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Program Report

Economic Fluctuations and Growth

Robert E. Hall*

The U.S. economy has enjoyed uninterrupted growth since the trough of the last recession in the spring of 1991. As unemployment has declined to just over 5 percent, attention has turned increasingly to issues of longer-run macroeconomic performance. Now, the topics of economic fluctuations and growth also are combined in a single NBER program, since the economic fluctuations program has taken over the functions of the earlier growth project (officially becoming the Program in Economic Fluctuations and Growth in early 1996). This continues to be the largest of the Bureau's research programs, with roughly 60 research associates and 25 faculty research fellows.

Many of the research activities of the "EFG program" take place in small groups working on specific topics. These groups are open, and some group members do not have formal affiliations with the NBER. The small groups' work is described in some detail later in this report. Almost all of these groups also meet in Cambridge in July as part of the Bureau's Summer Institute. At that time, the entire program also meets to present and discuss six academic research papers. The small groups meet during the academic year on their own, or in conjunction with other NBER program meetings, as well. Finally, the EFG program is responsible for the NBER's Annual Conference on Macroeconomics, which takes place in Cambridge each March.

The 1995 Nobel Prize in Economics

Robert E. Lucas, Jr. of the University of Chicago, an active member of the EF program since its inception in 1978, won the 1995 Nobel Memorial Prize in Economics. The prize was announced shortly before the pro-

Hall is a professor of economics at Stanford University and director of the NBER's Program in Economic Fluctuations and Growth.

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gram's research meeting in October 1995, after Lucas had agreed to serve as a discussant at the meeting; this happy event was acknowledged in a suitable way at lunch. Also, program member Stanley Fischer and I were asked by the *Scandinavian Journal of Economics* to prepare papers summarizing Lucas's many contributions.[1]

Program Members in Washington

Members of the EFG program have held a number of important policymaking and advisory positions in Washington. For example, John B. Taylor of Stanford University served as a member of the Council of Economic Advisers under George Bush, and Martin Neil Baily was a council member under President Clinton. Joseph E. Stiglitz currently serves as chairman of the Council of Economic Advisers; Lawrence H. Summers is deputy secretary of the U.S. Treasury, and Alan S. Blinder of Princeton University served until recently as vice-chairman of the Federal Reserve Board of Governors.

Business Cycle Dating

Traditionally, the Business Cycle Dating Committee has been the most conspicuous public element of the EFG program. The committee last met in 1992 to determine the date of the end of the recession of 1990–1. With the nonstop growth of the economy since that meeting, the committee has not met again; it will not meet until well after the economy reaches a peak of activity and begins a new recession. At this writing, there is no sign of impending recession, and the experimental recession probability index prepared by program members James H. Stock of Harvard University and Mark W. Watson of Princeton University assigns a low probability to a recession in the near future.

Macroeconomics Annual

Under the leadership of program members Ben S. Bernanke of Princeton University and Julio J. Rotemberg of MIT, the EFG program organizes a major conference on macroeconomics each year. The proceedings appear in the *NBER Macroeconomics Annual,* published by the MIT Press. The organizers choose authors from among those who have recently developed important new lines of research in macroeconomics; the format of the conference and volume permits a fuller expression and integration of the research than is possible in major economics journals, in which the line of research usually has been exposed already. The emphasis of the *Annual* is on basic quantitative research with potential policy applications.

Small Research Groups

Growth[2]

The first meeting of the newly formed "Growth Group" focused on the accumulation and development of human capital, finding some surprisingly paradoxical results and developing exciting avenues for future research. Lant Pritchett of the World Bank presented cross-sectional evidence that the growth of human capital, as measured by years of education, is completely uncorrelated with the growth of output. This result is surprisingly robust to the use of different datasets, as confirmed by conference participant Jong-Wha Lee, NBER and Korea University, who, together with Robert J. Barro, NBER and Harvard University, has developed a broad international database on education.

The conventional measure of human capital, the years that students devote to education, is extraordinarily crude, providing inadequate assessment of the value and growth of human capital. Dale W. Jorgenson of Harvard University presents new estimates of the value of the output of the U.S. educational sector. Jorgenson places the valuation of human capital on an equal footing with the valuation of physical capital by using lifetime earnings profiles to estimate the net present value of the additional earnings induced by an additional year of education. Gary S. Becker and NBER Research Associate Kevin M. Murphy, both of the University of Chicago, pushed the discussion further, showing how differences in the earnings of U.S. workers by country of origin could be used to infer differences in the value of their educational attainment and, by extension, to develop deflators for the nominal output of the educational sector. The application of these methods to broader international comparisons appears to be an essential first step in unraveling the puzzle posed by Pritchett and others.

Income Distribution and Macroeconomics[3]

This group has concentrated on three broad topics of significant importance to the U.S. economy. First, researchers have identified four channels through which income distribution affects growth and macroeconomic activity. Inequality, in the presence of imperfections in capital markets, may affect investment in human and physical capital adversely and therefore may reduce output and economic growth. These macroeconomic affects may be magnified by the sorting of individuals into homogeneous communities. Second, inequality may generate conflict that diminishes the security of property rights, hence lowering investment and economic growth. Third, inequality may have an adverse effect on investment in human capital, and therefore may increase fertility and slow economic growth. Fourth, inequality generates pressure for distortionary redistribution, adversely affecting investment and growth.

The first three mechanisms receive significant support from cross-country evidence, whereas the fourth is refuted. Studies carried out in the group shed new light on the potential macroeconomic implications of inequality in general, and of the recent rise in inequality in the United States in particular.

Next, several researchers in this group have examined the interaction among technological progress, intergenerational earnings mobility, and economic growth. For example, they have identified mechanisms through which technological progress determines earnings mobility and income distribution; conversely, they show how earnings mobility and income distribution affect the pace of technological progress and output growth. Major technological breakthroughs increase social mobility and income inequality and initially lower the pace of future economic growth. However, as technology becomes more accessible, mobility decreases, income inequality diminishes, and the pace of future economic growth accelerates. These studies enable us to assess the effect of the recent wave of technological progress, such as the computer revolution, on social and occupational mobility, wage and income inequality, and economic growth in the United States.

In a third area, researchers in this group have examined the implications of social institutions, such as education finance, fiscal policies, and labor market institutions, on macroeconomic performance and economic growth. Some have provided explanations for the differences in education finance and fiscal policies in the United States versus Europe and Japan. Others have examined the optimality of various forms of education finance, contrast-

ing public and private provision of education.

Macroeconomic Complementarities[4]

A complementarity exists when the activities of one person or firm have favorable effects on other people or firms. The topics that this group explores are standard in macroeconomics: the sources and consequences of economic fluctuations; economic growth; income distribution; the operation of labor markets; the demand for money; and the implications of government policies. In the presence of complementarities, though, there can be underemployment of resources and even the possibility of multiple equilibriums.

The idea of macro complementarities encompasses linkages across agents in an economy, so that higher activity in the economy generally induces higher activity by a single worker or firm. We may think of activity as broadly defined and including: hours worked; output produced; time spent searching; level of investment activity; and so forth. In general, these linkages can be global (that is, a single agent's choices influenced by the aggregate level of activity) or local (a single agent's choices influenced by a few neighbors).

Established research has provided examples of multiplicity through technological links across a group of agents. NBER researchers extend that formulation to the stochastic growth model with technological complementarities. Related models positing increasing returns in technology analyze the multiplicity of equilibriums and the instability in the process of financial intermediation. Models based upon these technological linkages also have been formulated to study the timing of economic decisions, stressing the possibility of equilibrium delay. Peter A. Diamond of MIT has developed a search model with multiple equilibriums that provides another source of multiplicity and is being used to study labor markets and the demand for money.

A common theme of this group's research is that the presence of complementarities creates a source for the magnification and propagation of shocks, as well as creating the possibility of multiple equilibriums. In addition, the models are inherently nonlinear, which creates an important connection between these economies and evidence of nonlinearities in the aggregate economy.

Initially, the group's effort focused on understanding the environments that give rise to complementarities. Its more recent work has explored the quantitative aspects of these economies. In particular, evidence on the sources of complementarities and results on their time-series and cross-sectional implications are a major component of the group's activities.

Micro and Macro Perspectives on the Aggregate Labor Market[5]

The premise underlying this group's work is that a better understanding of the various facets of the labor market is important for many questions in macroeconomics, including for example, accounting for cyclical fluctuations, the determinants of growth, and the role of labor market regulations in explaining cross-country differences in employment.

One important part of the group's research draws on the empirical work of NBER Research Associates Steven J. Davis of the University of Chicago and John C. Haltiwanger of the University of Maryland (as well as others) that documents the large flows of employment across establishments at all points over the business cycle. Standard macroeconomic models abstract from these flows. There are three related lines of research that stem from this original finding: 1) more extensive measurement, aimed at identifying the important regularities; 2) building models that account for the regularities; and 3) using the models to address relevant policy questions. The group has been engaged actively in all three of these lines of research.

This work also has important implications for policy. Many labor market programs—including unemployment insurance, job protection legislation, subsidies to job creation, and subsidies to declining industries—affect job creation and destruction. Through their effects on the incentives to create and destroy jobs, these policies have implications for aggregate employment, aggregate productivity, and unemployment dynamics. To illustrate, a recent paper[6] by Steven Millard of the Bank of England and Dale T. Mortensen of Northwestern University finds that differences in taxation, unemployment insurance, and job protection can explain differences in average unemployment, and in particular differences in unemployment duration and incidence, between the United States and United Kingdom over the last decade.

It is also of obvious interest to examine the effects of various policies on welfare. Fernando Alvarez, University of Chicago, and Marcelo Veracierto, Cornell University, assess the extent to which several policies that distort production decisions may have beneficial results for welfare because of insurance considerations that arise from incomplete markets.[7] One of their findings is that unemployment insurance has a larger impact on allocations than do sever-

ance payments, but that in both cases the net welfare effect of these policies is still negative.

Aggregate Implications of Microeconomic Consumption Behavior[8]

One of the lines of research conducted within this group is concerned with modeling the distribution of wealth and saving across households. Karen Dynan of the Federal Reserve Board, Jonathan S. Skinner, NBER and Dartmouth College, and Stephen P. Zeldes, NBER and Columbia University, have developed evidence that households with high levels of permanent labor income have high lifetime saving rates. Mark Huggett and Gustavo Ventura of the University of Illinois have examined whether such a positive correlation between saving and income could arise in a general equilibrium model in which households experience idiosyncratic shocks and face a progressive Social Security system. Their model explains a positive correlation between permanent labor income and saving, in part because the progressivity of the Social Security system means that low lifetime-income households have comparatively high income late in life, and therefore have no need to save for retirement.

One empirical problem for this model, and for most other saving models with heterogeneous agents and idiosyncratic shocks, is that they tend to underpredict the wealthholding of the richest households. Two projects in the group examine whether the extreme concentration of wealth in the United states could be reproduced by relaxing the assumption that all consumers face the same budget opportunities. Vincenzio Quadrini of the University of Pennsylvania has developed a model in which households randomly receive entrepreneurial opportunities, and then choose to invest or not invest. Rios-Rull's model makes the rate of return a nonlinear function of the level of wealth, with wealthy consumers earning a higher rate of return. Both of these models are able to produce aggregate wealth distributions substantially similar to the empirical wealth distribution in the United States.

Another longstanding puzzle about wealthholding behavior in the United States is the small fraction of the household sector's financial wealth that is invested in risky assets. Michael C. Fratantoni of Johns Hopkins University has developed a model that shows that the combination of labor income risk and the risk associated with homeownership is large enough to induce consumers to hold any remaining assets mostly or entirely in riskless forms.

Two additional projects relate to the growing body of macroeconomic literature that has found that survey measures of consumer sentiment, and particularly measures of unemployment expectations, have substantial explanatory power for aggregate consumption growth. Nicholas Souleles of the University of Pennsylvania preliminarily finds that in household data as in the macroeconomic data, (lagged) consumer sentiment is correlated positively with current consumption growth. Carroll, Dynan, and Spencer D. Krane of the Federal Reserve Board have developed a theoretical model of the relationship between consumers' unemployment expectations and their wealthholdings. They present empirical evidence that, as the model predicts, households that face unusually high unemployment risk hold substantially more net worth than those with less risk.

Pinelopi K. Goldberg, NBER and Princeton University, and Attanasio examine a large survey of automobile purchasers to test the implications of the presence of liquidity constraints for the demand for loans. In particular, they find that the demand of groups who are more likely to be liquidity constrained, such as the young, is sensitive to the maturity of the loans and relatively insensitive to changes in the interest rate.

A final study, by Michael G. Palumbo, University of Houston, and coauthors, presents historical data from the late 19th century on saving patterns by U.S. workers. The authors find that, despite the enormous institutional changes over the past hundred years, saving behavior in that era appears to have been remarkably similar to current saving behavior.

Diversity of Agents and Specificity of Assets[9]

In macroeconomics, many advances have been made by assuming that people have similar preferences and that they own similar assets. But this group is exploring models that drop one or both of these assumptions. In these models, people and firms are quite different from one another, and place higher values on their assets than any potential buyer would.

In one example, Valerie A. Ramey, NBER and University of California, San Diego, and Matthew D. Shapiro, NBER and University of Michigan, are using the experience of a failed defense contractor to document the costs of adapting capital goods from one use to another. Olivier J. Blanchard and Michael Kremer, both of NBER and MIT, start from the premise that greater private opportunities made possible by reform in Eastern Europe may have been responsible for the costly breakdown of complex economic relationships. Mohamad L. Hammour of Columbia University and

Caballero are exploring the multiple macroeconomic consequences of unprotected asset specificity.[10]

A number of studies focus on search frictions and the allocation process. Daron Acemoglu of MIT is investigating the implications of search for income distribution, whereas Giuseppe Bertola, NBER and Università di Torino, and Pietro Garibaldi, Innocenzo Gasparini Institute for Economic Research, Milan, are considering the implications for the distribution of wages across different size firms. James S. Costain of the University of Chicago analyzes unemployment insurance in a general equilibrium model with precautionary savings. Harold Cole of the Federal Reserve Bank of Minneapolis and Rogerson are working on an explanation of the cyclical properties of job creation and job destruction based on a modified Diamond–Mortensen–Pissarides search model.

One natural way to model asset specificity is with irreversibility and fixed costs of adjustment. Janice C. Eberly, NBER and University of Pennsylvania, and John Shea, University of Maryland, test for differences in the degree of irreversibility among various types of investment. In order to understand durable goods cycles, Jerome Adda of the Institut Nationale de la Recherche Agronomique, and Cooper analyze the recent use of tax policy to stimulate auto demand in France. Christopher L. Foote of the University of Michigan shows that if there are costs to hiring and firing workers, the cyclicality of job creation and destruction within the sector may depend on whether a sector is growing or declining.

Finally, a number of studies analyze the relationship between frictions and information revelation. V. V. Chari, University of Minnesota, and Patrick J. Kehoe, NBER and University of Pennsylvania, model herding in foreign lending, and Christophe Chamley of Boston University studies the implications of information dynamics for business cycles.

Empirical Methods[11]

This group's concerns are primarily methodological, but its topics are firmly grounded in applications. The group develops econometric tools needed for identifying and addressing substantive issues in empirical macroeconomics. Its activities focus on characterizing and modeling business cycle dynamics, estimation, and inference in vector autoregressive models, and estimation of macroeconomic relationships and models. A common theme, running through many of the group's activities, is the development of methods for forecasting economic activity. Much of the group's recent research will be contained in a forthcoming special symposium "Forecasting and Empirical Methods in Macroeconomics," in the *International Economic Review*.

Dynamics of the Business Cycle

The salient questions in this area are of tremendous practical importance. For example: How and why do key variables move in parallel over the cycle? What methods are best for monitoring the cycle in real time and for quickly identifying business cycle turning points? What potential exists for forecasting the cycle, and the turning points in particular? How can we learn from our track record and modify our methods accordingly? The group is working on a variety of new methods and models that will help provide answers to these and other questions.

For example, Charles H. Whiteman of the University of Iowa is developing a Bayesian approach to the construction and estimation of a dynamic factor model of macroeconomic activity, from which he extracts an index of leading indicators. His method has been extremely successful in forecasting economic conditions and in generating state revenue forecasts in Iowa.

Bruce Hansen of Boston College is developing the statistical estimation theory for models that capture regime-switching behavior in the macroeconomy. He is exploring the applicability of such econometric techniques to macroeconomic models with multiple equilibriums.

Edward B. Montgomery, NBER and University of Maryland, Victor Zarnowitz, NBER and University of Chicago, and two coauthors assess the comparative forecasting performance of a variety of linear and nonlinear models of the U.S. unemployment rate. They find that combining standard linear forecasts with forecasts from models that allow for asymmetric behavior in the rise and decline of unemployment improves the accuracy of the forecasts.

Gabriel Perez-Quiros and Allan Timmermann of the University of California, San Diego, study the links between real macroeconomic activity and the stock market. In particular, they characterize the pattern and magnitude of business cycle variations in U.S stock returns. Using a new approach that precisely identifies the stage of the business cycle, they document patterns that cast doubt on standard asset-pricing models, but that nevertheless suggest promising directions for future research.

Estimation, Inference, and Forecasting in Vector Autoregressive (VAR) Models

VARs are now the dominant framework for empirical macroeconomic analysis and forecasting, but

existing methods provide only very crude guidance as to the uncertainty associated with VAR parameter estimates, impulse response estimates, and forecasts. Hence the group is focusing on key questions such as: Does imposing long-run restrictions on VAR forecasting models improve the accuracy of long-run forecasts? How can we accurately assess the uncertainty associated with parameter estimates and impulse-response estimates from VARs? How can we accurately assess the uncertainty associated with our forecasts, especially long-horizon forecasts?

