, New York University, "Intangible Assets and Growth Accounting: Evidence from Computer Investments"

Susan C. Athey and **Scott Stern**, NBER and MIT, "The Impact of Information Technology on Emergency Health Care Outcomes" (NBER Working Paper No. 7887)

Aghion, Harris, Howitt, and **Vickers** ask whether more intense market competition and imitation are good for growth. They use an endogenous growth model with "step-by-step" innovations, in which technological laggards must first catch up with the leading-edge technology before battling for technological

leadership in the future. The authors find that the usual Schumpeterian effect of more intense product market competition (PMC) is almost always outweighed by the increased incentive for firms to innovate in order to escape competition; this means that PMC has a *positive* effect on growth. They also find that a little imitation almost always enhances growth, as it promotes more frequent neck-and-neck competition, but too much imitation unambiguously reduces growth. Thus, their model points to complementary roles for competition (antitrust) policy and patent policy.

Creative destruction, driven by experimentation and the adoption of new products and processes when investment is sunk, is a core mechanism of development. Generically, underdeveloped and politicized institutions are a major impediment to a well-functioning creative destruction process and result in sluggish creation, technological sclerosis, and spurious reallocation. Those ills reflect the macroeconomic consequences of contracting failures in the presence of sunk investments. Recurrent crises are another major obstacle to creative destruction. But **Caballero** and **Hammour** reject the common inference that increased liquidations during crises result in increased restructuring. Rather, they suggest that crises freeze the restructuring process, and this is associated with the tight financial-market conditions that follow. This productivity cost of recessions adds to the traditional costs of resource underutilization.

Both organizational economics and industrial organization seek to explain patterns of asset ownership in the economy. To that end, **Baker** and **Hubbard** develop a model of asset ownership in trucking. They test it by examining how the adoption of different classes of on-board computers (OBCs) from 1987 to 1997 influenced shippers to use their own trucks for hauls versus contracting with for-hire carriers. Baker and Hubbard find that OBCs' incentive-improving features pushed hauls toward private carriage, but their resource-allocation-improving features pushed them toward for-hire carriage. The authors conclude that ownership patterns in trucking reflect the importance of both incomplete contracts (Grossman and Hart, 1986) and job design and measurement issues (Holmstrom and Milgrom, 1994).

Brynjolfsson and **Yang** revise growth accounting methodology and address several puzzles regarding the rapid computer investments and the disappointing productivity performance after 1973 followed by the productivity surge of the late 1990s. They show that the computer-related portion of intangible investments is substantial and growing rapidly. In particular, the authors find that the magnitude of the intangible capital investments that accompany the computerization of the economy are far larger than the direct investments in computers themselves. The apparent productivity slowdown after 1973 may be in part an artifact of the omission of this capital accumulation from the national accounts. A revised estimate that takes the intangible investments into account indicates that the total factor productivity of the U.S. economy grew up to one percent per year faster during this period than previously estimated. If the ratio of intangible assets to computer investments has remained approximately constant, then the recent productivity surge may have been underestimated as well.

Athey and **Stern** analyze the productivity of technology and job design in emergency response (911) systems. During the 1990s, many systems adopted Enhanced 911 (E911) which used information technology to link automatic caller identification to a database of address and location information. Using data from Pennsylvania counties in 1994-6, when almost half of them experienced a change in technology, Athey and Stern analyze the health status of cardiac patients at the time of ambulance arrival; this should be improved by timely response. The authors find that E911 increases the short-term survival rates for patients with cardiac diagnoses by about one percent. They also find that E911 reduces hospital charges. Finally, the authors find that Emergency Medical Dispatching (EMD), where call-takers gather medical information, provide medical instructions over the telephone, and prioritize the allocation of ambulance and paramedic services, does not affect the E911 results. EMD and E911 are neither substitutes nor complements.