Peter Christoffersen of the IMF and Diebold explore the effects of imposing cointegration on VARs. Imposing cointegration guarantees that long-horizon forecasts hang together in reasonable ways. Christoffersen and Diebold nevertheless show that, contrary to popular belief, imposing cointegration does not improve long-horizon forecasts when forecast accuracy is evaluated using standard measures. They conclude that the standard accuracy measures are deficient in an important respect, and they suggest alternatives.

Stock examines long–horizon point forecasts and prediction intervals when variables are nearly cointegrated. To do so, he uses asymptotic methods in which the forecast horizon is a fixed fraction of the sample size. Based on this notion he compares the standard approaches to long-horizon forecasting with several alternatives. He finds that standard point forecasts in VARs and vector error correction models tend to be biased, and the associated standard interval forecasts tend to have distorted coverage. The performance of the alternative methods is mixed.

Stock and Watson propose procedures for computing confidence intervals for parameters in VARs with highly persistent data, without making rigid assumptions about the nature of the persistence. They are applying their methods to obtaining improved estimates of the relationships among money, aggregate output, and interest rates.

Lutz Kilian of the University of Michigan analyzes the related problem of bias in VAR impulse response estimates, which play an important role in empirical macroeconomics. He proposes a bootstrap confidence interval designed to account for both the bias and the skewness in the impulse response distribution. He shows that this bootstrap interval is more accurate than alternative methods.

Christopher A. Sims, NBER and Yale University, and Tao Zha, Federal Reserve Bank of Atlanta, develop Bayesian methods for forecasting with VARs. They attempt to bridge the middle ground between traditional Bayesian reduced-form models and explicitly structural econometric models. Sims and Zha's main focus is on improving existing equation-by-equation estimation methods and on quantifying forecast uncertainty.

Estimation

Traditional instrumental-variable estimation remains an important tool in applied research. However, little is known about measuring instrument relevance. To aid in the selection of instruments, Shea proposes a new test for instrument relevance in multivariate linear models.

Generalized method of moments (GMM) estimation, another instrumental-variable technique, suffers from a lack of constructive diagnostic tests for assessing the adequacy of a fitted model. Fallaw Sowell of Carnegie–Mellon University proposes new tests for violations of moment conditions in the GMM framework. Unlike existing tests, Sowell's test has power against both parameter instability and violations of overidentifying restrictions.

Can we develop estimation methods for dynamic macroeconomic models that are better grounded in statistical theory than "calibration" techniques, yet structured enough to enable the incorporation of stochastic restrictions from economic theory? David DeJong, University of Pittsburgh, Beth Ingram, and Whiteman estimate the parameters of a neoclassical business cycle model using a fully Bayesian procedure. They also quantify the sources of business cycle fluctuations. Their procedure provides an alternative to the informal calibration exercises that are now prevalent in the macroeconomic literature.

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[1]*My paper begins, "Over the last thirty years, the theory and practice of economic dynamics has undergone an extraordinary transformation. Robert Lucas has been and continues to be the leader of this transformation. He has provided economists with new tools and new ways of thinking about dynamic problems. Moreover, in the process, he has provided new answers to many of the problems of greatest concern to macroeconomists. From investment to unemployment, economic growth to monetary policy, monetary theories of the business cycle to the income distribution, one can find a seminal and path-breaking analysis from Lucas."*

[2]*Led by Charles I. Jones, Stanford University, and Alwyn Young, NBER and Boston University.*

[3]*Led by Roland Benabou, NBER and New York University, Steven Durlauf, NBER and University of Wisconsin, and Oded Galor, Brown University.*

[4]*Led by Russell Cooper, NBER and Boston University.*

[5]*Led by Richard Rogerson, University of Minnesota, and Randall Wright, University of Pennsylvania.*

[6]*S. Millard and D. T. Mortenson, "The Unemployment and Welfare Effects of Labor Market Policy"*

[7]*F. Alvarez and M. Veracierto, "Welfare Effects of Job Security Provisions Under Imperfect Insurance Markets"*

[8]*Led by Orazio Attanasio, NBER and University College, London, Christopher D. Carroll, NBER and Johns Hopkins University, and José-Victor Rios-Rull, Federal Reserve Bank of Minneapolis.*

[9]*Led by Ricardo J. Caballero, NBER and MIT, Andrew Caplin, NBER and New York University, and John V. Leahy, NBER and Harvard University.*

[10]*R. J. Caballero and M. L. Hammour, "The Macroeconomics of Specificity," NBER Working Paper No. 5757, September 1996.*

[11]*Led by Francis X. Diebold, NBER and University of Pennsylvania, and Kenneth D. West, NBER and University of Wisconsin.*

Research Summaries

Heterogeneity in Schooling, Uncertainty, and the Return to Education

Joseph G. Altonji*

There is an enormous empirical literature on human capital and earnings that has grown out of work by Jacob Mincer, Gary Becker, and other pioneers. Much of the research focuses on measuring the value of a year spent in school.[1] But in recent years, the research has begun to explore more fully the implications of the fact that schooling is heterogenous, both in quality and in subject matter, and that people make decisions about schooling without complete knowledge of their tastes and talents for different types of work. This article briefly summarizes three avenues that I have been pursuing: First, what are the implications of the fact that education is a sequential choice made under uncertainty? Second, can we get inside the black box of years-spent-in-school by examining the effects of actual courses taken on the payoff to school? And third, I use a new methodology to revisit an old and controversial question—do school inputs affect outcomes?

*Altonji is a professor of economics at Northwestern University and a research associate in the NBER's labor studies program. His profile appears in this issue.

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

The standard human capital model of schooling assumes that individuals are able to choose a future level of education with no uncertainty about actually completing that level. It also focuses on the number of years of school chosen, rather than on the specific major. In contrast, I model the demand for education as a sequence of choices made under uncertainty. I then examine how variables that influence tastes for school, ability to do college work, and the payoffs to particular college programs affect the expected return to a year of school.[2]

Three facts suggest that uncertainty is important, and they motivate this research. First, many individuals who plan to complete college instead drop out. Second, for some demographic groups the ex post returns to education are associated largely with completing high school or completing college. Such nonlinearities in the ex post returns, or a gap between the effect of education on wages and the borrowing rate, may produce substantial differences between ex ante and ex post returns to the first year or two of college. The return to the first year of college is not the earnings differential between individuals with 12 and 13 years of schooling. Rather, the return is the difference between the earnings of the person who stops at 12 years of education and the expected earnings net-of-education-costs of a person who attends the first year of college. Expected earnings depend on the earnings associated with 14, 15, 16, or more years of education. Expected earnings also depend on the probabilities of the various education outcomes for an individual who has completed year 13. Family background, aptitude, and other factors that affect the odds that an individual actually will complete the program may influence the expected return to starting college.

Third, there are large differences across fields of specialization in the earnings differential between graduates of college and high school. Individuals who do not know if they will be able to, but want to, complete a program in a particular field must consider the alternative options that result from starting that particular program.

A theoretical analysis and empirical investigation show that personal characteristics affect the ex ante rate of return to starting college, in part by altering the market payoffs to completing particular postsecondary programs of study, and in part by altering the completion probabilities. There are a number of specific empirical findings. First, the ex ante return to starting college for male high school graduates is higher than the ex post return to the first year of college because starting college provides the option to continue. Second, gender differences in the probability of completing a high-paying major tend to raise the return to college for men relative to women. Third, aptitude raises the ex ante return to starting college. Aptitude raises the return for men both by increasing the ex post payoffs to college and by favorably altering the probabilities of the various education outcomes conditional on starting college. Aptitude raises the ex ante return to education for women by increasing the ex post payoff to college. Fourth, an academic high school curriculum and a favorable family background raise the ex ante return for men but matter little for women.[3] Fifth, those who start college have a substantially higher ex ante internal rate of return to doing so than those who do not.

High School Curriculum and the Value of Education

Why does a year of schooling lead to substantial wage increases? How are these increases affected by what a student does while in school? These questions long have been neglected in the literature. The relevance of estimates of the payoff to specific courses for curriculum design is obvious, but such estimates also have implications for key questions regarding the economics of education, including the "human capital/screening" debate over why years spent in school have economic value. From the point of view of the human capital interpretations, one would hope that a year's worth of high school courses has value regardless of whether one requires an extra year to complete them.[4]

I used the National Longitudinal Survey of the High School Class of 1972 to provide the first systematic study of the effects of high school curriculum on postsecondary education and on success in the labor market.[5] The major problem in studying the consequences of curriculum is that the quantity and level of difficulty of courses are chosen by students and schools. The design of the dataset permits one to use as instrumental variables for the courses chosen by individuals the means for each high school of courses taken in each subject. I control for the other characteristics of the individual students, and for high school variables, including the average characteristics of the students in the high school. Unfortunately, differences across high schools in courses taken by the average student do not allow for a clean natural experiment. For example, the average number of math courses in a high school is likely to be correlated positively with the average family background, primary school preparation, ability of the student body, and quality of the courses. While I control for average student characteristics and for other high school level variables in the empirical analysis, the controls are almost certainly imperfect. Since there is little prior research or evidence on the effects of curriculum on wages, I also use simpler regression strategies that relate variation among students in curriculum to variation in wages and postsecondary education, as well as regressions that relate differences in curriculum to differences in outcomes among persons who attended the same high school.

My main finding for wage rates is that the return to additional courses in academic subjects is small. Even when one does not control for family background and ability, the instrumental variables estimates indicate that one more year of science, math, English, social studies, and foreign language would lead to a wage increase of only 0.3 percent. In other words, the effect of a year equivalent of courses is much smaller than the value of one year in high school. This conclusion is not sensitive to alternative ways of dividing up "credit" for the effect of postsecondary education on wages between high school courses and college, in part because the instrumental variables estimates show only a modest effect of academic courses on years of college completed. The least squares regressions, especially when a fixed effect is included for each high school, suggest larger estimates, particularly for mathematics. However, these estimates are likely to be biased upward. In any event, when one controls for family background, the different estimation methods all produce estimates of the value of a year of additional courses that are far below the value of a year of high school. Taken at face value, the results seem more consistent with a screening view of high school than a human capital view.

While there are many reasons to challenge the specific estimates I obtain, almost all suggest that the estimates for academic courses are, if anything, overstated. The reason is that the quality of courses is correlated positively with the quantity in academic areas such as math and science. Furthermore, both the quantity and the quality of courses are correlated positively with favorable personal and school characteristics. While I believe that high school curriculum does matter, and I find the

low estimates to be surprising and challenging, they are not easy to dismiss with an appeal to unobserved heterogeneity in courses, schools, and students. Hopefully, this work will stimulate a major effort to understand how what one studies in school influences the value of a year of school.

Do School Inputs Matter?

There is a huge literature that examines the relationship between measures of school quality and achievement, and a smaller literature that asks whether measures of school quality are related to wages.[6] The previous research on wage effects used variation in school inputs across geographic areas or across schools. However, there is still much disagreement about what the evidence says. In a recent paper, Thomas Dunn of Syracuse University and I provide the first study that uses variation among siblings in high school inputs to identify the effects of these variables on the wages.[7] By adding to our wage models constant terms for each family, we are able to control for unobserved variables that are common to siblings. This gets around the criticism that variation across families, schools, or states in school inputs is related to other characteristics that affect wage levels. While one would presume that persons from more favorable family environments (and communities) also attend better schools, the sign of the bias from failure to fully control for background depends on the relative strength of the relationship between omitted factors and both family background and school quality.

Our study finds that differences between siblings in the quality of the high school attended have a substantial positive relationship to differences in the wages of high school graduates. Increases in teachers' salary and expenditures per pupil (equal to the interquartile range for these variables) lead to wage increases of 10.6 percent and 5.6 percent, respectively, for a student who leaves school after high school. There is little evidence that the results are biased by a positive correlation between sibling differences in school inputs and in other factors that are favorable to wages. Future research using sibling pairs to analyze the effects of school inputs is necessary.

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[1] *This topic, as well as the analysis of changes over time in the return to education, has received a lot of attention from members of the NBER's labor studies group in recent years. Among the papers are: J. Angrist and A. Krueger, "Does Compulsory School Attendance Affect Schooling and Earnings?"* Quarterly Journal of Economics *(November 1991), pp. 979–1014, and O. Ashenfelter and A. Krueger, "Estimates of the Economic Return to Schooling from a New Sample of Twins,"* American Economic Review, *forthcoming.*

[2] *This work is presented in J. G. Altonji, "The Demand for and Return to Education When Education Outcomes Are Uncertain,"* Journal of Labor Economics *(January 1993), pp. 48–83. See also C. F. Manski, "Schooling as Experimentation: A Reappraisal of the Postsecondary Dropout Phenomenon,"* Economics of Education Review *8, 4 (1989), pp. 305–312.*

[3] *J. G. Altonji and T. A. Dunn, "The Effects of Family Characteristics on the Return to Education,"* Review of Economics and Statistics *(forthcoming) studies the effects of parental education on the ex post return to a year of school.*

[4] *See A. Weiss, "Human Capital Versus Signaling Explanations of Wages,"* Journal of Economic Perspectives *(Fall 1995), pp. 133–154.*

[5] *See J. G. Altonji, "The Effects of High School Curriculum on Education and Labor Market Outcomes,"* Journal of Human Resources *(Summer 1995), pp. 410–438, which provides citations to a few related studies.*

[6] *Surveys of this literature include: E. Hanushek, "The Economics of Schooling: Production and Efficiency in Public Schools,"* Journal of Economic Literature *24 (September 1986), pp. 1141– 1177; L. V. Hedges, R. D. Laine, and R. Greenwald, "Does Money Matter? A Meta Analysis of Studies of the Effects of Differential School Inputs on Student Outcomes,"* Educational Researcher *23 (1994), pp. 5–14; J. Betts, "Is There a Link Between School Inputs and Earnings? Fresh Scrutiny of an Old Literature," in* Does Money Matter? The Link Between Schools, Student Achievement, and Adult Success, *G. Burtless, ed. Washington, DC: Brookings Institution, 1955; and D. Card and A. B. Krueger "Labor Market Effects of School Quality: Theory and Evidence," NBER Working Paper No. 5450, February 1996.*

[7] *J. G. Altonji and T. A. Dunn, "Using Siblings to Estimate the Effects of School Quality on Wages,"* Review of Economics and Statistics, *forthcoming.*

Labor Markets and Public Assistance Programs[1]

Rebecca M. Blank*

The current heated debate over welfare reform focuses on getting more welfare recipients to work. The effectiveness of changes in the design of welfare programs depends heavily on the economic environment surrounding these programs. Changes in the macroeconomy and the labor market can have large effects on the behavior and the well-being of poor families.

Economic Growth and Poverty[2]

It is a widely held belief that economic growth helps the poor. Many have claimed that a rising tide not only lifts all boats, but might even lift the smaller boats faster than the larger boats. Indeed, the steep declines in poverty in the 1960s were caused almost entirely by strong and sustained macroeconomic growth.

The poor feel the impact of economic growth primarily through the labor market. When the economy expands, demand for labor rises and unemployment falls. This most benefits those who are unemployed, underemployed, employed part time, or out of the labor force entirely. Disproportionately, less-skilled workers experience much higher unemployment. The unemployment rate among workers without high school diplomas has been consistently about five times that of workers with college degrees over the past 20 years. Job expansions therefore help these workers and their families more than they help skilled workers.

*Rebecca M. Blank is a research associate in the NBER's labor studies program and a professor of economics at Northwestern University. Her "Profile" appears later in this issue.

Given this relationship, it was puzzling when a strong and sustained recovery during the late 1980s brought the poverty rate down by only a small amount. Estimates based on historical experience would have predicted much steeper declines in poverty between 1983 and 1989. Subsequent analysis indicated that the decline in unemployment over the 1980s followed earlier patterns, as less-skilled workers expanded their employment as quickly as in the 1960s. Why then did poverty not decline as rapidly as in the 1960s?

The difference was attributable to changes in wages. In the 1960s, wages (for workers of all skill levels) increased at the same time that employment expanded. A 1 percent increase in GDP growth in the 1960s was correlated with a $2.18 increase in real weekly wages among the poorest decile of the population. As employment expanded, the result was a double-whammy effect on poverty: people worked more and earned more for each hour that they worked.

In contrast, over the 1980s, wages for less-skilled workers declined steadily. Between 1983 and 1989, GDP growth of 1 percent was correlated with a $0.32 decline in weekly wages for the poorest decile of the population. The result was that the employment expansions were offset by declining wages. People worked more, but they earned less for each hour that they worked. As a result, poverty fell by only a small amount.

In the 1990s, these effects continue to operate. Both 1992 and 1993 were years of aggregate economic expansion. For the first time in post–World War II history, however, poverty actually continued to rise as the economy expanded. Not until the third year of the expansion, in 1994, did poverty begin to fall.

In short, for the last 15 years, economic growth has not been as powerful in fighting poverty as it was in the past. This is bad news, since economic growth provides a win–win policy: everyone's standard of living improves, even as poor families catch up faster. Alternative policies to reduce poverty are much less attractive, requiring the government to design and administer programs and to use redistributive taxation. Part of the current frustration with public assistance programs may relate to the fact that antipoverty efforts have had to rely on *programs* more heavily in recent years, as economic expansions have had less effect on poverty, and such programs have in-herent limits to their effectiveness.

Work Opportunities for Less-Skilled Workers[3]

Two phenomena have been operating over time to make it harder for poor families to escape poverty through employment. First, declining wages for less-skilled workers mean that work by itself provides a less effective way out of poverty. Among men with less than a high school diploma who work full time all year, real weekly wages declined 22 percent between 1979 and 1993. The result is that less-skilled men face far worse labor market opportunities than their fathers did.

Among women with less than a high school diploma who work full time all year, real weekly wages declined only 6 percent, but these women started on a very low base and continue to earn only 71 percent of what less-skilled men earn. These women face essentially the same

(very poor) labor market opportunities as their mothers. Particularly since many single mothers cannot always work full time, for many poor women earnings alone will be inadequate to support a family. While there is substantial evidence that welfare-to-work programs can increase women's earnings and labor market involvement and decrease their use of welfare, few of these programs result in large improvements in women's total family income. This suggests that some form of ongoing subsidies to some share of women who leave welfare for work will be necessary if they are to be better off working than on welfare. These could be either in the form of wage subsidies (such as the Earned Income Tax Credit—EITC—provides) or in the form of income subsidies (through ongoing cash support, child care supplements, Food Stamps, and so on). Alternatively, expanded private support for these women (through expansions in child support payments, for example) also would help solve this problem.

Second, the growth in the share of female-headed families among the poor has made employment a less effective route out of poverty. In 1993, about 43 percent of all poor persons lived in a family headed by a single parent, almost all of them women; 35 percent live in families headed by married couples; the remaining 22 percent of the poor are unrelated individuals. Single-parent families face a triple disadvantage when they try to escape poverty through employment. First, there is only one adult who can go to work in these families, which limits their potential earned income. Second, the fact that the one adult is female typically means that her wages are well below those of equivalent less-skilled men. Third, because there is no other adult to provide child care, a substantial share of earnings often will go to pay for child care, which does little to improve the overall resources available to the family from work.

The result of these shifts is that it is currently harder for poor families to escape poverty (or to get off welfare) through employment than at any time in the past 30 years. Current efforts to increase employment and decrease the use of public assistance among poor families are occurring at a time when both the labor market and the demographic composition of families make this harder to achieve.

Evaluating Public Assistance Programs

All of this evidence suggests that cutting welfare may not reduce poverty, at least in the short run, even if it does result in greater labor market effort. At present, one-fifth of all poor families include one full-time year-round worker, yet they remain poor. Thus, the question of how best to design income support programs remains very important.

A substantial literature in economics investigates the nature and magnitude of incentive effects embedded in the design of assistance programs. For example, some research has looked at whether cross-state differentials in Aid to Families with Dependent Children (AFDC) benefits create incentives for the migration of poor families to high-benefit states, or whether these differences in benefits lead to differences in the length of time that women spend on welfare.[4] Most research in this area has found some disincentive effects, but they tend to be relatively small. For instance, while differences in cash assistance between states appear to induce some difference in women's propensity to work, the elasticity of the labor supply response is not large. Higher-range estimates of the labor market response to benefits suggest that for every $100 gained in monthly cash assistance, women will work two hours less per month.

One aspect of program design that often is underemphasized in the economics literature is the way in which the implementation and operation of programs encourage or discourage usage. In fact, only about two-thirds of all eligible women participate in the AFDC program, and a smaller share of eligible families participate in Food Stamps.[5] The likelihood that an eligible family will participate in public assistance is related to the economic environment (which affects their expected level and duration of need), the level of program benefits, and to the general availability of program offices. A surprisingly large number of women appear to stop receiving AFDC and Food Stamps even when they remain eligible for substantial benefits.

There are two possible ways to interpret this: it could reflect the fact that the welfare system often makes life unpleasant for its recipients, and many women will forgo substantial income to avoid participating in it. The alternative interpretation is that there is substantial unreported income available to women, either through their own earnings or those of boyfriends and relatives, and women replace welfare income with this income when it is available.

In general, the wariness toward broad-based cash assistance programs in the United States, which is reflected strongly in the current welfare reform debate, has moved the United States to run more in-kind programs, providing food, medical care, or housing subsidies rather than general support. More recently, the concern about behavior among public assistance recipients is resulting in policies that increasingly tie program eligibility to much more than a family's income level. For instance, the new welfare reform law

passed this summer makes cash support after two years available only to women who participate in job search programs. Alternatively, many states are limiting benefits to women who refrain from having additional children out of wedlock. The public assistance program that has grown fastest in the past five years—the EITC—is available only to workers.

This targeting makes programs more limited in whom they serve and what they cost. But such targeting also increases the administrative effort required to make the programs operate effectively, and may increase administrative costs even if it decreases direct benefit expenses.

If we could only count on macroeconomic growth to fight poverty, it would substantially reduce the need for a government bureaucracy to design programs, screen applicants, and monitor recipients. In a world where general job availability is not enough to help the poor, however, and in a world where general cash transfers are viewed with disfavor, then key questions in public assistance programs increasingly will revolve around how to design, implement, and monitor complicated targeted programs. The government often is considered less able to do this sort of administrative task well than the private sector. Greater movements in this direction, such as are embedded in many current welfare reform plans, may create greater problems of effective management. This may only increase public distrust about the effectiveness of antipoverty programs in the long run.

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[1]*Much of the discussion in this research summary (and particularly the final section) is taken from R. M. Blank,* It Takes a Nation: A New Agenda for Fighting Poverty, *forthcoming from Princeton University Press.*

[2]*The discussion in this section is based on R. M. Blank and A. S. Blinder, "Macroeconomics, Income Distribution, and Poverty," in* Fighting Poverty, What Works and What Doesn't, *S. Danziger and D. Weinberg, eds. Cambridge, MA: Harvard University Press, 1986; R. M. Blank, "Why Were Poverty Rates So High in the 1980s?" in* Poverty and Prosperity in the Late Twentieth Century, *D. Papadimitrious and E. Wolff, eds. London: Macmillan Press, 1993; R. M. Blank and D. E. Card, "Poverty, Income Distribution, and Growth: Are They Still Connected?* Brookings Papers on Economic Activity *(1993:2).*

[3]*The discussion in this section is based on R. M. Blank, "The Employment Strategy: Public Policies to Increase Work and Earnings," in* Confronting Poverty: Prescriptions for Change, *S. Danziger, G. Sandefur, and D. Weinberg, eds. Cambridge, MA: Harvard University Press, 1994, and "Outlook for the U.S. Labor Market and Prospects for Low-Wage Entry Jobs," in* The Work Alternative: Welfare Reform and the Realities of the Job Market, *D. Nightingale and R. Haveman, eds. Washington, D.C.: Urban Institute Press, 1995; and R. M. Blank and R. A. London, "Trends Among the Working Poor: The Impact of Economy, Family, and Policy," in* America's Working Poor, *T. Swartz and K. Weigert, eds. Notre Dame: University of Notre Dame Press, 1996.*

[4]*For instance, see R. M. Blank, "The Effect of Welfare and Wage Levels on the Location Decisions of Female-Headed Households,"* Journal of Urban Economics *24, 2 (1988), or "Analyzing the Duration of Welfare Spells,"* Journal of Public Economics *8,1 (1990).*

[5]*For a discussion of these issues, see R. M. Blank and P. Ruggles, "When Do Women Use AFDC and Food Stamps? The Dynamics of Eligibility Versus Participation,"* Journal of Human Resources *31, 1 (1996).*

Banks and Security Markets

Gary Gorton*

What do banks do (that markets cannot do)? In the United States in 1845, the answer would have been that banks made loans and issued mortgages, but their most important role was to provide a medium of exchange by issuing private money.[1] By the late 19th century, U.S. capital markets were more developed, but at the same time large banks resembled German universal banks.[2] Passage of the Glass–Steagall Act in 1934 changed that by restricting banks' activities.[3] In 1996 banks face competition from money market mutual funds for deposit business and from junk bonds, commercial paper, and medium-term notes for bank loans.[4] While smaller firms continue to rely heavily on banks, banks are now engaged in many new activities, such as interest rate and currency swaps.[5] Whatever it is that defines banks as unique institutions, the pattern of bank activities has changed over the last 150 years as banking has interacted with the development of security markets. The challenge is to explain the persistence of banking as security markets increasingly develop.

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*Gorton is a research associate in the NBER's Program in Corporate Finance and a professor at The Wharton School. His "Profile" appears later in this issue.

Banks and Security Markets in the Organization of Capitalist Economies

One problem in understanding what banks do is that the function of securities markets is not well understood. With James Dow, I address the issue of the connection between stock market price "efficiency" and

economic efficiency.[6] In this work, we assume that firms are operated by managers who must be compensated in a way that induces them to find desirable investment projects. The managers may make an effort to produce information, but are not always successful in receiving information. When they are not successful, they may be induced by their compensation contracts to rely on inferences drawn from changes in their firms' stock market prices. In such an economy, two types of information must be produced and transmitted in order to achieve the most efficient allocation of resources. First, the stock market must provide forward-looking or prospective information when informed traders produce information about the firm's investment opportunities for managers to act on. Second, the stock market must provide backward-looking or retrospective information when stock prices reflect informed traders' production of information about the outcomes of investment decisions made in previous periods. Managerial compensation based on stock prices then can induce managerial effort.

This model of the stock market seems to be what most economists have in mind when they speak of "market efficiency." Stock prices allocate resources by influencing investment decisions and by providing a way to monitor corporate managers. But, consider the same economy without the stock market but with banks instead. Banks design contracts to hire information-producing loan analysts who write prospective and retrospective reports about investment opportunities and managerial performance. Dow and I show that the banks can implement the same allocation as the efficient equilibrium of the stock market economy. Efficient security prices are neither necessary nor sufficient for economic efficiency.

That the savings–investment process might be equally well organized around banks as around security markets suggests empirically investigating the role of banks in economies where securities markets are less important than in the United States, as in Germany. For much of recent German history the stock market has been small and illiquid. German banks, though, can own stock legally. The question is whether bank block shareholding is, in some sense, a substitute for a liquid stock market. Schmid and I examine the role of banks in Germany, and show that in the 1970s firm performance was better when a bank was a large shareholder. This is consistent with the proposition that when banks obtain a block of stock (via a family selling out, or because of financial distress), they have an incentive to improve firm performance by monitoring because, effectively, the block cannot be sold (since the stock market is traded so thinly).[7] By the 1980s, however, German capital markets had developed further, and this role of banks was no longer present.[8]

Bank Uniqueness

Banks and securities markets may be substitutes but, even in economies with highly developed capital markets, banking persists as an important institution. This suggests that banks perform some tasks that markets cannot accomplish, even when they are highly developed.

On the asset side of the balance sheet, banks originate loans. To the extent that bank loans are held by the bank (so that bank equity is at risk), there is an incentive to oversee the activities of borrowers to maintain the value of the loan. Because of free-riding, it is difficult for a large number of debt holders to interact with borrowers during certain states of the world: "monitoring" them, for example, when they are distressed, or verifying that they can repay the loan. A bank, by concentrating the debt, eliminates this problem.[9] Beyond this, the details of what "monitoring" really means are fuzzy. Moreover, the argument about concentration would seem to apply to all debt and so cannot explain the role of bank loans as distinct from corporate bonds.

The renegotiability of bank loans emanates from a contract provision that gives banks the right to seize collateral, and from the fact that a single agent is in a position to renegotiate. Kahn and I consider the optimality of this contract provision.[10] We model the interaction between a bank and a borrower when: 1) the borrower may have an incentive to (at a cost) increase the risk of a project if the project goes badly; while 2) the bank may have an opportunistic incentive to threaten early termination of the project. When the borrower seeks to add risk, the bank may respond by forgiving some debt to eliminate the borrower's incentive to add risk, liquidating the loan by seizing the collateral, raising the interest rate, or doing nothing. All of these outcomes happen in equilibrium. In fact, the variance of the value of the firm is state dependent in equilibrium, a result that has implications for the application of option-pricing methods to corporate securities. The contract provision allowing the bank the right to initiate renegotiation by threatening to seize the collateral is optimal when this type of renegotiation, that is, monitoring, is valuable ex ante.

Banks not only provide unique services on the asset side of the balance sheet, but they also produce a medium of exchange on the liability side of the balance sheet. Pennacchi and I explain this.[11] If agents face unanticipated needs to consume, and face a cash-in-advance constraint, then they will have to dissave

by selling securities to obtain cash. When they sell securities, they may sell in a market where better-informed traders take advantage of this liquidity need. The uninformed consumers lose money, on average, when they are less informed about the value of the risky securities they are selling. Their loss to informed traders is increasing in the variance of the value of the security being sold. Therefore, a low-variance security or, in particular, a riskless security with a known value, would minimize or avoid such losses. Banks produce such a riskless trading security by issuing debt, which is a claim on a diversified portfolio (of loans). If the debt is not riskless, the government can improve matters with deposit insurance.[12]

Panics and the Origin of Bank Regulation

The combination of demand deposits, which can be redeemed at par on demand, with nontraded bank loans can create the possibility of an event in which depositors en masse exercise their right to demand cash for their deposits. In the United States large numbers of relatively undiversified banks issuing demand deposits faced repeated banking panics of this type. There is nothing mysterious about banking panics. I show that in the United States banking panics occurred at the peak of the business cycle when consumers received information forecasting a recession.[13] At the peak, consumers know that they will want to dissave in the coming recession. Their savings are in banks, some of which will fail during the recession. Because of asymmetric information about the value of the nontraded bank loans, depositors cannot distinguish the banks that will fail from those that will not. As a result, when they receive information forecasting a recession, rational, risk-averse depositors withdraw from all banks. This event is a banking panic.

During the 19th century, banks formed coalitions—clearinghouses—partly to address the problem of banking panics. Clearinghouses monitored member banks by restricting their activities, conducted strict bank examinations, and enforced sanctions against members to enforce compliance. During panics clearinghouses organized suspensions of the payment of cash to honor demand deposits; instead of paying out cash, they provided a form of deposit insurance by issuing their own private money (claims on the clearinghouse) to honor deposit contracts. Since this money was a claim on the clearinghouse, depositors were insured against the failure of any particular member bank, although not against the failure of the clearinghouse (which never occurred in U.S. history).[14]

Panics can be seen in the context of the industrial organization of banking. Demand deposits are a medium of exchange that clears internally in the banking system, not externally through trade in a market. Internal clearing closed the external market in which bank claims were traded, the banknote market of the pre–Civil War Era. But this caused an information asymmetry, since there was no longer any information-revealing market about the value of banks.[15] But, without an information-revealing market, how are depositors to monitor banks? Banking panics can be seen as a monitoring mechanism and, in this sense, were desirable.[16] The information asymmetry created the necessary condition for panics, but also the incentives for the private provision of bank regulation, examination, and insurance. Ultimately, government bank regulation and insurance took over the clearinghouse functions.

Current Regulatory Issues

In the 1980s, while a number of new debt markets opened or grew significantly (including junk bonds and commercial paper), banks failed at increasing rates as they became unprofitable. One widespread explanation for the high failure rate of banks involves the moral hazard attributable to underpriced deposit insurance. In this view, bank shareholders have an incentive to take on risk when the value of the bank charter falls sufficiently.[17] This view is inconsistent with banks being run by managers and, it turns out, with empirical evidence on which types of banks want to take on inefficient risk.

Rather than assume that shareholders directly control bank actions, Rosen and I assume that bank managers, who may own a fraction of the bank, make the lending decisions.[18] If managers have different objectives than outside shareholders, and disciplining managers is costly, then managerial decisions may be at odds with the decisions that outside shareholders would like them to take.[19] We show empirically that, contrary to the moral hazard view, excessive risktaking by banks occurred at those banks controlled by managers with stockholdings well below 50 percent, but sufficiently high that they constituted important blockholders. This result suggests that a failure in the market for corporate control in banking can explain the persistence of unprofitability of banking in the 1980s.

Another explanation for the persistence of bank failures during the 1980s concerns "regulatory forbearance," that is, the unwillingness of regulators to close insolvent banks. This view raises more general welfare questions concerning bank regulation. What is the objective function of regulators? What should

they do when banks become riskier? Winton and I consider the question of bank capital requirements in a general equilibrium setting.[20] General equilibrium imposes the discipline that the capital in banks must come from somewhere in the economy. We show that there are unique costs associated with bank capital, and that regulators optimally will not, indeed cannot, force banks to raise costly capital. The basic argument is that consumers need a riskless transactions medium supplied by banks, as I have discussed here. Holding bank equity exposes consumers to possible losses should they need to sell the equity. To the extent that they must hold bank equity, and not demand deposits, they face losses if they have unanticipated needs requiring them to sell their bank equity. But this risk is priced and so imposes a cost on equity that is unique to the banking industry. We show that capital requirements never can be binding: if they are too onerous they can be avoided by exit from the banking industry. But then banks do not supply the socially valuable services that markets cannot supply. To avoid such socially undesirable exit, the regulators may take actions that resemble forbearance. This, however, is socially optimal.

Recent Developments in Banking

Banking has been transformed in the last 15 years. One major change has been the opening and growth of the market for loans. According to theory, bank loans are not liquid: no one should buy a loan, because then banks will lack incentives for monitoring. Moreover, if loans and bonds are substitutes, a direct contract with a firm dominates purchasing a loan, since the buyer of a loan relies on the bank for representation if the firm goes bankrupt. Yet the bank, having sold the loan, would appear to have little incentive to perform. Despite this, the market for such loans is now enormous.[21] Pennacchi and I empirically search for implicit contract features that make loan sales compatible with incentives.[22] We find some evidence that banks selling loans keep a portion of the loan, and that the price of the loan being sold reflects this.

Another major change in banking has been the advent of the derivatives market, a market with commercial banks at its center. Derivatives have been controversial because of the difficulty in valuing them. Rosen and I investigate the involvement of U.S. commercial banks in the market for interest rate swaps.[23] We find that banks, generally speaking, do not appear to be taking on excessive risk in this market. Banks seem to have small net positions in derivatives.