International Trade and Investment

The NBER's Program on International Trade and Investment met on December 1–2 at the NBER's offices in Palo Alto, California. Program Director Robert C. Feenstra, University of California, Davis, organized the meeting. The following papers were discussed:

James E. Anderson, NBER and Boston College, and **Eric van Wincoop**, Federal Reserve Bank of New York, "Gravity with Gravitas: A Resolution of the Border Puzzle"

Peter Debaere, University of Texas, "Testing New Trade Theory without Testing for Gravity: Reinterpreting the Evidence"

Donald R. Davis and **David E. Weinstein**, NBER and Columbia University, "A New Approach to Bilateral Trade Patterns and Balances"

Eckhard Janeba, NBER and University of Colorado, Boulder, "Global Corporations and Local Politics: A Theory of Voter Backlash"

Theo Eicher, University of Washington, Seattle, and **Thomas Osang**, Southern Methodist University, "Politics and Trade Policy: An Empirical Investigation"

James A. Levinsohn, NBER and University of Michigan, and **Wendy Petropoulos**, University of Michigan, "Creative Destruction or Just Plain Destruction? The U.S. Textile and Apparel Industries since 1972"

Robert C. Feenstra and **Gordon H. Hanson**, NBER and University of Michigan, "Intermediaries in Entrepot Trade: Hong Kong Reexports of Chinese Goods" (NBER Working Paper No. 8088)

Bruce A. Blonigen, NBER and University of Oregon, and **Ronald B. Davies**, University of Oregon, "The Effect of Bilateral Tax Treaties on U.S. FDI Activity" (NBER Working Paper No. 7929)

The gravity model has been widely used to infer that such institutions as customs unions and exchange rate mechanisms have substantial effects on trade flows. However, **Anderson** and **van Wincoop** show that the gravity model as usually estimated does not correspond to the theory behind it. They solve the "border puzzle" by applying that theory differently and find that national borders reduce trade between the United States and Canada by about 40 percent, while reducing trade among other industrialized countries by about 30 percent.

Debaere revisits the ongoing debate about empirical support for monopolistic competition models in international trade. He refutes the claim that monopolistic competition models, which should explain trade primarily among developed countries, find empirical support among just any group of non-OECD countries. After reexamining Helpman's 1987 analysis of trade-to-GDP ratios and country similarity, Debaere reintroduces trade-to-GDP ratios in the test equations for these models; this has the advantage of providing a zero-gravity test of New Trade Theory. The results therefore will not depend on the strong correlation between countries' size and their volume of trade.

The standard approach to bilateral trade patterns is the so-called "gravity model," which holds that bilateral trade volumes are proportional to the product of country GDPs and inversely proportional to bilateral distance. Though this model generates good fits with data, it has an important shortcoming: it posits that all traded goods are differentiated by source, predicting that trade volumes move smoothly with distance and size. If instead there are also homogeneous goods for which price is the principal determinant of bilateral trade patterns, then the standard gravity model needs to be supplemented with a model of bilateral trade in homogeneous goods. **Davis** and **Weinstein** implement such a dual approach to bilateral trade patterns for a sample of 61 countries and 30 industries. The countries and industries that appear to focus largely on homogenous goods trade are so identified in this empirical exercise. Moreover, the authors identify substantial improvements in predictions of bilateral trade patterns and balances.

Host governments often display two types of behavior toward outside investors. Initially, they compete eagerly by offering subsidy packages, but often they reverse these policies later. In contrast to the literature that explains this behavior as a result of a hold-up problem, **Janeba** argues that these policy reversals are the result of a change in the policy choice or the identity of the policymaker. Voters disagree over the net benefits of attracting corporations because of a redistributional conflict. Economic shocks change the identity of the policymaker over time by affecting the number of people who support the corporation, the incentive of an opponent to become a candidate, and the opponent's probability of winning the election against a proponent. Janeba also shows that societies with more income inequality are less likely to attract outside investment.