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[1]*See G. Gorton, "Reputation Formation in Early Bank Note Markets,"* Journal of Political Economy *104 (1996), pp. 346–397; and "Pricing Free Bank Notes," NBER Working Paper No. 3645 (1990, out of print).*

[2]*See C. Calomiris, "The Costs of Rejecting Universal Banking: American Finance in the German Mirror, 1870–1914," in* The Coordination of Activity Within and Between Firms, *N. Lamoreaux and D. M. G. Raff, eds. Chicago: University of Chicago Press, 1995.*

[3]*On the Glass–Steagall Act, see R. Kroszner and R. Rajan, "Is the Glass–Steagall Act Justified? A Study of the U.S. Experience with Universal Banking Before 1933,"* American Economic Review *84 (1994), pp. 810–832; "Organizational Structure and Credibility: Evidence from the Underwriting Activities of Commercial Banks Before Glass–Steagall," NBER Working Paper No. 5256, March 1995; and M. Puri, "Commercial Banks in Investment Banking: Conflict of Interest or Certification Role?"* Journal of Financial Economics *40 (1996), pp. 373–401.*

[4]*See G. Gorton and G. Pennacchi, "Money Market Funds and Finance Companies: Are They the Banks of the Future?" in* Structural Change in Banking, *M. Klausner and L. J. White, eds. Homewood, IL: Business One-Irwin, 1993. Also see L. Beneveniste, M. Singh, and W. J. Wilhelm, "The Failure of Drexel Burnham Lambert: Evidence on the Implications for Commercial Banks,"* Journal of Financial Intermediation *3 (1993), pp. 104–137. For surveys of recent developments in banking, see A. Berger, A. Kashyap, and J. Scalise, "The Transformation of the U.S. Banking Industry: What a Long Strange Trip It's Been,"* Brookings Papers on Economic Activity *2, (1995); and J. Boyd and M. Gertler, "U.S. Commercial Banking: Trends, Cycles, and Policy," in* NBER Macroeconomics Annual 1993, *O. Blanchard and S. Fischer, eds. Cambridge, MA: MIT Press.*

[5]*On loans to small business, see M. Petersen and R. Rajan, "The Benefits of Lending Relationships: Evidence from Small Business Data,"* Journal of Finance *49 (1994), pp. 3–37; and "The Effect of Credit Market Competition on Lending Relationships,"* Quarterly Journal of Economics *110 (1995), pp. 407–443. On swaps, see G. Gorton and R. Rosen, "Banks and Derivatives," in* NBER Macroeconomics Annual 1995, *B. S. Bernanke and J. J. Rotemberg, eds. Cambridge, MA: MIT Press.*

[6]*J. Dow and G. Gorton, "Stock Market Efficiency and Economic Efficiency: Is There a Connection?" NBER Working Paper No. 5233, August 1995.*

[7]*See also F. Allen and D. Gale, "Financial Markets, Intermediaries, and Intertemporal Smoothing," Working Paper #5-95, The Wharton School, University of Pennsylvania.*

[8]*In a series of papers Hoshi, Kashyap, and Scharfstein have investigated the role of banks in Japan. They find that the main banks of* keiretsus *interact with member firms in ways that the market apparently cannot reproduce. See T. Hoshi, A. Kashyap, and D. Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups,"* Quarterly Journal of Economics *106 (1991), pp. 33–60; "The Role of Banks in Reducing the Costs of Financial Distress in Japan,"* Journal of Financial Economics *27 (1990), pp. 67–88; and "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships," in* Asymmetric Information, Corporate Finance, and Investment, *R. G. Hubbard, ed. Chicago: University of Chicago Press, 1990.*

[9]*The idea of banks as monitors is attributable to D. Diamond, "Financial*

Intermediation and Delegated Monitoring," Review of Economic Studies *51 (1984), pp. 393–414.*

[10]*Also see R. Rajan, "Insiders and Outsiders: The Choice Between Informed and Arm's-Length Debt,"* Journal of Finance *47 (1992), pp. 1367–1400; S. Sharpe, "Asymmetric Information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships,"* Journal of Finance *45 (1990), pp. 1069–1087.*

[11]*G. Gorton and G. Pennacchi, "Financial Intermediaries and Liquidity Creation,"* Journal of Finance *45 (1990), pp. 49–72.*

[12]*Other notions of liquidity production by banks are given by B. Holmstrom and J. Tirole, "Private and Public Supply of Liquidity," MIT mimeo, 1995; and D. Diamond and P. H. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity,"* Journal of Political Economy *91 (1983), pp. 401–419.*

[13]*G. Gorton, "Banking Panics and Business Cycles,"* Oxford Economic Papers *40 (1988), pp. 751–781. Also see G. Gorton and C. Calomiris, "The Origins of Banking Panics: Models, Facts, and Bank Regulation," in* Financial Markets and Financial Crises, *R. G. Hubbard, ed. Chicago: University of Chicago Press, 1991.*

[14]*See G. Gorton, "Clearinghouses and the Origin of Central Banking in the United States,"* Journal of Economic History *45 (1985), pp. 277–283; and G. Gorton and D. Mullineaux, "The Joint Production of Confidence: Endogenous Regulation and Nineteenth-Century Commercial Bank Clearinghouses,"* Journal of Money, Credit and Banking *19 (1987), pp. 458–468. See also G. Gorton, "Bank Suspension of Convertibility,"* Journal of Monetary Economics *15 (1985), pp. 177–193.*

[15]*Banknotes may have survived in some form but faced a prohibitively high tax when the federal government began printing money under the National Banking Acts passed during the Civil War. In any case, the trend toward the use of demand deposits in place of notes was already clear.*

[16]*See G. Gorton, "Self-Regulating Bank Coalitions," The Wharton School mimeo, 1989; and F. Allen and D. Gale, "Optimal Financial Crises," The Wharton School mimeo, 1996.*

[17]*See M. Keeley, "Deposit Insurance, Risk, and Market Power in Banking,"* American Economic Review *80 (1990), pp. 1183–1200; and A. Marcus, "Deregulation and Bank Financial Policy,"* Journal of Banking and Finance *8 (1990), pp. 557–565.*

[18]*G. Gorton and R. Rosen, "Corporate Control, Portfolio Choice, and the Decline of Banking,"* Journal of Finance *50 (1995), pp. 1377–1420.*

[19]*If a bank's (market-value) capital ratio is sufficiently low, then both managers and outside shareholders may agree that the bank should maximize the value of deposit insurance. Rosen and I do not dispute this argument. Rather we focus on the prior question of how the bank came to have a low capital ratio.*

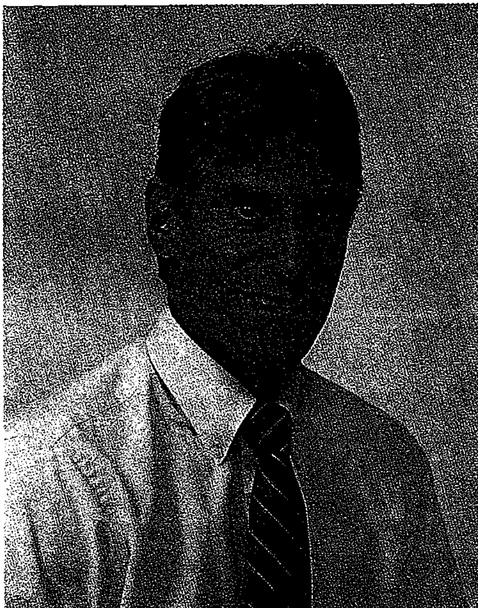
[20]*G. Gorton and A. Winton, "Bank Capital Regulation in General Equilibrium," The Wharton School mimeo, 1996.*

[21]*See G. Gorton and G. Pennacchi, "Are Loan Sales Really Off-Balance Sheet?"* Journal of Accounting, Auditing and Finance *4, 2 (1989), pp. 125–145; G. Gorton and J. Haubrich, "The Loan Sales Market," in* Research in Financial Services, Volume 2, *G. Kaufman, ed. Greenwich, CT: JAI Press, 1990.*

[22]*See G. Gorton and G. Pennacchi, "Banks and Loan Sales: Marketing Nonmarketable Assets,"* Journal of Monetary Economics *35 (1995), pp. 389–411.*

[23]*See G. Gorton and R. Rosen, "Banks and Derivatives," in* NBER Macroeconomics Annual 1995, *op. cit.*

NBER Profile: *Joseph G. Altonji*



Joseph G. Altonji is a research associate in the NBER's Program in Labor Studies and a professor of economics at Northwestern University. He received his B.A. and M.A. degrees in economics from Yale University in 1975, and a Ph.D. in economics from Princeton University in 1981. From 1980–86 he served on the faculty of Columbia University. He also has been a visiting professor of economics at Princeton.

Altonji teaches labor economics and econometrics. He has worked on a variety of topics, including the nature of labor market fluctuations, labor supply, consumption, the effects of immigration on the labor market, the returns to job seniority, intergenerational links in income and consumption, information and the labor market, the economics of education, and econometric methods. He is currently a coeditor of the *Journal of Human Resources* and has served on the Board of Editors of the *American Economic Review.*

Altonji is married to Cynthia Nethercut, who holds an M.P.A. from the Woodrow Wilson School at Princeton and is a manager for the Regional Transportation Authority in Chicago. They have two children: Matthew, 8, and Mary, 6. Altonji enjoys playing in Evanston softball leagues, and coaching soccer and baseball.

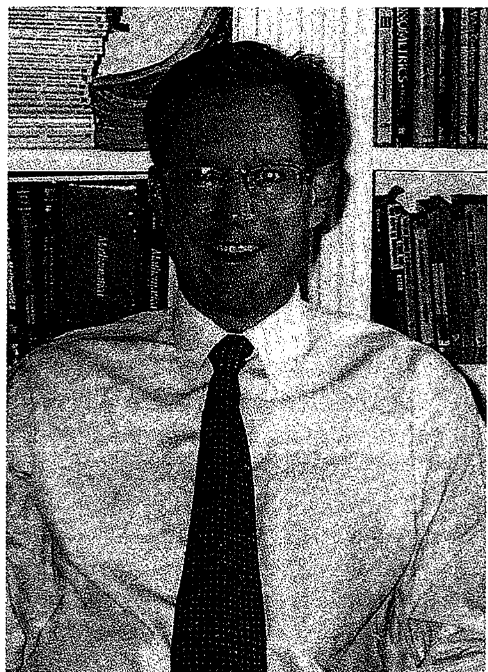
NBER Profile: *Rebecca M. Blank*

Rebecca M. Blank is a research associate in the NBER's labor studies program and a professor of economics at Northwestern University. Prior to coming to Northwestern, she taught at Princeton University, and served for a year as a senior staff economist with the President's Council of Economic Advisers.

Blank holds a Ph.D. in economics from MIT. Her research focuses on the interaction among the macroeconomy, government antipoverty programs, and the behavior and well-being of low-income families. She has studied the relationship between economic growth and income distribution over the 1980s, and has written a book comparing social protection programs in the United States and other industrialized countries: *Social Protection Versus Economic Flexibility: Is There a Trade-Off?* Her latest book project, *It Takes a Nation: A New Agenda for Fighting Poverty,* forthcoming from Princeton University Press, analyzes the recent discussion about poverty and public policy in the United States.

Blank is married to Johannes Kuttner, and they have a six-month-old daughter, Emily Kuttner. Both Becky and her husband are "total policy wonks" and enjoy arguing about politics and public policy. Becky used to spend much of her spare time reading fiction, but now plays with her baby instead.

NBER Profile: *Gary B. Gorton*



Gary B. Gorton is a tenured professor of finance at The Wharton School (University of Pennsylvania) and a research associate in the NBER's Program in Corporate Finance. He received a B.A. in Chinese Language and Literature from Oberlin College in 1973 and an M.A. in Chinese Studies from the University of Michigan the following year. Shifting fields, he received an M.A. in economics from Cleveland State University in 1977, and a Ph.D. in economics from the University of Rochester in 1983.

Gorton joined the Wharton faculty in 1984 as an assistant professor of finance, was promoted to associate professor in 1990, and to full professor in 1995. He also has taught at the University of Chicago's Graduate School of Business, and served as both a senior economist and an advisor to the Federal Reserve Bank of Philadelphia.

Gorton's research, particularly on banking, has been published in all the major economic journals and in several NBER books. When he is not engaged in research on financial economics, Gorton can be found playing with his two red-headed daughters, Nicole (2) and Danielle (10 months) and with their Great Dane puppy, Blue. Otherwise, he is listening to his red-headed wife discourse on tax arbitrage.

Conferences

International Seminar on Macroeconomics

The NBER's 19th annual International Seminar on Macroeconomics took place at the Institute for Advanced Studies in Vienna on June 17 and 18. Cochair Jeffrey A. Frankel, NBER and University of California, Berkeley, along with organizers Torsten Persson, NBER and Stockholm University, and James H. Stock, NBER and Harvard University, planned this program:

Paul Gregg and
Alan Manning, London School of Economics, "Skill-Biased Change, Unemployment, and Wage Inequality"
Discussants:
Richard Rogerson, University of Minnesota, and
Dennis Snower, Birkbeck College

Giuseppe Bertola, NBER and Università di Torino, and
Richard Rogerson, "Institutions and Labor Relocation"
Discussants:
Alan B. Krueger, NBER and Princeton University, and
Josef Zweimuller, Institute for Advanced Studies

Lawrence J. Christiano and
Martin S. Eichenbaum, NBER and Northwestern University, and
Charles Evans, Federal Reserve Bank of Chicago, "Monetary Policy Shocks and Their Consequences: Theory and Evidence"
Discussants:
Christopher A. Sims, NBER and Yale University, and
Francesco Giavazzi, Università Bocconi

Ben S. Bernanke, NBER and Princeton University, and
Ilian Mihov, Princeton University, "Central Bank Responses to Inflation: A Comparative Study"
Discussants:
Lawrence J. Christiano, and Jürgen von Hagen, University of Mannheim

Lars E. O. Svensson, NBER and Stockholm University, "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targeting"
Discussants:
Kenneth S. Rogoff, NBER and Princeton University, and
Guido Tabellini, Innocenzo Gasparini Institute for Economic Research

Karen K. Lewis, NBER and University of Pennsylvania, "Are International Capital Market Restricted Countries Liquidity Constrained?"
Discussants:
Christopher D. Carroll, NBER and Johns Hopkins University, and
Guglielmo Weber, Università di Padova

Janice C. Eberly, NBER and University of Pennsylvania, "International Evidence on Investment and Fundamentals"
Discussants:
John Hassler, Stockholm University, and
Simon Gilchrist, Boston University

Tamim Bayoumi and
David Coe, International Monetary Fund, and
Elhanan Helpman, NBER and Tel Aviv University, "R and D Spillovers and Global Growth"
Discussants:
Charles Bean, London School of Economics, and
Per Krusell, University of Rochester

Gregg and **Manning** argue for making relative wages an argument of the labor supply function (or wage curve) in order to explain the observed patterns of wage inequality and unemployment. If this is done, they expect that labor market institutions will be much less important than is generally assumed in determining longer-run labor market outcomes, and that policies toward education will be much more important.

Despite stringent restrictions on dismissal in most European countries, rates of job creation and destruction are remarkably similar across European and North American labor markets. **Bertola** and **Rogerson** show that relative-wage compression is conducive to higher employer-initiated job turnover. They argue that wagesetting institutions and job-security provisions differ across countries in ways that are both consistent with rough uniformity of statistics on job turnover and readily explained by intuitive theoretical considerations.

Christiano, Eichenbaum, and **Evans** present new evidence on the

credibility of certain measures of monetary policy shocks. They then present new results on the response of aggregate profits and both industry-level and aggregate real wages to a monetary policy shock. Finally, they use these facts to evaluate the plausibility of two models of the monetary transmission mechanism. They find that the sticky-price model leads to the perverse implication that profits rise after a monetary contraction. They conclude that sticky prices alone are not sufficient to account for the key facts: labor market frictions, whose effect is to inhibit cyclical movements in marginal costs by mimicking very high labor supply elasticities, need to be embedded in the current general equilibrium sticky-price models. They reach the same conclusion with the limited participation model. They conclude that, as with the sticky-price models, it is important to embed labor market frictions, whose effect is to mimic a high elasticity of labor supply, into the current generation of limited participation models.

Since 1975 the Bundesbank has described its monetary policy strategy as money-growth targeting. **Bernanke** and **Mihov** show that Bundesbank policy is characterized better as inflation targeting, in the sense that forecasted inflation explains a much greater share of the historical variation in the "Lombard rate" than does forecasted money growth. They also provide estimates of Bundesbank operating procedures to support their use of the Lombard rate as an indicator of German monetary policy.

Svensson shows that inflation targeting implies inflation *forecast* targeting: the central bank's inflation forecast becomes an intermediate target. Inflation forecast targeting simplifies both the implementing and the monitoring of monetary policy. The inflation forecast is actually an ideal intermediate target: it is most correlated with the goal; easier to control than the goal; more observable than the goal; and very transparent. Money growth targeting generally leads to higher variability of inflation than inflation targeting. In the rare special cases when either money growth or the exchange rate is the best intermediate target, inflation forecast targeting automatically implies the relevant intermediate target.

Countries do not share risk optimally. Explanations for this imperfect risksharing must incorporate restrictions in international capital movements with the presence of nontradables. **Lewis** examines whether restrictions in the international capital market imply different liquidity constraints for unrestricted countries and, hence, different consumption-smoothing behavior. She shows that countries facing some restrictions exhibit significantly different consumption behavior over time.

Eberly specifies a model in which a firm may face fixed, linear, and convex costs of investing; she estimates the resulting investment function using firm-level data from 11 countries. She finds important nonlinearities, consistent with fixed or other nonquadratic costs, in the relationship between investment and fundamentals for most countries.

A country can raise its total factor productivity by investing in R and D. But countries also can boost their productivity by trading with other countries that have large "stocks of knowledge" from cumulative R and D activities. Using a special model that incorporates R and D spillovers among industrial countries, and from industrial countries to developing countries, **Bayoumi, Coe,** and **Helpman** find that R and D, R and D spillovers, and trade all play important roles in boosting growth in industrial and developing countries.

Also participating in this conference were: Philippe Bacchetta and Walter Wasserfallen, Studienzentrum Genzensee; NBER President Martin Feldstein, also of Harvard University; Vitor Gaspar, Banco do Portugal; Robert J. Gordon, NBER and Northwestern University; Henri Pages, Banque de France; and conference cochair Charles Wyplosz, Institut Européen d'Administration des Affaires.

These papers and their discussions will be published in a special edition of the *European Economic Review.*

Franco–American Seminar

Approximately 100 economists from 12 countries attended the NBER Franco–American Seminar on "R and D, Innovation, and Productivity." It was held in Strasbourg, France in June 1996 in conjunction with the 10th International Conference of l'Association pour le Développement en Economie et Statistique (ADRES). The topic of the ADRES Conference this year was "The Economics and Econometrics of Innovation." Three of the sessions were sponsored by the NBER: Innovation and Market Share; Knowledge Spillovers; and Patent Design and Competition Policy. The conference itself was organized by Bruno Crepon, INSEE Paris; David Encaoua, Université de Paris I; Bronwyn H. Hall, NBER and University of California, Berkeley; François Laisney, Université Louis Pasteur, Strasbourg; and Jacques Mairesse, NBER and INSEE Paris. The following papers were presented at the Franco–American Seminar:

Bronwyn H. Hall, and **Katrin Vopel**, University of Mannheim, "Innovation, Market Share, and Market Value"

Corinne Barlet, **Emmanuel Duguet**, **David Encaoua**, and **Jacqueline Pradel**, all of Université de Paris I, "An Econometric Analysis of Innovation Outputs in French Manufacturing"

Lee Branstetter, Dartmouth College, "The Scope of Knowledge Spillovers"

Carlo Carraro, University of Venice, and **Antoine Soubeyran**, Université d'Aix-Marseille II, "R and D Cooperation, Innovation Spillovers, and Environmental Dumping"

Claude Crampes and **Corinne Langinier**, Université des Sciences Sociales, Toulouse, "Information Disclosure in the Renewal of Patents"

Jean O. Lanjouw, NBER and Yale University, and **Josh Lerner**, NBER and Harvard Business School, "Preliminary Injunctive Relief: Theory and Evidence from Patent Litigation" (NBER Working Paper No. 5689)

Hall and **Vopel** investigate the relationship among R and D spending, market share, and market value in large U.S. manufacturing firms. Using a newly constructed dataset that contains a measure of the average sales share obtained by firms in the markets in which they compete, they confirm a recent finding of Blundell, Griffith, and Van Reenen (who use U.K. data) that the stock market valuation of innovative output is higher when a firm has large market share. This finding also holds in the United States when innovative activity is measured as R and D spending. Further, in the U.S data, the higher market value is related more strongly to the size of the firm than to its market share. The authors argue that a possible implication is that the cost-reducing (Schumpeter) effect of being a dominant firm in an innovative industry may be as important as the revenue-enhancing (Gilbert and Newberry) effect, which is linked explicitly to market share. However, they caution that their results are somewhat preliminary.

Using data on French firms, **Barlet, Duguet, Encaoua,** and **Pradel** examine the link between innovation implementation by manufacturing firms and their share of sales from innovation. Using the results of a new survey of innovative activity and sources of innovation, they find that the sales share of innovative products is driven by demand from users and by new technology, with effects that are roughly equal in magnitude. The return on product imitation decreases with the sectoral innovation level, while the return on real product innovation increases.

Branstetter uses data on firms in the United States and Japan to investigate the geographical extent of knowledge spillovers within and between these two countries. His paper was motivated by the recent theoretical literature in international trade and economic growth, which has paid considerable attention to the potential role of technological externalities in determining the pattern of trade. In a number of contexts, it has been shown that these types of externalities can generate multiple equilibriums in the global pattern of specialization and trade, with different consequences for the relative welfare of the trading countries. In such models, temporary government policies can have lasting effects by pushing the global economy into a particular equilibrium. However, the prediction of multiple equilibriums generally hinges on the assumption that the technological externalities are intranational rather than international in scope. Branstetter points out shortcomings in previous efforts to estimate the effects of intranational and international knowledge spillovers. He then provides new estimates of the relative impact of these spillovers at the firm level, using previously unexploited panel data from the United States and Japan. His results, in con-

trast to those of some previous studies, indicate that knowledge spillovers are primarily intranational in scope, providing empirical confirmation of a crucial assumption in much of the previous theoretical literature.

Using a theoretical model of the reaction of firms to changes in environmental regulation, **Carraro** and **Soubeyran** investigate the effects of environmental dumping on technological choice and firm location. Firms in a country with more stringent environmental regulation (such as higher taxes) may decide either to relocate their plants in the country where regulation is more lax, or to adopt a new environmental-friendly technology. The authors show that, even if firms in the industry share the same initial technology and are allowed to enter the industry freely, in equilibrium they make different choices in response to the same environmental policy. In particular, the dumping policy may not be able to attract many firms because they may prefer to cooperate in carrying out environmental R and D rather than to relocate their plants abroad. Under some conditions, environmental dumping can be effective in attracting firms to a location, and under other conditions R and D cooperation is the optimal reaction to a cross-country difference in environmental regulations.

Crampes and **Langinier** present a model of patent choice allowing strategic decisions in a sequential game with two agents: a patentholder, who knows the characteristics of the market perfectly, and a potential entrant who has no information about the value of demand. The authors show that there exists no separating equilibrium, because the incumbent in a high-valued market always has some incentive to mimic the behavior of a firm in a bad market. Consequently, they find some equilibriums in which the incumbent prefers not to pay the renewal fee for the patent, hoping that it will be interpreted by the challenger as a signal of low market profitability.

Lanjouw and **Lerner** investigate whether established plaintiffs request preliminary injunctions in patent suits in order to prey on less financially healthy firms. They present a model in which differences in litigation costs drive the use of preliminary injunctions in civil litigation. Using a sample of 252 patent suits, they find evidence of predation. They go on to explore the impact of policy reforms, such as relaxation of the standards for obtaining a preliminary injunction, or easing of the financing costs associated with litigation.

Selected papers from the Franco–American and ADRES conferences will be published in a special issue of *Annales d'Economie et de Statistique*. A more detailed report of the conferences will become available on the NBER Web site:

http://www.nber.org

(see the menu on the home page for details).

Privatizing Social Security

For the past two years, the National Bureau of Economic Research has organized a research project on "Privatizing Social Security." The project, under the direction of Bureau President Martin Feldstein, studied the experience in countries that have shifted their retirement programs to funded, privately managed accounts. It has analyzed the issues that would be involved in a similar shift in the United States. On August 1 and 2, the Bureau held a conference at which the results of this research were discussed with a wider group that included experts from around the globe:

Sebastian Edwards, NBER and University of California, Los Angeles, "The Chilean Pension Reform: A Pioneering Program"
Discussant:
Stephen P. Zeldes, NBER and Columbia University

Malcolm Edey and
John Simon, Reserve Bank of Australia, "Australia's Retirement Income System: Implications for Saving and Capital Markets"
Discussant:
John Piggot, University of New South Wales

Alan Budd,
Nigel Campbell, and
Alexi Chan, HM Treasury, "The Pensions System in the United Kingdom"
Discussant:
Richard Disney, Institute for Fiscal Studies

Carlos Sales, Banobras, and
Fernando Solis and
Alejandro Villagómez Instituto Technológico Autónomo de México, "Pension System Reform: The Mexican Case"
Discussant:
Aaron Tornell, NBER and Harvard University

Joaquin A. Cottani and
Gustavo C. Demarco, Ministry of Finance, Argentina, "The Shift to a Funded Social Security System: The Case of Argentina"
Discussant:
Anita Schwarz, The World Bank

Panel Discussion: The Recommendations of the U.S. Social Security Advisory Council
Edward Gramlich, University of Michigan
Sylvester Schieber, Watson Wyatt Worldwide
Carolyn Weaver, American Enterprise Institute

Martin Feldstein, and
Andrew Samwick, NBER and Dartmouth College, "The Transition Path in Privatizing Social Security" (NBER Working Paper No. 5761)
Discussant:
John B. Shoven, NBER and Stanford University

Laurence J. Kotlikoff, NBER and Boston University, "Simulating the Privatization of Social Security in General Equilibrium" (NBER Working Paper No. 5776)
Discussant:
Thomas J. Sargent, NBER and Stanford University

James M. Poterba, NBER and MIT, and
David A. Wise, NBER and Harvard University, "Individual Financial Decisions in Retirement Saving Plans and the Provision of Resources for Retirement"
Discussant:
Jack Vanderhei, Employee Benefit Research Institute

Alan L. Gustman, NBER and Dartmouth College, and
Thomas L. Steinmeier, Texas Tech University, "Privatizing Social Security: The First Rounds of a Generic, Voluntary, Privatized U.S. Social Security System"
Discussant:
David M. Cutler, NBER and Harvard University

Olivia S. Mitchell, NBER and University of Pennsylvania, "Administrative Costs in Public and Private Retirement Systems"
Discussant:
Sylvester Schieber

As part of Chile's economic reforms, an inefficient pay-as-you-go pension system was replaced by a privately administered defined-contribution system. This reform has been credited with aiding the development of Chile's capital market, reducing government contingent liabilities, and stimulating Chile's traditionally anemic savings rate. A large number of pension reforms around the world are now being tailored after Chile's pioneering program. **Edwards** analyzes the most salient aspects of the Chilean program and evaluates its achievements to date.

Australia is currently in the early stages of introducing a system of self-provision for retirement through mandatory contributions to private pension funds. For most employees, the scheme eventually will replace, either fully or partially, the government pensions that are currently relied upon by a large majority of retirees. However, a number of policy issues remain. Perhaps the most important,

Edey and **Simon** point out, is the impact of the system on retirement decisions: a number of features of the system effectively create incentives for early retirement and continued reliance on the government pension.

The United Kingdom is one of the few major economies that does not face a serious long-term problem of public sector pension (social security) payments. The net present value of U.K. public pension liabilities is estimated at 4 percent of GDP, compared with over 100 percent in Japan, Germany, and France. As **Budd, Campbell,** and **Chan** explain, there are two principal reasons for this. First, the basic state pension has been held constant in real terms since 1980. It is currently about 15 percent of average earnings. If this policy is continued, future reductions in contributions rates will be possible. In addition, there is a second-tier state earnings-related pension scheme, but only 17 percent of employees belong to it. Most employees belong to funded private occupational schemes; membership has been encouraged by regulation and favorable tax treatment.

Sales, Solís, and **Villagómez** analyze the Mexican pension reform and preliminarily assess its future effects on the Mexican economy. Essentially, the reform replaces a pay-as-you-go system with a fully funded defined-contribution system based on individual accounts with a minimum pension guaranteed by the government. Total contributions to the individual accounts will amount to 13.5 percent of salary for the average worker, plus 2.5 percent for disability and life insurance that still will be managed by the government's Social Security Institute (IMSS). The new Mexican system will result in lower administrative costs by: limiting the number of transfers between pension fund managers to one per year; allowing pension managers to operate several funds; not establishing a minimum guaranteed rate of return for pension funds; and providing a centralized agency for collecting contributions. Among its disadvantages are: the prohibition against funds investing in foreign securities; the IMSS being the sole provider of disability and life insurance; limits on the market share; and portability problems. Still, the fiscal cost of transition to the new system is relatively low compared to similar reforms in other Latin American countries, and the Mexican reform is expected to have a significant effect on financial savings.

The Argentine government replaced the pay-as-you-go public social security regime with a system combining public and private administration that began operating in July 1994. **Cottani** and **Demarco** analyze the problems of the old regime that led to the reform, and characterize the structure of the new system. Their projections of the public provisional deficit, and of the pension funds for the next three decades, provide the basis for a final discussion about the expected macroeconomic effects of the new system, particularly those associated with the domestic saving rate of the economy.

At dinner, three members of the current U.S. Social Security Advisory Council—**Gramlich, Weaver,** and **Schieber**—described the council and its work. Over the past several years, the council has reviewed various options for bringing the Social Security system into actuarial balance. Current projections indicate that the OASDHI system will be bankrupt by 2030 unless changes are made. Council members are now split among three plans. The first plan would reduce benefits slightly but maintain current tax rates. The remaining gap would be closed by investing some of the Social Security trust fund in equities. The second plan would scale back benefits further in order to bring the system into balance without raising payroll tax rates. To supplement the reduced benefits, the plan requires each worker to contribute to a new defined-contribution plan with individual accounts, similar to TIAA–CREF or the Federal Thrift Plan. The third plan would create Personal Savings Accounts (PSAs). Under this two-tiered plan, 7.4 percent of the 12.4 percent payroll tax would provide a flat dollar payment for a worker with a full lifetime employment record. The remaining 5 percent of the payroll tax would be invested in private savings accounts. Withdrawals from PSAs would be allowed at age 62; benefits could be included in estates, and annuitization would not be required at retirement. The PSA plan also includes a 1.5 percent payroll tax supplement for the next 70 years to pay for the transition to this new system, and would require $600 billion of additional borrowing.

In discussing the three plans, **Weaver** noted that it is remarkable that more than half of the council members support one of the two plans that include individual savings accounts. She said that few of the council members began the process expecting to support privatization of Social Security. But, after studying the alternatives, a majority decided that partial privatization looks like the most appealing option.

Feldstein and **Samwick** report their calculations of a feasible transition from the existing U.S. Social Security system to a system based on Mandatory Individual Retirement Accounts (MIRAs). A gradual transition that maintains the same benefits that could be paid with the current 12.4 percent payroll tax would raise

the current payroll tax rate by less than 1.5 percentage points (to a maximum of 13.7 percent in 2007). By 2019, the payroll tax would be lower than 12.4 percent. Because of the high return on a fully funded plan, the 12.4 percent payroll tax eventually could be replaced by a payroll tax of only 2.1 percent while maintaining the same long-term benefits that would have been paid with the 12.4 percent tax. They also discuss how a MIRA system could deal with the problem of low-income employees and with the risks associated with uncertain longevity and fluctuating market returns.

Kotlikoff finds that privatizing Social Security can generate major long-run increases in output and living standards. Further, although the long-run gains are larger if privatization redistributes resources from initial to future generations, the pure efficiency gains from privatization are also substantial.

Proposals for mandatory private saving accounts differ in the degree of investment discretion that they provide to individual savers, and in their provisions for annuitization of accumulated assets. **Poterba** and **Wise** draw on the existing experience with 401(k) and related plans to provide evidence on these issues. They find that the share of 401(k) plan assets held in corporate equities has increased substantially in recent years. They also learn that the education and income level of participants are related to asset allocation decisions, with less-educated and lower-income participants less inclined to invest in equity securities. A unique survey of TIAA–CREF participants also provides some evidence on the purchase of annuities, another aspect of privatization plan design.

Gustman and **Steinmeier** investigate individual responses to a simple scheme for privatizing Social Security. They explore the sensitivity of outcomes to how individuals project life expectancy and value spouse and survivor benefits, and to expected future reductions in Social Security benefits. Depending on assumptions made, first-year participation ranges from 20 percent to almost 100 percent. Estimated paths for taxes over time decline immediately with privatization, but the decline in benefits grows slowly over a period of two or three decades. Labor force participation rates are not affected greatly by privatization, even if major changes in pensions are induced.

Mitchell collects and analyzes information on the expenses associated with public versus private retirement systems. She also examines the costs of the U.S. Social Security system, comparing it to national systems from other countries. Mitchell finds that the administration costs of publicly run social security systems vary greatly across countries and institutional settings. A key factor influencing costs is scale: plans with more assets and more participants are less expensive to administer. She concludes that privately managed old-age retirement programs will be somewhat more costly to operate than current publicly managed programs, depending on the specific design of the programs. Nevertheless, she expects these costs to be accompanied by new services for participants.

The proceedings of this conference will be published by the University of Chicago Press. The release of this volume will be announced in a future issue of the *Reporter*.

Bureau News

1996 Summer Institute

Over 900 economists from 227 universities and organizations around the world attended the NBER's 18th annual Summer Institute. This year's program was funded primarily by a grant from the Lynde and Harry Bradley Foundation, with additional support from the National Science Foundation and the National Institute on Aging. The papers presented at 30 different sessions covered a wide variety of topics. A list of all papers and work in progress can be obtained by writing to: Summer Institute Catalogue, NBER, 1050 Massachusetts Avenue, Cambridge MA 02138-5398.