Eicher and **Osang** examine the empirical relevance of three prominent endogenous protection models. Is protection for sale, or do altruistic policymakers worry about political support? They find that protection is indeed "for sale." However, the existence of lobbies matter, as does the

relative size of the sectoral pro- and anti-protection contributions. The authors extend the previous tests of the Influence Driven approach (Grossman and Helpman, 1994), comparing its performance to well-specified alternatives. Using J-tests to directly compare the power of the models, they find significant misspecification in the Political Support Function approach. They cannot reject the null hypothesis of correct specification of the Influence Driven model, and they find evidence of some misspecification in the Tariff Function model (Findlay and Wellisz, 1982).

Levinsohn and **Petropoulos** use plant-level data to examine changes in the U.S. textile and apparel industries. They find that although industry-level evidence suggests that these industries are declining, some plants have experienced significant job creation, investment, and productivity gains. The authors make the case that these two industries are good examples of Schumpeterian Creative Destruction, but that this conclusion requires plant-level data, because the industry-level data paint a very pessimistic picture.

Feenstra and **Hanson** examine Hong Kong's role in intermediating trade between China and the rest of the world. Hong Kong distributes a large fraction of China's exports. Net of customs, insurance, and freight charges, reexports of Chinese goods are much more expensive when they leave Hong Kong than when they enter. Hong Kong markups on reexports of Chinese goods are higher for differentiated products, products with higher variance in export prices, products sent to China for further processing, and products shipped to countries that have less trade with China. These results are consistent with quality-sorting models of intermediation and with the outsourcing of production tasks from Hong Kong to China. Additional results suggest that Hong Kong traders price discriminate across destination markets and use transfer pricing to shift income from high-tax counties to Hong Kong.

The effects of bilateral tax treaties on foreign direct investment (FDI) activity have been unexplored, despite significant ongoing activities by countries to negotiate and ratify these treaties. **Blonigen** and **Davies** estimate the impact of bilateral tax treaties using both U.S. inbound and outbound FDI from 1966–92. Their estimates suggest a statistically significant average annual increase ranging from 2 to 8 percent of FDI activity for each additional year of a treaty, depending on the measure of FDI activity and the empirical framework the authors use. While treaties have an immediate impact on FDI flows, there is a substantial lag before treaty adoption positively affects FDI stocks and affiliate sales. Finally, the results suggest that bilateral tax treaties have an effect on investment beyond the withholding tax rates that they alter; this may include the commitment and risk reduction effects of these treaties.

Market Microstructure

Members and guests of the NBER's Market Microstructure Project met in Cambridge on December 8. Bruce Lehmann, University of California, San Diego; Andrew W. Lo, NBER and MIT; Matthew Spiegel, Yale University; and Avanidhar Subramanyam, University of California, Los Angeles, organized this program.

Michael J. Barclay, NBER and University of Rochester; **Terrence Hendershott**, University of Rochester; and **D. Timothy McCormick**, NASD, Inc., "Electronic Communications Networks and Market Quality"

Discussant: Robert Battalio, University of Notre Dame

Christine A. Parlour and **Uday Rajan**, Carnegie Mellon University, "Payment for Order Flow"

Discussant: Leslie Marx, University of Rochester

Charles M. Jones, Columbia University, "A Century of Stock Market Liquidity and Trading Costs"

Discussant: Joel Hasbrouck, New York University

Tarun Chordia, Emory University; **Richard Roll**, University of California, Los Angeles; and **Avanidhar Subrahmanyam**, "Market Liquidity and Trading Activity"

Discussant: Larry Glosten, Columbia University

Mark Peterson, Southern Illinois University, and **Erik Sirri**, Babson College, "Order Submission Strategy and the Curious Case of Marketable Limit Orders"

Discussant: Venkatesh Panchapagesan, Washington University

Barclay, **Hendershott**, and **McCormick** compare the execution quality of trades with market makers to trades on Electronic Communications Networks (ECNs). Average realized and effective spreads are smaller for ECN trades than for market-maker trades. The lower effective spreads for ECN trades are generated by lower quoted spreads at the time of the trade, and because market makers give more price improvement

to small trades than ECNs do. ECN trades are also more informative than trades with market makers. The authors show that increased trading on ECNs improves most measures of overall market quality. In the cross section, more ECN trading is associated with lower quoted, effective, and realized spreads, both overall and on trades with market makers. More ECN trading is also associated with less quoted depth.

Parlour and **Rajan** develop a dynamic model of price competition in broker and dealer markets. Competing market makers quote bid–ask spreads, and competing brokers choose a commission to be paid by an investor. Brokers also choose a routing strategy across market makers. Then, to minimize their total transaction costs, investors choose a broker. This environment changes the order mix and can make retail investors worse off. It leads to lower brokerage commissions but higher market-maker spreads, thereby increasing the total transactions cost for investors.

Jones assembles an annual time series of bid–ask spreads on Dow Jones stocks from 1898–1998, along with an annual estimate of the weighted-average commission rate for trading New York Stock Exchange stocks since 1925. Spreads gradually declined over the course of the century but are punctuated by sharp rises during periods of market turmoil. Proportional one-way commissions rise dramatically to a peak of nearly one percent in the late 1960s and early 1970s, and fall sharply following commission deregulation in 1975. The sum of half-spreads and one-way commissions, multiplied by annual turnover, is an estimate of the annual proportional cost of aggregate equity trading. This cost drives a wedge between aggregate gross equity returns and net equity returns. This wedge accounts for only a small part of the observed equity premium, though. All else equal, the gross equity premium is perhaps one percent lower today than it was early in the 1900s. Finally, Jones shows that these measures of liquidity — spreads and turnover — predict stock returns up to one year ahead. High spreads predict high stock returns; high turnover predicts low stock returns. This suggests that liquidity is an important determinant of conditional expected returns.

After studying spreads, depths, and trading activity for U.S. equities over an extended time sample, **Chordia**, **Roll**, and **Subrahmanyam** find that daily changes in market averages of liquidity and trading activity are highly volatile, negatively serially dependent, and influenced by a variety of factors. Liquidity plummets significantly in down markets but increases weakly in up markets. Trading activity increases in either up or down markets. Recent market volatility induces less trading activity and reduces spreads. There are strong day-of-the-week effects; Fridays are relatively sluggish and illiquid while Tuesdays are the opposite. Long- and short-term interest rates influence liquidity and trading activity. Depth and trading activity increase just prior to major macroeconomic announcements.

Peterson and **Sirri** compare the execution costs of market orders and marketable limit orders (that is, limit orders with the same trading priority as market orders) to provide empirical evidence on the order submission strategy of investors with similar commitments to trade. The results indicate that the unconditional trading costs of marketable limit orders are significantly greater than those of market orders. The authors attribute the difference in costs to a selection bias and show that the order submission strategy decision is based on prevailing market conditions, stock characteristics, and the type of investor. After correcting for the selection bias, their results suggest that the average trader chooses the order type with lower conditional trading costs.

Bureau Books

Innovation Policy and the Economy, Volume I

Innovation Policy and the Economy, edited by Adam B. Jaffe, Josh Lerner, and Scott Stern, is available from the MIT Press for $24.00 in paperback or $55.00 clothbound.

It may be ordered directly from the MIT Press at 5 Cambridge Center, Cambridge, MA 02142; or, by phone to 617-625-8569 or 1-800-356-0343. The MIT Press also has a web site: **http://mitpress.mit.edu/journals.tcl**

This volume is the first in a new annual series that will present 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: publicly funded science and the productivity of the pharmaceutical industry; creating markets for new vaccines; navigating the patent thicket; commercialization of the Internet; how the Bayh-Dole Act affected university patenting and licensing; and the potential role of government in the market for scientists and engineers.

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 in an assistant professor at MIT's Sloan School of Management.

The following volumes may be ordered directly from the University of Chicago Press, Order Department, 11030 South Langley Avenue, Chicago, IL 60628-2215, 1-800-621-2736. Academic discounts of 10 percent for individual volumes and 20 percent for standing orders for *all* NBER books published by the University of Chicago Press are available to university faculty; orders must be sent on university stationery.

Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey

Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey, edited by Magnus Blömstrom and Linda S. Goldberg, is available from the University of Chicago Press for $44.00. This NBER conference volume includes an introduction and the eight papers and comments presented at a celebration of the work of NBER Research Associate Robert E. Lipsey. The book is organized around three areas in which he has done important research: international comparisons of output and prices, international trade, and multinational firms. Both the conference and the volume honor Lipsey's contributions to economic research and his efforts to promote the work and careers of other international economists, including the contributors to this volume.

Blomström, a frequent coauthor of Lipsey, is an NBER Research Associate in International Trade and Investment and a professor of international economics at the Stockholm School of Economics. Goldberg, currently on leave from the NBER, is an assistant vice president of international research at the Federal Reserve Bank of New York.

International Taxation and Multinational Activity

International Taxation and Multinational Activity, edited by James R. Hines, is available from the University of Chicago Press for $43.00. This NBER conference volume includes an introduction and nine papers and comments on the global ramifications of tax policies. The analysis falls into three broad categories: the way in which taxation affects foreign direct investment; the effect of tax policies in encouraging international tax avoidance; and the relationship between tax incentives and international spillovers of technology.

Hines is a Research Associate in the NBER's Program in Public Economics and a professor of business economics at the University of Michigan Business School.

Current Working Papers

NBER Working Papers On-Line

A complete list of all NBER Working Papers with searchable abstracts and the full texts of Working Papers issued since November 1994 are available at **http://www.nber.org/wwp.html** to anyone located at a university or other organization that subscribes to the (hard copy) Working Paper series.

If you believe that your organization subscribes, but you cannot access the on-line Working Paper service, please e-mail the NBER at **wwp@nber.org** for more information and assistance.

*

Individual copies of NBER Working Papers, Historical Factors in Long-Run Growth Papers, and Technical Papers are available free of charge to Corporate Associates. **For all others, there is a charge of $10.00 per hardcopy or $5.00 per downloaded paper. (Outside the United States, add $10.00 per order for postage and handling.) Advance payment is required on all orders.** To order, call the Publications Department at (617) 868-3900 or visit **www.nber.org/papers**. Please have ready the number(s) of any Working Paper(s) you wish to order.

Subscriptions to the full NBER Working Paper series include all 500 or more papers published each year. Subscriptions are free to Corporate Associates. For others within the United States, the standard rate for a full subscription is $1850; for academic libraries and faculty members, $1070. Higher rates apply for foreign orders. **Partial Working Paper subscriptions**, delineated by program, are also available.

For further information, see our Web site, or please write: National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398.

*

Titles of all papers issued since November 2000 are presented below. For previous papers, see past issues of the *NBER Reporter*. Working Papers are intended to make results of NBER research available to other economists in preliminary form to encourage discussion and suggestions for revision before final publication. They are not reviewed by the Board of Directors of the NBER.

NBER Working Papers

Paper	Author(s)	Title
7998	Andrew B. Bernard Meghan R. Busse	Who Wins the Olympic Games: Economic Development and Medal Totals
7999	Charles T. Clotfelter	Interracial Contact in High School Extracurricular Activities
8000	Dora L. Costa	Understanding Mid-Life and Older Age Mortality Declines: Evidence from Union Army Veterans
8001	David F. Bradford Rebecca Shlieckert Stephen H. Shore	The Environmental Kuznets Curve: Exploring A Fresh Specification
8002	Eiji Ogawa Takatoshi Ito	On the Desirability of a Regional Basket Currency Arrangement