Economic Fluctuations and Growth

Nearly 150 members and guests of the NBER's Program on Economic Fluctuations and Growth met in Cambridge on July 13. Andrew B. Abel, NBER and University of Pennsylvania, and Kenneth D. West, NBER and University of Wisconsin, organized this program:

Jeremy Greenwood, University of Rochester, and
Mehmet Yorukoglu, University of Chicago, "1974"
Discussant:
Joel Mokyr, Northwestern University

Simon Gilchrist, Boston University, and
John Williams, Federal Reserve Board, "Putty-Clay and Investment: A Business Cycle Analysis"
Discussant:
Thomas Cooley, University of Rochester

Mark Bils, NBER and University of Rochester, and
James Kahn, University of Rochester, "What Inventory Behavior Tells Us About Business Cycles"
Discussant:
Valerie A. Ramey, NBER and University of California, San Diego

Jeffrey A. Frankel and
David H. Romer, NBER and University of California, Berkeley, "Trade and Growth: An Empirical Investigation" (NBER Working Paper No. 5476)
Discussant:
Steven N. Durlauf, NBER and University of Wisconsin

Daniel Levy, Emory University; and
Mark Bergen,
Shantanu Dutta, and
Robert Venable, University of Chicago, "On the Magnitude of Menu Costs: Direct Evidence from Large U.S. Supermarket Chains"
Discussant:
Robert E. Hall, NBER and Stanford University

Robert J. Shiller, NBER and Yale University, "Why Do People Dislike Inflation?" (NBER Working Paper No. 5539)
Discussant:
Stanley Fischer, International Monetary Fund

Greenwood and **Yorukoglu** ask whether 1974 was a watershed year: it saw an increase in the rate of technological change in the production of new equipment; it also signaled the beginning of a sharp rise in income inequality, and of the productivity slowdown. The authors ask whether these phenomena were related, and whether they might have been the result of an industrial revolution associated with the introduction of information technologies.

Gilchrist and **Williams** develop a business cycle model based on the putty-clay technology introduced by Johansen (1959). The putty-clay model fits the observed pattern of forecastable comovements of labor, output, consumption, and investment much better than an equivalent model based on the standard neoclassical production technology. Their model also provides a much stronger propagation mechanism for shocks to technology and relative prices.

Bils and **Kahn** argue that the behavior of manufacturing inventories provides evidence against models of business cycle fluctuations based on productivity shocks, increasing returns to scale, or favorable externalities, while supporting models with short-run diminishing returns and procyclical work effort. Both finished goods and work-in-progress inventories move proportionally much less than sales or production over the business cycle. The authors can explain the cyclical behavior of inventory holdings by allowing for procyclical work effort, the cost of which is internalized by firms but is not reflected contemporaneously in measured wage rates.

Frankel and **Romer** construct measures of the geographic component of countries' trade, and use those measures to obtain instrumental-variables estimates of the effect of trade on income. Their results suggest that ordinary-least-square estimates understate the effects of trade, and that trade has a quantitatively large, significant, and robust positive effect on income.

Levy, Bergen, Dutta, and **Venable** provide direct macroeconomic evidence on the actual magnitude of menu costs for four large U.S. retail supermarket chains. They show that in these establishments, changing prices is a complex process, requiring dozens of steps and a lot of resources: the menu costs in these chains range from $91,416 to $114,188 annually per store, for an average of $105,687. Menu costs comprise 0.7 percent of revenues, 2.8 percent of gross margins, and 35.2 percent of the net margins of these chains. Additional evidence from these chains suggests that these menu costs may be a barrier to certain cost-based price changes.

Shiller conducted a survey of how people think about inflation, and what real problems they see it causing. With results from 677 people, he compared people in the United States, Germany, and Brazil; the young and the old; and economists and noneconomists. The most striking differences among the groups studied were between economists and noneconomists. There were also important international and intergenerational differences. The U.S.–Germany differences (on questions not simply about information) were usually less strong than the intergenerational differences.

Science and Technology Policy

Over 40 academic, government, and industry economists met in Cambridge on August 14 as part of the NBER's project on science and technology policy. Adam B. Jaffe, NBER and Brandeis University, Paul M. Romer, NBER and Stanford University, and David Mowery, University of California, Berkeley, organized this program:

Scott Wallsten, Stanford University, "The Small Business Innovation Research Program: Encouraging Technological Innovation and Commercialization in Small Firms?"
Discussant:
Joshua Lerner, Harvard University

William J. Spencer, Sematech, discussed "Sematech International Collaborations"

Lynne G. Zucker and **Michael R. Darby,** NBER and University of California, Los Angeles, "The Diffusion of Biotechnology in Japan: Scientists, Institutions, and Firms"
Discussant:
Scott Stern, NBER and MIT

Wesley Cohen, Carnegie–Mellon University, and **Lucien Randazzese,** Harvard University, "Eminence and Enterprise: The Impact of Industry Support on the Conduct of Academic Research in Science and Engineering"
Discussant:
Michael S. Fogarty, Case Western Reserve University

Richard Nelson, Columbia University, "A Preliminary Report on University Inventing"
Discussant:
Adam B. Jaffe

Francis Narin, CHI Research, Inc., "Linkage Between Basic Research and Patented Technology"
Discussant:
David Austin, Resources for the Future

The Small Business Innovation Research (SBIR) Program now awards close to $1 billion in R and D grants to small firms each year. **Wallsten** analyzes the program using a new dataset of awardees, firms that applied to the program and were rejected, and eligible firms that never applied to the program. He finds that: multiple awards per firm are common; older, larger, and more patent-intensive firms win more awards; awardees go on to receive more patents than rejected firms do; winning awards does not seem to be correlated with increased sales or employment; and, based on a sample of public firms, there is a substantial, almost dollar-for-dollar, crowd-out effect. That is, firms that receive SBIR grants seem to reduce their other R and D expenditures by an amount almost equal to the award.

The continuing improvement of computers, telecommunications, and in fact all modern electronics, is attributable to the amazing productivity growth in the manufacture of silicon integrated circuits: 25–30 percent per year for nearly three decades. Part of these productivity gains were the result of the ever-increasing diameter of silicon wafers, from 30mm in 1965 to 200mm today, and probably to 300mm by the year 2000. The cost of converting from 200mm to 300mm wafers will be far more than any single company can afford. Therefore, two cooperative efforts are under way, aimed at developing 300mm manufacturing capability: I300I (International 300mm Initiative) involving a total of 13 semiconductor manufacturers from the United States, Europe, Korea, and Taiwan; and Selete (Semiconductor Leading Edge Technologies Inc.), which consists of 10 Japanese members. **Spencer** compares the two in terms of their objectives, scope, membership, funding, and methodology. He then considers the policy implications of the I300I international cooperation in the areas of trade, tariffs, intellectual property, and the role of government funding.

Zucker and **Darby** report on the relationship between births of new biotechnology enterprises (NBEs) in Japan and "stars" and other variables. They find much the same process at work in Japan as in the United States. However, star scientists in

Japan induce entry of significantly fewer NBEs there than in the United States. Three major factors in Japan interact to deter the formation of new biotechnology firms (NBFs): 1) the closed nature of the Japanese system of higher education and noncompetitive research funding; 2) incompleteness of the capital markets, especially the lack of a national venture capital industry capable of financing new firms, and the related absence of initial public offerings prior to a firm's achieving substantial profitability; and 3) cultural characteristics and incentive systems that discourage Japanese entrepreneurship generally, and affect scientists in particular. Zucker and Darby conclude that these factors explain both the low level of NBF formation and the smaller impact of intellectual capital on resources on the births of NBEs.

Since the early 1980s, ties between industry and academic research have deepened. There is a concern that those deepening ties may lead to less basic research being conducted and to limitations on the disclosure of academic research. **Cohen** and **Randazzese** examine the effects of deepening ties between industry and academia on university research by developing a model of university–industry research relationships and testing it with data from a 1991 survey of directors of university–industry research centers in the United States.

Nelson reports on a research project, still in its early stages, aimed at describing the inventing going on in U.S. research universities since the passage of the 1980 Bayh–Dole Act. The author is interested in the kinds of inventions being made, where in the university they are occurring, and the sources of funding for the efforts that lead to inventing. He plans to study the firms that are drawing on university inventing to determine their industries and whether they are typically big or small, and to learn what kind of inventions are taken up by firms in the vicinity of the university. The author is especially interested in what the new incentive regime launched by Bayh–Dole is doing to the nature of research at universities, and to the university culture more broadly.

According to **Narin,** there has been a *threefold* increase in linkage between patented technology and the research science base over the six years separating 1987/8 and 1993/4. The number of front-page citations to U.S.-authored research papers in SCI-covered journals has increased from 16,607 to 49,510 over the six years. Second, a large fraction of these papers cited in patents originate in the U.S. university system, and are funded by U.S. research support agencies. Specifically, for the 1993 data, approximately 67 percent of the cited U.S. papers have at least one author from a university. Of these U.S. university papers, approximately 68 percent acknowledged support from one or more government agencies. Thus, university research in the United States, supported by the U.S. governmental agencies, is a major source of the research that underlies patented industrial technology.

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Abstracts of all papers issued since July 1996 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

Entry and Predation: British Shipping Cartels, 1879–1929

Fiona Scott Morton

NBER Working Paper No. 5663
July 1996
JEL Nos. L92, L12
Industrial Organization

I examine the outcomes of cases of entry by merchant shipping lines into established markets around the turn of the century. These established markets are dominated completely by an incumbent cartel composed of several member shipping lines. The cartel decides whether or not to begin a price war against the entrant; some entrants are admitted formally to the cartel without any conflict. I use characteristics of the entrant to predict whether or not the entrant will encounter a price war conditional on entering. I find that weaker entrants are fought, where "weaker" means having fewer financial resources, less experience, being smaller, or having poor trade conditions. My empirical results support the "long purse" theory of predation. I discuss qualitative evidence, such as predatory intent expressed in correspondence between cartel members, which supports the empirical results. The results are also robust to misclassification of the dependent variable, which is a particular concern when dealing with historical data.

Where Are We in the Economics of Gender? The Gender Pay Gap

Francine D. Blau

NBER Working Paper No. 5664
July 1996
JEL Nos. J16, J31
Labor Studies

Empirical research on gender pay gaps traditionally has focused on the role of gender-specific factors, particularly gender differences in qualifications and in the treatment of otherwise equally qualified male and female workers (that is, labor market discrimination). This paper explores the determinants of the gender pay gap and argues for the importance of an additional factor: wage structure, that is the array of prices set for labor market skills and the rewards received for employment in favored sectors. Drawing on joint work with Lawrence Kahn, I illustrate the impact of wage structure by presenting empirical results on its effect on international differences in the gender gap, and on trends over time in the gender differential in the United States.

Changes in U.S. Tariffs: Prices or Policies?

Douglas A. Irwin

NBER Working Paper No. 5665
July 1996
JEL Nos. F13, N72
International Trade and Investment, Development of the American Economy

In the century after the Civil War, roughly two-thirds of U.S. dutiable imports were subject to specific duties with ad valorem equivalents related inversely to the price level. This paper finds that import price fluctuations easily dominate commercial policies (for example, changes in rates of import duty) in bringing about changes in the average U.S. tariff from 1865–1973. About three-quarters of the post–Smoot–Hawley decline in U.S. tariffs, for example, can be attributed to higher import prices, and the remainder to negotiated reductions in tariff rates.

Exclusive Dealing

B. Douglas Bernheim and Michael D. Whinston

NBER Working Paper No. 5666
July 1996
JEL No. L42
Industrial Organization

We provide a conceptual framework for understanding the phenomenon of exclusive dealing, and we explore the motivations for and effects of its use. For a broad class of models, we characterize the outcome of a contracting game in which manufacturers may employ exclusive dealing provisions in their contracts. We then apply this characterization to a sequence of specialized settings. We demonstrate that exclusionary contractual provisions may be irrelevant, anticompetitive, or efficiency-enhancing, depending upon the setting. More specifically, we demonstrate the potential for anticompetitive effects in *noncoincident* markets (that is, markets that do not practice exclusive dealing). We also explore the potential for the enhancement of efficiency in a setting in which common representation gives rise to incentive conflicts. In each instance, we describe the manner in which equilibrium outcomes would be altered by a ban on exclusive dealing. We demonstrate that a ban may have surprisingly subtle and unintended effects.

The Determinants and Consequences of Financial Education in the Workplace: Evidence from a Survey of Households

B. Douglas Bernheim and Daniel M. Garrett

NBER Working Paper No. 5667
July 1996
JEL Nos. H31, I21
Aging, Public Economics

In recent years, there has been significant growth in programs of financial and retirement education in the U.S. workplace. This phenomenon provides an opportunity for assessing the effects of targeted education programs on financial choices. We use a novel household survey to develop econometric evidence on the efficacy of employer-based financial education. While our primary focus is on the effects of these programs on saving (both in general and for retirement purposes), we also examine a number of collateral issues. These include the circumstances under which employers offer, and employees participate in, financial education programs, and the effects of these programs on sources of information and advice concerning retirement planning. We find that employer-based retirement education strongly influences household financial behavior.

International R and D Spillovers: A Reexamination

Frank R. Lichtenberg and Bruno Van Pottelsberghe de la Potterie

NBER Working Paper No. 5668
July 1996
JEL Nos. F10, O30, O40
Productivity

Coe and Helpman (1995) have measured the extent to which technology spills over between industrialized countries through the particular channel of trade flows. This paper reexamines two particular

features of their study. First, we suggest that their functional form of how foreign R and D affects domestic productivity via imports is probably incorrect. We provide an alternative model that turns out to be more accurate, both theoretically and empirically.

Second, we take into account two new potential channels of technology transfer: inward foreign direct investment (FDI) and technology sourcing, as proxied by outward FDI. We show that outward FDI flows and imports flows are simultaneous channels through which technology is diffused internationally. Inward FDI flows are not a significant channel of technology transfer. The hypothesis of technology sourcing associated with multinational enterprises' activities abroad therefore is confirmed, while the widespread belief that inward FDI is a major channel of technology transfer is rejected.

An Empirical Examination of Information Barriers to Trade in Insurance

John Cawley and Tomas Philipson

NBER Working Paper No. 5669
July 1996
JEL Nos. D8, G22, H55
Health Care

This paper tests restrictions implied by the canonical theory of insurance under asymmetric information using data that contain the self-perceived and actual mortality risk of individuals, as well as the price and quantity of their life insurance.

We report several findings that are hard to reconcile with the canonical theory. First, we find that self-perceived risk is strikingly independent of the price of insurance. We also find the opposite type of nonlinear pricing from what is predicted by the theory: the theory predicts that prices rise with quantity, but we find that they fall. Third, we find that risk is correlated negatively with the quantity of insurance purchased, although the theory predicts a positive correlation. We find too that a substantial fraction of individuals hold multiple insurance contracts; this casts doubt on the prediction that unit prices rise with quantity, because multiple small contracts dominate a large one. Finally, we test the accuracy of the self-perceived risk of the insured by estimating the induced profits that it implies. We conclude by discussing the robustness of these results and the questions they raise for future theoretical models.

Application of Nationality-Adjusted Net-Sales-and-Value-Added Framework: The Case of Japan

Fukunari Kimura and Robert E. Baldwin

NBER Working Paper No. 5670
July 1996
JEL No. F1
International Trade and Investment

This paper applies to Japan the nationality-adjusted net-sales-and-value-added framework proposed in Baldwin and Kimura (1996). Despite possibly large estimation errors caused by statistical deficiencies, the framework is very useful for analyzing the relationship of the Japanese economy to the world economy. We find that Japan is special in four aspects: First, Japanese-owned firms have become increasingly dependent on the marketing activities of their foreign affiliates, rather than depending on cross-border exports by parent firms located in Japan. Second, the much smaller activities of Japanese affiliates of foreign firms relative to those of foreign affiliates of Japanese firms (FAJF) are apparent in terms of sales, value added, and employment, at both the macroeconomic and sectoral levels. Third, Japanese net sales to foreigners are consistently larger than cross-border net exports of Japan. Fourth, among the activities of FAJF, the importance of commercial FAJF is particularly large; these commercial FAJF handle a large portion of Japanese exports and imports. We conclude by discussing a number of statistical improvements required by the Japanese government in order to apply our analytical framework more rigorously.

Earnings and Expected Returns

Owen Lamont

NBER Working Paper No. 5671
July 1996
JEL No. G12
Asset Pricing

The aggregate dividend payout ratio forecasts the aggregate excess returns on stocks and corporate bonds in postwar U.S. data. Both high corporate profits and high stock prices forecast low excess returns on equities. When the payout ratio is high, the expected returns are high. The payout ratio's correlation with business conditions gives it predictive power for returns; it contains information about future stock and bond returns that is not captured by other variables. The payout ratio is useful because it captures the temporary components of earnings. The dynamic relationship among dividends, earnings, and stock prices shows that a positive innovation in earnings lowers expected returns in the near future, but raises them thereafter.

Performance Pay and Productivity

Edward P. Lazear

NBER Working Paper No. 5672
July 1996
JEL Nos. J00, J33
Labor Studies, Productivity

What happens when a firm switches from paying hourly wages to paying piece rates? The theory I develop predicts that average productivity rises, that the firm will attract a more able work force, and that the variance in output across individuals at the firm will rise as well. I test the theory with data from a large autoglass company that changed compensation structures between 1994 and 1995. All my theoretical predictions are borne out. In the firm I examine, the productivity effects are extremely large, amounting to anywhere from about 20 percent to 36 percent of output, depending on what factors are held constant. About half of the worker-specific increase in productivity is passed on to workers in the form of higher wages.

The Effects of the Corporate Average Fuel Efficiency Standards

Pinelopi K. Goldberg

NBER Working Paper No. 5673
July 1996
JEL Nos. F1, H2, K2, L5

This paper examines the effects of the Corporate Average Fuel Efficiency standards (CAFE) on the automobile product mix, prices, and fuel consumption. To this end, first I estimate a discrete-choice model of automobile demand and a continuous model of vehicle utilization using microdata from the Consumer Expenditure Survey for 1984–90. Next, I combine the demand side model with a model of oligopoly and product differentiation on the supply side. After estimating the demand and supply parameters, I assess the effects of the CAFE regulation through simulations, and compare them to the effects of alternative policy instruments, such as a powerful gas guzzler tax and an increase in the gasoline tax.

I find that vehicle utilization in the short run is unresponsive to changes in fuel cost; vehicle purchases, however, respond to both car prices and fuel cost. Taken together, these results imply that: 1) contrary to the claims of CAFE opponents, higher fleet fuel efficiency is not neutralized by increased driving; and 2) policies aiming at reducing fuel consumption by shifting the composition of the fleet toward more fuel-efficient vehicles are more promising than policies that target utilization. Policies with such compositional effects operate through two channels: changes in vehicle prices and changes in operating costs. Contrary to the claims of environmental groups, my results do not indicate the existence of consumer "myopia." Nonetheless, I find that the gasoline tax increase necessary to achieve fuel consumption reductions equivalent to the ones currently achieved through CAFE is 780 percent; whether an increase of this magnitude is currently politically feasible is questionable. In general, I find that the CAFE regulation was effective in reducing fuel consumption; however, shifts in the classification of products as domestic versus imports may have weakened the effectiveness of the standards.

Elephants

Michael Kremer and Charles Morcom

NBER Working Paper No. 5674
July 1996
JEL Nos. D90, Q20, Q22
Economic Fluctuations and Growth

Existing models of open-access resources are applicable to nonstorable resources, such as fish. However, many open-access resources are used to produce storable goods. Elephants, rhinos, and tigers are three prominent examples. Anticipated future scarcity of these resources will increase current prices, and current poaching. This implies that, for given initial conditions, there may be rational expectations equilibriums leading both to extinction and to survival. Governments may be able to eliminate extinction equilibriums by promising to implement tough antipoaching measures if the population falls below a threshold. Alternatively they, or private agents, may be able to eliminate extinction equilibriums by accumulating a suf-ficient stockpile of the storable good.

Forecasting Exchange Rates and Relative Prices with the Hamburger Standard: Is What You Want What You Get with McParity?

Robert E. Cumby

NBER Working Paper No. 5675
July 1996
JEL Nos. F31, F30
International Finance and Macroeconomics

A decade ago the *Economist* began an annual survey of Big Mac prices as a guide to "whether currencies are trading at the right exchange rates." This paper asks how well the hamburger standard has performed. Although average deviations from absolute Big Mac parity are large for several currencies, once estimates of these average deviations are removed from the data, the evidence suggests that convergence to relative Big Mac parity is quite rapid. The half-life of deviations from Big Mac parity appear to be about one year, which is considerably shorter than estimates of the half-life of deviations from purchasing power parity (four to five years) that are reported in the literature. In

addition, deviations from relative Big Mac parity appear to provide useful information for forecasting exchange rates. After accounting for currency-specific constants, a 10 percent undervaluation according to the hamburger standard in one year is associated with a 3.5 percent appreciation over the following year. Finally, deviations from relative Big Mac parity seem to be helpful in forecasting relative local currency prices. When the U.S. dollar price of Big Macs is high in a country, the relative local currency price of Big Macs in that country is likely to fall during the following year.

Relative Labor Productivity and the Real Exchange Rate in the Long Run: Evidence for a Panel of OECD Countries

Matthew B. Canzoneri, Robert E. Cumby, and Behzad Diba

NBER Working Paper No. 5676
July 1996
JEL Nos. F30, F31, F00
International Finance and Macroeconomics

The Balassa–Samuelson model, which explains real exchange rate movements in terms of sectoral productivities, rests on two components. First, for a class of technologies including Cobb–Douglas, the model implies that the relative price of nontraded goods in each country should reflect the relative productivity of labor in the traded and nontraded goods sectors. Second, the model assumes that purchasing power parity (PPP) holds for traded goods in the long run. We test each of these implications using data from a panel of OECD countries. Our results suggest that the first of these two fits the data quite well. In the long run, relative prices generally reflect relative labor productivities. The evidence on PPP in traded goods is considerably less favorable. When we look at U.S. dollar exchange rates, PPP does not appear to hold for traded goods, even in the long run. On the other hand, when we look at Deutschemark exchange rates, PPP appears to be a somewhat better characterization of traded goods prices.

Demographic Structure and the Political Economy of Public Education

James M. Poterba

NBER Working Paper No. 5677
July 1996
JEL Nos. H42, H72, I22, J14
Aging, Public Economics

This paper examines the relationship between demographic structure and the level of government spending on grades K–12 education. Panel data for the U.S. states over 1960–90 suggests that an increase in the fraction of elderly residents in a jurisdiction is associated with a significant reduction in educational spending per child. This reduction is particularly large when the elderly residents and the school-age population are from different racial groups. Variation in the size of the school-age population does not result in proportionate changes in education spending, so students in states with larger school-age populations receive lower per-student spending than those in states with smaller numbers of potential students. These results support models of generational competition in the allocation of public sector resources. They also suggest that the effect of cohort size on government-mediated transfers must be considered in analyzing how cohort size affects economic wellbeing.

Money and Exchange Rates in the Grossman–Weiss–Rotemberg Model

Fernando Alvarez and Andrew Atkeson

NBER Working Paper No. 5678
July 1996
JEL Nos. F31, F33
International Finance and Macroeconomics

We examine the impact of monetary injections in the Grossman–Weiss–Rotemberg model. We show that monetary shocks can lead to nominal exchange rates that are much more volatile than inflation, money growth, or interest rate differentials. Moreover, movements in real exchange rates following monetary injections can be persistent and nearly as large as movements in nominal exchange rates.

Wage Subsidies for the Disadvantaged

Lawrence F. Katz

NBER Working Paper No. 5679
July 1996
Labor Studies

Wage subsidies to private employers often have been proposed by economists as a potentially flexible and efficient method for improving the earnings and employment of low-wage workers. This paper lays out the basic economics of wage subsidies; examines issues arising in the design of alternative forms of wage subsidies; and reviews evidence on the effectiveness of recent U.S. wage subsidy programs and demonstration projects. Wage subsidies to employers to hire disadvantaged workers appear to raise the demand for labor for those workers modestly. Stand-alone wage subsidies (or employment tax credits) that are highly targeted on very specific groups (for example, welfare recipients) appear to have low utilization rates and (in some cases) may stig-

matize the targeted group. But new evidence from 1979 to 1994 based on an examination of changes in eligibility rules for the Targeted Jobs Tax Credit—the major U.S. wage subsidy program for the economically disadvantaged—suggests that it had modest positive employment effects on economically disadvantaged young adults. Policies combining wage subsidies with job development, training, and assistance for job search appear to have been somewhat successful in improving the employment and earnings of spe-cific targeted disadvantaged groups.

Implementing Results-Oriented Trade Policies: The Case of the U.S.–Japanese Auto Parts Dispute

Kala Krishna and John Morgan

NBER Working Paper No. 5680
July 1996
JEL Nos. F12, F13
International Trade and Investment

Why would the United States threaten punitive tariffs on luxury autos to implement a market share target in auto parts? We show that by making threats to a *linked* market, a market share target may be implemented with fairly weak informational and administrative requirements. Moreover, such policies can be both pro-competitive and advantageous to U.S. firms.

Contagious Currency Crises

Barry Eichengreen, Andrew K. Rose, and Charles Wyplosz

NBER Working Paper No. 5681
July 1996
JEL No. F31
International Finance and Macroeconomics

This paper examines the fact that speculative attacks tend to be correlated temporally, that is, currency crises appear to pass "contagiously" from one country to another. The paper provides a survey of the theoretical literature, and empirically analyzes the contagious nature of currency crises. Using 30 years of panel data from 20 industrialized countries, we find evidence of contagion. Contagion appears to spread more easily to countries that are tied closely by international trade linkages than to countries in similar macroeconomic circumstances.

Optimal Money Burning: Theory and Application to Corporate Dividend Policy

B. Douglas Bernheim and Lee Redding

NBER Working Paper No. 5682
July 1996
JEL Nos. H32, G35
Public Economics

We explore signaling behavior in settings with a discriminating signal and several costly nondiscriminating ("money burning") activities. In settings in which informed parties have many options for burning money, existing theory provides no basis for selecting one nondiscriminating activity over another. When senders have private information about the costs of these activities, each sender's indifference is resolved; the taxation of a nondiscriminating signal is Pareto-improving; and the use of the taxed activity becomes more widespread as the tax rate rises. We apply this analysis to the theory of dividend signaling. We verify empirically the central testable implication of the model.

Tax Policy and Investment

Kevin A. Hassett and R. Glenn Hubbard

NBER Working Paper No. 5683
July 1996
JEL No. H3
Public Economics,
Economic Fluctuations and Growth

In this paper, we summarize recent advances in the study of the effects of tax policy on the fixed investment decisions of firms. We attempt to identify consensus where it has been achieved, and to highlight important unresolved issues. In addition, we discuss the implications of recent findings for the analysis of policy options, and discuss arguments for and against long-run tax policy that favors business investment spending.

Control of the Public Debt: A Requirement for Price Stability?

Michael Woodford

NBER Working Paper No. 5684
July 1996
Economic Fluctuations and Growth,
Monetary Economics

This paper considers the role of limits on the permissible growth of public debt, such as those stipulated in the Maastricht treaty, in making price stability possible. I show that a certain type of fiscal instability, specifically variations in the present value of current and future primary government budgets, necessarily results in price level instability, in the sense that there is no monetary policy that will result in an equilibrium with stable prices. In the presence of sluggish price adjustment, the fiscal shocks disturb real output and real interest rates as well.

On the other hand, shocks of this kind can be eliminated by a Maastricht-type limit on the value of the public debt. In the presence of the debt limit (and under assump-

tions of frictionless financial markets, and so forth), "Ricardian equivalence" holds, and fiscal shocks have no effect on real or nominal variables. Further, an appropriate monetary policy rule can ensure price stability even in the face of other types of real shocks. Thus the debt limit serves as a precondition for the common central bank in a monetary union to have responsibility for maintaining a stable value for the common currency.

Demand Shifts, Population Adjustments, and Labor Market Outcomes During the 1980s

John Bound and Harry J. Holzer

NBER Working Paper No. 5685
July 1996
JEL Nos. J31, J61
Labor Studies

We explore the effects of shifts in labor demand and population adjustments across metropolitan areas on the employment and earnings of various demographic groups during the 1980s. We show that, although earnings and employment deteriorated for less-educated and black males in most areas in the 1980s, there was a good deal of geographic variation in the magnitudes of these changes. Shifts in labor demand across local areas contributed to this variation, and had greater relative impacts on the earnings and employment of these demographic groups. We also find that population shifts across areas, presumably attributable to migration, at least partially offset the effects of these shifts in demand. However, less-educated workers adjusted substantially less in response to these shifts in demand. Their limited supply responses apparently contributed quite a bit to the relatively greater deterioration of employment and earnings among these groups in the declining geographic areas during the 1980s.

Assessing the Effectiveness of Saving Incentives

R. Glenn Hubbard and Jonathan S. Skinner

NBER Working Paper No. 5686
July 1996
JEL Nos. E2, H3
Public Economics

In this paper, we argue that there is more to be learned from recent research on the effectiveness of targeted saving incentives than the wide variation in empirical estimates suggests. First, characterizations of "all new saving" or "no new saving" are extreme; IRAs and 401(k) plans appear to stimulate moderate amounts of new saving. Second, taking a cost–benefit approach might involve asking: What is the incremental gain in capital accumulation per dollar of foregone revenue? We find that for quite conservative measures of the saving impacts of IRAs or 401(k)s, the incremental gains in capital accumulation per dollar of lost revenue are large.

Deregulation and Labor Earnings in the Airline Industry

David Card

NBER Working Paper No. 5687
July 1996
JEL No. J4
Labor Studies

This paper uses a variety of data sources to study the effect of deregulation on the structure of wages in the airline industry. Microdata from the 1980 and 1990 Censuses show a 10 percent decline in the relative earnings of airline workers after deregulation, with roughly similar declines for industry-specific occupations (pilots and flight attendants) and general occupations (managers and secretaries). Union contract data for pilots, flight attendants, and mechanics at the major firms show similar trends in the levels of earnings, along with a rise in interfirm wage inequality, especially for pilots. Finally, data from the displaced worker surveys reveal that airline workers experienced similar wage losses to those who lost jobs in other industries over the 1980s. Taken as a whole, the evidence suggests that the rent premiums earned by airline workers in the regulatory era were relatively modest, and were comparable to the wage premiums earned in many other sectors.

The Economic Consequences of Parental Leave Mandates: Lessons from Europe

Christopher J. Ruhm

NBER Working Paper No. 5688
July 1996
JEL No. J38
Health Care, Labor Studies, Public Economics

This study investigates the economic consequences of parental leave mandates, using data for 16 European countries over 1969 through 1988. Since women use virtually all of the family leave in most nations, men constitute a reasonable comparison group. The natural experiment in most of the analysis involves examining how changes in entitlements to leave affect the gap between female and male labor market outcomes. I also compare the employment-to-populations ratios of women in their prime childbearing years to those of older females, as a function of changes in leave regulations. Parental leave mandates are associated with increases in total employment, but appear to have a more modest effect on weekly work hours. There is some evidence that women pay for entitlements to extended leave by receiving lower relative wages. The econometric estimates are sensitive to the inclusion of controls for time-varying country effects and for sex-specific within-country time trends.

Preliminary Injunctive Relief: Theory and Evidence from Patent Litigation

Jean O. Lanjouw and Josh Lerner

NBER Working Paper No. 5689
July 1996
Productivity

This paper examines the hypothesis that established plaintiffs seek preliminary injunctions to prey on financially weaker firms. We present a model in which differences in litigation costs drive the use of preliminary injunctions in civil litigation. We test the hypothesis using a sample of 252 patent suits, which allows us to characterize the litigating parties while controlling for the nature of the dispute. Our evidence is consistent with the predation hypothesis. We then explore various implications of the model and the impact of policy reforms.

Perceptions of Economic Insecurity: Evidence from the Survey of Economic Expectations

Jeff Dominitz and Charles F. Manski

NBER Working Paper No. 5690
July 1996
Labor Studies

We recently initiated the Survey of Economic Expectations (SEE) in order to learn how Americans perceive their near-term economic futures. Using SEE data on over 2000 labor force participants interviewed in 1994 and 1995, we measure economic insecurity through responses to questions about the probability of three events occurring in the year ahead: absence of health insurance; victimization by burglary; and job loss. With item response rates exceeding 98 percent, respondents clearly are willing to answer the expectations questions, and they appear to do so in a meaningful way.

Using the responses to classify individuals as *relatively secure*, *relatively insecure*, and *highly insecure*, we find that respondents with a high risk of one adverse outcome tend also to perceive high risks of the other outcomes. Economic insecurity tends to decline with age and with schooling. Black respondents perceive much greater insecurity than do whites, especially males. Within 1994–95, we find some time-series variation in insecurity but no clear trends. We find that expectations and realizations of health insurance coverage and of jobs tend to match up quite closely, but respondents substantially overpredict the risk of burglary.

Dynamic Complementarities: A Quantitative Analysis

Russell W. Cooper and Alok Johri

NBER Working Paper No. 5691
July 1996
JEL Nos. E32, E23, E37
Economic Fluctuations and Growth

This paper considers the importance of dynamic complementarities as an endogenous source of propagation in a dynamic stochastic economy. Dynamic complementarities link the stocks of human and organizational capital, both of which are influenced by past levels of economic activity, to current levels of productivity. We supplement an otherwise standard dynamic business cycle model with both contemporaneous and dynamic complementarities. We calibrate the model using estimates of these effects. Our quantitative analysis identifies empirically relevant dynamic complementarities as a source of propagation for both technology and taste shocks.

Federal Reserve Private Information and the Behavior of Interest Rates

Christina D. Romer and David H. Romer

NBER Working Paper No. 5692
July 1996
JEL Nos. E52, E43, D82
Economic Fluctuations and Growth, Monetary Economics

Many authors argue that asymmetric information between the Federal Reserve and the public is important for the conduct and the effects of monetary policy. This paper tests for the existence of such information by examining Federal Reserve and commercial inflation forecasts. We demonstrate that the Federal Reserve has considerable information about inflation beyond what is known to commercial forecasters. We also show that monetary policy actions provide signals of the Federal Reserve's private information, and that commercial forecasters modify their forecasts in response to those signals. These findings may explain why long-term interest rates typically rise in response to shifts to tighter monetary policy.

Trade Liberalization and Income Distribution

Donald R. Davis

NBER Working Paper No. 5693
August 1996
JEL Nos. F11, F13, D15
International Trade and Investment

Empirical work relating trade liberalization to income distribution has identified an important anomaly: The Stolper–Samuelson theorem predicts that trade liberalization will shift income toward a country's abundant factor. For developing countries, this suggests that liberalization principally will benefit the abundant unskilled labor. Yet extensive empirical studies have identified many cases with a contrary result.

This paper develops a simple theoretical explanation for this anomaly. It shows that countries that have global abundant labor may see wages decline with liberalization if they have local abundant capital. The current absence of empirical work that would allow us to identify the relevant local abundance implies that virtually all assertions regarding the anticipated distributional consequences of trade liberalization are without foundation. Likewise there may be important implications for industrialized countries that border developing countries that are undertaking trade liberalization, particularly in regard to the incentives for migration.

International Conflict, Defense Spending, and the Size of Countries

Alberto Alesina and Enrico Spolaore

NBER Working Paper No. 5694
August 1996
Monetary Economics

This paper provides a formal model of endogenous country formation and the choice of defense spending in a world with international conflict. The model is consistent with three observations: 1) secessions, and more generally breakup of countries, should follow a reduction in the likelihood of international conflict; 2) the number of regional conflicts among smaller countries may increase as a result of the breakup of larger countries; and 3) the size of the *peace dividend*—that is, the reduction in the defense spending in a more peaceful world—is limited by the process of country breakup.