Paper	Author(s)	Title
8003	Edward J. Kane Tara Rice	Bank Runs and Banking Policies: Lessons for African Policymakers
8004	John J. Donohue III Steven D. Levitt	The Impact of Legalized Abortion on Crime
8005	Kyle Bagwell Robert W. Staiger	GATT-Think
8006	Guillermo A. Calvo Carmen M. Reinhart	Fixing for Your Life
8007	V. Joseph Hotz Guido W. Imbens Jacob A. Klerman	The Long-Term Gains from GAIN: A Re-Analysis of the Impacts of the California GAIN Program
8008	Lee J. Alston Andrés Gallo	Evolution and Revolution in the Argentine Banking System under Convertibility: The Roles of Crises and Path Dependence
8009	Mihir A. Desai James R. Hines Jr.	The Uneasy Marriage of Export Incentives and the Income Tax
8010	Michael M. Knetter Thomas J. Prusa	Macroeconomic Factors and Antidumping Filings: Evidence from Four Countries
8011	Jennifer L. Blouin Jana Smith Raedy Douglas A. Shackelford	The Impact of Capital Gains Taxes on Stock Price Reactions to S&P Inclusion
8012	Alan M. Taylor	A Century of Purchasing-Power Parity
8013	Gordon H. Hanson	Scale Economies and the Geographic Concentration of Industry
8014	John W. Budd Matthew J. Slaughter	Are Profits Shared Across Borders? Evidence on International Rent Sharing
8015	Lee Branstetter	Is Foreign Direct Investment a Channel of Knowledge Spillovers? Evidence for Japan's FDI in the United States
8016	Daniel S. Hamermesh	12 Million Salaried Workers Are Missing
8017	Luis Garicano Steven N. Kaplan	The Effects of Business-to-Business E-Commerce on Transaction Costs
8018	Paul Glewwe Michael Kremer Sylvie Moulin Eric Zitzewitz	Retrospective vs. Prospective Analysis of School Inputs: The Case of Flip Charts in Kenya
8019	David N. Figlio Maurice E. Lucas	What's in a Grade? School Report Cards and House Prices
8020	Laurence C. Baker	Managed Care and Technology Adoption in Health Care: Evidence from Magnetic Resonance Imaging
8021	Jonathan Gruber Michael Lettau	How Elastic is the Firm's Demand for Health Insurance
8022	Rodolfo E. Manuelli	Technological Change, the Labor Market and the Stock Market
8023	Michael J. Boskin Lawrence J. Lau	Generalized Solow-Neutral Technical Progress and Postwar Economic Growth

Paper	Author(s)	Title
8024	Ariel Pakes	A Framework for Applied Dynamic Analysis in I.O.
8025	Stefan Gerlach Lars E.O. Svensson	Money and Inflation in the Euro Area: A Case for Monetary Indicators?
8026	Alessandra Casella	Games for Central Bankers: Markets vs. Politics in Public Policy Decisions
8027	Alessandra Casella	Market Mechanisms for Policy Decisions: Tools for the European Union
8028	Michael A. Clemens Jeffrey G. Williamson	Where did British Foreign Capital Go? Fundamentals, Failures and the Lucas Paradox: 1870-1913
8029	Emmanuel Saez	The Desirability of Commodity Taxation under Non-Linear Income Taxation and Heterogenous Tastes
8030	Christopher L. House John V. Leahy	An sS Model with Adverse Selection
8031	David T. Ellwood Jeffrey B. Liebman	The Middle Class Parent Penalty: Child Benefits in the U.S. Tax Code
8032	Eric M. Engen William G. Gale	The Effects of 401(k) Plans on Household Wealth: Differences Across Earnings Groups
8033	Albert Ando	On the Japanese Economy and Japanese National Accounts
8034	Edward L. Glaeser Bruce Sacerdote	The Social Consequences of Housing
8035	Barry Eichengreen	The EMS Crisis in Retrospect
8036	Timothy Besley Stephen Coate	Issue Unbundling via Citizens' Initiatives
8037	Emmanuel Saez	The Optimal Treatment of Tax Expenditures
8038	Benoît Mulkay Bronwyn H. Hall Jacques Mairesse	Firm Level Investment and R&D in France and the United States: A Comparison
8039	Nicholas Barberis Andrei Shleifer	Style Investing
8040	Kjetil Storesletten Chris I. Telmer Amir Yaron	The Welfare Cost of Business Cycles Revisited: Finite Lives and Cyclical Variation in Idiosyncratic Risk
8041	William A. Brock Steven N. Durlauf	Growth Economics and Reality
8042	Josh Angrist	Consequences of Imbalanced Sex Ratios: Evidence from America's Second Generation
8043	Robert J. Barro Silvana Tenreyro	Closed and Open Economy Models of Business Cycles with Marked up and Sticky Prices
8044	Jean-Pierre Danthine Francesco Giavazzi Ernst-Ludwig von Thadden	European Financial markets After EMU: A First Assessment
8045	Amy Finkelstein James Poterba	Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market

Paper	Author(s)	Title
8046	Bruce A. Blonigen Christopher J. Ellis Dietrich Fausten	Industrial Groupings and Strategic FDI: Theory and Evidence
8047	Benjamin M. Friedman	The Role of Interest Rates in Federal Reserve Policymaking
8048	Roberton C. Williams	Health Effects in a Model of Second-Best Environmental Taxation or Reconsidering "Reconsidering the Tax-Interaction Effect"
8049	Roberton C. Williams	Environmental Tax Interactions When Pollution Affects Health or Productivity
8050	Richard B. Freeman Morris M. Kleiner Cheri Ostroff	The Anatomy of Employee Involvement and Its Effects on Firms and Workers
8051	Linda A. Bell Richard B. Freeman	The Incentive for Working Hard: Explaining Hours Worked Differences in the U.S. and Germany
8052	Brian J. Hall Kevin J. Murphy	Stock Options for Undiversified Executives
8053	Edward L. Glaeser José Scheinkman	Non-Market Interactions
8054	Eliana Garces Duncan Thomas Janet Currie	Longer Term Effects of Head Start
8055	David N. Figlio Marianne E. Page	School Choice and the Distributional Effects of Ability Tracking: Does Separation Increase Equality?
8056	Anne Case I-Fen Lin Sara McLanahan	Understanding Child Support Trends: Economic, Demographic, and Political Contributions
8057	Benjamin M. Friedman	Monetary Policy
8058	Richard B. Freeman Remco Oostendorp	Wages Around the World: Pay Across Occupations and Countries
8059	Ravi Bansal Amir Yaron	Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles
8060	Martin Schneider Aaron Tornell	Balance Sheet Effects, Bailout Guarantees and Financial Crises
8061	Esther Duflo	Grandmothers and Granddaughters: Old Age Pension and Intra-household Allocation in South Africa
8062	Shlomo Yitzhaki	A Public Finance Approach to Assessing Poverty Alleviation
8063	John C. Ham Lara D. Shore-Sheppard	The Effect of Medicaid Expansions for Low-Income Children on Medicaid Participation and Insurance Coverage: Evidence from the SIPP
8064	Jeffrey R. Brown Mark J. Warshawsky	Longevity-Insured Retirement Distributions from Pension Plans: Market and Regulatory Issues

Paper	Author(s)	Title
8065	Paul A. Heidenreich Mark McClellan Craig Frances Laurence C. Baker	The Relation Between Managed Care Market Share and the Treatment of Elderly Fee-For-Service Patients with Myocardial Infarction
8066	John H. Cochrane	The Risk and Return of Venture Capital
8067	Dennis W. Carlton Judith A. Chevalier	Free Riding and Sales Strategies for the Internet
8068	Andrew B. Bernard J. Bradford Jensen Peter K. Schott	Factor Price Equality and the Economies of the United States
8069	David Meltzer Jeanette Chung	Effects of Competition under Prospective Payment on Hospital Costs among High and Low Cost Admissions: Evidence from California, 1983–1993
8070	Jonathan Eaton Samuel Kortum	Trade in Capital Goods
8071	Michael Woodford	Inflation Stabilization and Welfare
8072	Michael Woodford	Fiscal Requirements for Price Stability
8073	Hyuk Choe Bong-Chan Kho Réne M. Stulz	Do Domestic Investors Have More Valuable Information About Individual Stocks Than Foreign Investors?
8074	Martin Feldstein Elena Ranguelova	Individual Risk in an Investment-Based Social Security System
8075	Nathalie Greenan Jacques Mairesse Agnes-Topiol-Bensaid	Information Technology and Research and Development Impacts on Productivity and Skills: Looking for Correlations on French Firm Level Data
8076	Sebastian Edwards	Capital Mobility and Economic Performance: Are Emerging Economies Different?
8077	Ellen R. McGrattan Edward C. Prescott	Is the Stock Market Overvalued?
8078	V. Joseph Hotz John Karl Scholz	The Earned Income Tax Credit
8079	James E. Anderson Eric van Wincoop	Gravity with Gravitas: A Solution to the Border Puzzle
8080	Bruce Sacerdote Edward L. Glaeser	Education and Religion
8081	Boyan Jovanovic Peter L. Rousseau	Why Wait? A Century of Life Before IPO
8082	Sewin Chan Ann Huff Stevens	Retirement Incentives and Expectations
8083	Daron Acemoglu Jaume Ventura	The World Income Distribution
8084	Robert E. Lipsey	Foreign Direct Investors in Three Financial Crises

Paper	Author(s)	Title
8085	Hans-Werner Sinn Michael Reutter	The Minimum Inflation Rate for Euroland
8086	Dennis W. Carlton Michael Waldman	Competition, Monopoly, and Aftermarkets
8087	Frederic S. Mishkin	Financial Policies and the Prevention of Financial Crises in Emerging Market Countries
8088	Robert C. Feenstra Gordon H. Hanson	Intermediaries in Entrepôt Trade: Hong Kong Re-Exports of Chinese Goods
8089	Lucian Arye Bebchuk David I. Walker	The Overlooked Corporate Finance Problems of a Microsoft Breakup
8090	Janet Currie V. Joseph Hotz	Accidents Will Happen? Unintentional Injury, Maternal Employment, and Child Care Policy
8091	Suzanne Doyle Olivia S. Mitchell John Piggott	Annuity Values in Defined Contribution Retirement Systems: The Case of Singapore and Australia
8092	John H. Boyd Ravi Jagannathan Jian Hu	The Stock Market's Reaction to Unemployment News: Why Bad News is Usually Good for Stocks
8093	Artyom Durnev Randall Morck Bernard Yeung	Does Firm-specific Information in Stock Prices Guide Capital Allocation?
8094	Edward P. Lazear	The Peter Principle: Promotions and Declining Productivity
8095	William D. Nordhaus	Alternative Methods for Measuring Productivity Growth
8096	William D. Nordhaus	Productivity Growth and the New Economy
8097	William D. Nordhaus	New Data and Output Concepts for Understanding Productivity Trends
8098	Ravi Jagannathan Zhenyu Wang	Empirical Evaluation of Asset Pricing Models: A Comparison of the SDF and Beta Models
8099	Angus Deaton	Relative Deprivation, Inequality, and Mortality
8100	Michael Bordo Anna J. Schwartz	From the Exchange Stabilization Fund to the International Monetary Fund
8101	Raquel Fernández	Sorting, Education and Inequality
8102	Kimberly Ann Elliott Richard B. Freeman	White Hats or Don Quixotes? Human Rights Vigilantes in the Global Economy
8103	Jonathan Gruber David Wise	An International Perspective on Policies for an Aging Society
8104	Aart Kraay Jaume Ventura	Comparative Advantage and the Cross-section of Business Cycles

Paper	Author(s)	Title

NBER Technical Working Papers

264	Francis X. Diebold Atsushi Inoue	Long Memory and Regime Switching
265	Casey B. Mulligan Barbara Schneider Rustin Wolfe	Time Use and Population Representation in the Sloan Study of Adolescents

NBER Historical Working Papers

131	Lee J. Alston Ruth Dupré Tomas Nonnenmacher	Social Reformers and Regulation: The Prohibition of Cigarettes in the U.S. and Canada
132	Leonard Caruana Hugh Rockoff	A Wolfram in Sheep's Clothing: U.S. Economic Warfare in Spain, 1940–1944

NBER Reporter
NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue
Cambridge, Massachusetts 02138-5398
(617) 868-3900

Address Correction Requested

Nonprofit Org.
U.S. Postage
Paid
Boston, MA
Permit No. 55932