Quota Licenses for Imported Capital Equipment: Could Bureaucrats Ever Do Better Than the Market?

Barbara J. Spencer

NBER Working Paper No. 5695
August 1996
JEL No. F13
International Trade and Investment

Despite valid criticisms, many developing countries have issued nontransferable import licenses to a limited number of final-goods producers in order to restrict the imports of an input, such as capital equipment. This paper demonstrates that for a given import quota, such licensing restrictions actually can increase domestic production of both the input and the final product, but at the cost of reduced quota rents. Under pure competition, domestic welfare falls relative to the use of marketable quota licenses, but if foreigners otherwise would get the quota rents, or if external economies cause decreasing costs, then bureaucratic allocation can dominate.

A Unified Treatment of Horizontal Direct Investment, Vertical Direct Investment, and the Pattern of Trade in Goods and Services

James R. Markusen, Anthony J. Venables, Denise Eby Konan, and Kevin H. Zhang

NBER Working Paper No. 5696
August 1996
JEL Nos. F12, F23
International Trade and Investment

This paper contributes to research that endogenizes multinational firms into general-equilibrium trade models. We attempt to integrate separate contributions on horizontal multinationals, which produce the same final product in multiple locations, with work on vertical multinationals, which geographically fragment production by stages. Previously derived results now emerge as special cases of a more general model. Vertical multinationals dominate when countries are very different in relative factor endowments. Horizontal multinationals dominate when the countries are similar in size and in relative endowments, and trade costs are moderate to high. In some cases, foreign investment or trade liberalization leads to a reversal in the direction of trade. Investment liberalization also can lead to an increase in the volume of trade, and produces a strong tendency toward factor-price equalization. Thus direct investment can be a complement to trade in both a volume-of-trade sense and in a welfare sense.

Why Are There Rich and Poor Countries? Symmetry-Breaking in the World Economy

Kiminori Matsuyama

NBER Working Paper No. 5697
August 1996
JEL Nos. F12, O12
International Trade and Investment

To explain cross-country differences in economic performance, the economics of coordination failures typically portrays each country in a closed-economy model with multiple equilibriums and then argues that the poor countries' equilibriums are inferior to those of the rich countries. This approach cannot tell us anything about the degree of inequality in the world economy. A more satisfactory approach would be to build a world-economy model and show why it has to be separated into the rich and the poor regions; that is, to demonstrate the coexistence of the rich and poor as an inevitable aspect of the world trading system. In the present model, the symmetry-breaking of the world economy into the rich and the poor

occurs because international trade causes agglomeration of different economic activities in different regions of the world. International trade thus creates a kind of "pecking order" among nations, and as in a game of "musical chairs," some countries must be excluded from being rich.

Determinants of Economic Growth: A Cross-Country Empirical Study

Robert J. Barro

NBER Working Paper No. 5698
August 1996
JEL No. O4
Economic Fluctuations and Growth

Empirical findings for a panel of roughly 100 countries from 1960 to 1990 strongly support the general notion of conditional convergence. For a given starting level of real per capita GDP, the growth rate is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. For given values of these and other variables, growth is related negatively to the initial level of real per capita GDP. Political freedom has only a weak effect on growth, but there is some indication that the relationship is nonlinear. At low levels of political rights, an expansion of these rights stimulates economic growth. However, once a moderate amount of democracy has been attained, a further expansion reduces growth. In contrast to the minor effect of democracy on growth, there is a strong positive influence of the standard of living on a country's propensity to experience democracy.

From Obscurity to Notoriety: A Biography of the Exchange Stabilization Fund

Anna J. Schwartz

NBER Working Paper No. 5699
August 1996
JEL No. E52
Monetary Economics

The U.S. Treasury's $20 billion loan to Mexico in January 1995 from the Exchange Stabilization Fund (ESF) brought to public notice the fund that had functioned in obscurity since its authorization by the Gold Reserve Act of January 31, 1934. The design of the ESF, as set forth in the statute, contributed to its obscurity. Its stated mission was to stabilize the exchange value of the dollar, but it also has assumed a role that had no mandate, that of lender to favored countries. ESF's intervention activities and the Federal Reserve's warehousing of ESF foreign currency assets are questionable. A statistical profile of the ESF accounts for the growth of its working balance from $200 million in 1934 to $42.6 billion in assets in 1995.

The Endogeneity of the Optimum Currency Area Criteria

Jeffrey A. Frankel and Andrew K. Rose

NBER Working Paper No. 5700
August 1996
JEL Nos. F15, F41
International Trade and Investment, International Finance and Macroeconomics

A country's suitability for entry into a currency union depends on a number of economic conditions. These include, inter alia, the intensity of trade with other potential members of the currency union and the extent to which domestic business cycles are correlated with business cycles of the other countries. But international trade patterns and international business cycle correlations are endogenous. This paper develops and investigates the relationship between the two. Using 30 years of data for 20 industrialized countries, we uncover a strong and striking empirical finding: countries with closer trade links tend to have business cycles that are more tightly correlated. It follows that countries are more likely to satisfy the criteria for entry into a currency union after they take steps toward economic integration than before.

Do Financial Incentives Encourage Welfare Recipients to Work? Evidence from a Randomized Evaluation of the Self-Sufficiency Project

David Card and Philip K. Robins

NBER Working Paper No. 5701
August 1996
JEL No. I3
Labor Studies

This paper reports on a randomized evaluation of an earnings subsidy offered to long-term welfare recipients in Canada. The program —known as the Self-Sufficiency Project (SSP)—provides a supplement equal to one-half the difference between a target earnings level and a participant's actual earnings. The SSP supplement is similar to a negative income tax with two important differences: 1) eligibility is limited to long-term welfare recipients who find a full-time job; and 2) the payment depends on individual earnings rather than on family income. Our evaluation is based on a classical randomized design: one-half of a group of single parents who had been on welfare for over a year were eligible to receive the SSP supplement, while the other half were assigned to a control group. Results for an early cohort of SSP partici-

pants and controls suggest that the financial incentives of the SSP increase labor market attachment and reduce welfare participation.

Social Policy Dimensions of Economic Integration: Environmental and Labor Standards

Kym Anderson

NBER Working Paper No. 5702
August 1996
JEL Nos. F13, F15
International Trade and Investment

Social policies, particularly with regard to the environment and labor, have become a part of trade policymaking, including the General Agreement on Tariffs and Trade. However, they are likely to have a more prominent role in trade policy discussions in the years ahead for the new World Trade Organization (WTO). Many developing countries perceive the entwining of these social issues with trade policy as a threat both to their sovereignty and to their economies, while significant groups in advanced economies consider it unfair, ecologically unsound, and even immoral to trade with countries adopting much lower standards than theirs.

This paper examines why these issues are becoming more prominent, whether the WTO is an appropriate forum for discussing them, and how they affect developing and other economies. I conclude that the *direct* effect on developing economies is likely to be small, and for some may even be positive through improved terms of trade and/or compensatory transfer payments; but there is an important *indirect* negative effect on them and other economies, namely, the potential erosion of the rules-based multilateral trading system that would result from an overuse of trade measures to pursue environmental or labor market objectives.

Chaos, Sunspots, and Automatic Stabilizers

Lawrence J. Christiano and Sharon G. Harrison

NBER Working Paper No. 5703
August 1996
JEL Nos. E13, E32, E61
Economic Fluctuations and Growth

We study a one-sector growth model that is standard except for the presence of an externality in the production function. The set of competitive equilibriums is large. It includes constant, sunspot, cyclical and chaotic equilibriums, and equilibriums with deterministic or stochastic regime switching. The efficient allocation is characterized by constant employment and a constant growth rate. We identify as the unique equilibrium outcome an income tax-subsidy schedule that supports the efficient allocation. That schedule has two properties: 1) it specifies the tax rate to be an increasing function of aggregate employment, and 2) earnings are subsidized when aggregate employment is at its efficient level. The first feature eliminates inefficient, fluctuating equilibriums, while the second induces agents to internalize the externality.

Inequality, Predation, and Welfare

Herschel I. Grossman and Minseong Kim

NBER Working Paper No. 5704
August 1996
JEL Nos. D31, D50, D63, D61
Economic Fluctuations and Growth

This paper studies the relationship between inequality and welfare in a general-equilibrium model in which people can choose to be either producers or predators. We assume that some people (the privileged) are well endowed with human capital, and other people (the unprivileged) are poorly endowed with human capital.

We analyze how the choice the privileged make between deterring and tolerating predation by the unprivileged depends on the interpersonal distribution of human capital. We find that if there are many unprivileged people, but that a privileged person does not have too much human capital relative to an unprivileged person, then the privileged will allocate enough time and effort to guarding against predation to deter the unprivileged from being predators. Otherwise, the privileged will tolerate predation by the unprivileged. Interestingly, a distribution of human capital that is more egalitarian (in that there are fewer unprivileged people) can result in the privileged choosing to tolerate rather than to deter predation by the unprivileged.

Next, we partition the feasible distributions of human capital into two sets of distributions, one that is Pareto efficient and one that is Pareto inefficient. Interestingly, we find that if the average endowment of human capital is large, then the fully egalitarian distribution is not Pareto efficient. Instead, Pareto efficiency implies an unegalitarian distribution of human capital in which each unprivileged person has only the endowment of human capital with which he was born. In addition, this unegalitarian distribution satisfies the Rawlsian criterion of maximizing the consumption of the unprivileged. With this unegalitarian distribution, the privileged choose to tolerate predation by the unprivileged, and predation results in maximum consumption for everyone.

Incentives and Careers in Organizations
Robert Gibbons

NBER Working Paper No. 5705
August 1996
JEL Nos. J41, J33, D23
Labor Studies

This paper surveys two related pieces of the labor economics literature: incentive pay and careers in organizations. In the discussion of incentives, I first summarize theory and evidence related to the classic agency model, which emphasizes the trade-off between insurance and incentives. I then offer econometric and case-study evidence suggesting that this classic model ignores several crucial issues, and sketch new models that begin to analyze these issues. In the discussion of careers in organizations, I begin by summarizing evidence on wages and positions using panel data within firms. This evidence is sparse and far-flung (drawn from industrial relations, organizational behavior, and sociology, as well as from labor economics). I identify ten basic questions that merit more systematic investigation. Turning to theory, I describe building-block models that address one or a few pieces of evidence, but focus on more recent models that address broad patterns of evidence.

Does Economic Geography Matter for International Specialization?
Donald R. Davis and David E. Weinstein

NBER Working Paper No. 5706
August 1996
International Trade and Investment

There are two principal theories of why countries trade: comparative advantage and increasing returns to scale. Yet there is no empirical work that assesses the relative importance of these two theories in accounting for production structure and trade. We use a framework that nests an increasing returns model of economic geography featuring "home market" effects with that of Heckscher–Ohlin–Vanek. We employ these trade models to account for the structure of OECD manufacturing production. The data militate against the economic geography framework. Moreover, even in the specification most generous to economic geography, endowments account for 90 percent of the explainable variance, and economic geography only 10 percent.

Construction of the Earnings and Benefits File for Use with the Health and Retirement Survey
Olivia S. Mitchell, Jan Olson, and Thomas L. Steinmeier

NBER Working Paper No. 5707
August 1996
Aging, Labor Studies

Analysts using the Health and Retirement Survey (HRS) often require information on earnings, labor market attachment, and Social Security benefits in order to better understand the factors affecting retirement and well-being at older ages. To this end the Earnings and Benefits File (EBF) constructed and documented several derived variables described here. The EBF provides a set of summary earnings, employment, and Social Security wealth measures for a subset of HRS respondents in Wave 1 of the survey, for whom administrative records are available.

The EBF, a restricted data file, is available from the University of Michigan's Institute for Social Research for matching only with versions of the HRS containing geographic detail no finer than the Census Division level. Interested users should contact hrsquest@umich.edu by email for further information on access to the data.

School Resources and Student Outcomes: An Overview of the Literature and New Evidence from North and South Carolina
David Card and Alan B. Krueger

NBER Working Paper No. 5708
August 1996
JEL No. J24
Labor Studies

This paper reviews and interprets the literature on the effect of school resources on students' eventual earnings and educational attainment. In addition, we present new evidence on the impact of the great disparity that existed in the first half of the 20th century in school resources between black and white students in North and South Carolina, and the subsequent narrowing of these resource disparities. Looking at birth cohorts over time, we find that gaps in earnings and educational attainment for blacks and whites in the Carolinas tend to mirror the gaps in school resources.

Real Exchange Rate Levels, Productivity, and Demand Shocks: Evidence from a Panel of 14 Countries
Menzie Chinn and Louis Johnston

NBER Working Paper No. 5709
August 1996
JEL Nos. F31, F41
International Finance and Macroeconomics

This paper investigates the determinants of the real exchange rate using a panel of disaggregated data for the OECD countries. It also marries two literatures: one that uses panel data to measure relationships between changes in exchange rates and changes in the determinants, and the other that uses cointegration techniques to measure the long-run relationship between the level of the exchange rate and the level of the determining factors. The previous

panel studies cannot account for deviations from long-run trend levels, while the extant literature, using time-series cointegration techniques, can only intermittently detect and measure posited relationships. Estimating the relationships in levels is an interesting enterprise because it allows one, in principle, to calculate trend real exchange rates.

After surveying the previous literature, we use a dynamic model of the real exchange rate to motivate the empirical exercise. In examining this problem, we exploit recent developments in the econometric analysis of nonstationary variables in panel data. Our results indicate that under certain assumptions, it is easier to detect cointegration in panel data than in the available time series; moreover, the estimates of reversion to trend also are estimated with greater precision. The most empirically successful models include productivity measures, government spending ratios, and either the terms of trade or the real price of oil. Using this latter model, we find that the implied equilibrium exchange rates indicate less overvaluation of the dollar than what is implied by a naive version of purchasing power parity.

Why Clashes Between Internal and External Stability Goals End in Currency Crises, 1797–1994

Michael D. Bordo and Anna J. Schwartz

NBER Working Paper No. 5710
August 1996
JEL No. E65
International Finance and Macroeconomics, Monetary Economics

We argue that recent currency crises reflect clashes between fundamentals and pegged exchange rates, just as crises did in the past. We reject the view that crises reflect self-fulfilling prophecies that are not closely related to measured fundamentals. Doubts about the timing of a market attack on a currency are less important than the fact that it is bound to happen if a government's policies are not consistent with pegged exchange rates. We base our conclusions on a review of currency crises in the historical record under metallic monetary regimes and of crises after World War II both under Bretton Woods and since, in European and Latin American pegged exchange rate regimes.

Risk-Shifting by Federally Insured Commercial Banks

Armen Hovakimian and Edward J. Kane

NBER Working Paper No. 5711
August 1996
JEL Nos. G2, K2, L5
Corporate Finance

Mispriced and misadministered deposit insurance imparts risk-shifting incentives to U.S. banks. Regulators are expected to monitor and discipline increases in bank risk exposure that would transfer wealth from the FDIC to bank stockholders. This paper assesses the success regulators had in controlling risk-shifting by U.S banks during 1985–94. In contrast to single-equation estimates developed from the option model by others, our simultaneous-equation evidence indicates that regulators failed to prevent large U.S. banks from shifting risk to the FDIC. Moreover, at the margin, banks that are undercapitalized shifted risk more effectively than other sample banks.

Flows of Knowledge from Universities and Federal Labs: Modeling the Flow of Patent Citations over Time and across Institutional and Geographic Boundaries

Adam B. Jaffe and Manuel Trajtenberg

NBER Working Paper No. 5712
August 1996
JEL No. O3
Productivity

The extent to which new technological knowledge flows across institutional and national boundaries is a question of great importance for public policy and the modeling of economic growth. This paper develops a model of the process generating subsequent citations to patents as a lens for viewing knowledge diffusion. We find that the probability of patent citation over time after a patent is granted fits well to a double-exponential function that can be interpreted as the mixture of diffusion and obsolescence functions. The results indicate that diffusion is localized geographically. Controlling for other factors, within-country citations are more numerous and come more quickly than those that cross country boundaries.

The Demand for Cocaine by Young Adults: A Rational Addiction Approach

Michael Grossman, Frank J. Chaloupka, and Charles C. Brown

NBER Working Paper No. 5713
August 1996
JEL No. I10
Health Economics

This paper applies to the demand for cocaine by young adults in the Monitoring the Future Panel rational addiction model, which emphasizes the interdependency of past, current, and future consumption of an addictive good. We add to this survey the

price of cocaine from the System to Retrieve Information from Drug Evidence maintained by the Drug Enforcement Administration of the U.S. Department of Justice. Our results suggest that annual participation and frequency of use given participation are related negatively to the price of cocaine. In addition, current participation is related positively to past and future participation, and current frequency of use given participation is related positively to past and future frequency of use. The long-run price elasticity of total consumption (that is, participation multiplied by frequency given participation) of –1.18 is substantial. A permanent 10 percent reduction in price caused, for example, by the legalization of cocaine would cause the number of cocaine users to grow by slightly more than 8 percent and would increase the frequency of use among users by a little more than 3 percent. Surely, both proponents and opponents of drug legalization should take account of this increase in consumption in debating their respective positions.

Country Fund Discounts, Asymmetric Information, and the Mexican Crisis of 1994: Did Local Residents Turn Pessimistic Before International Investors?

Jeffrey A. Frankel and Sergio L. Schmukler

NBER Working Paper No. 5714
August 1996
JEL Nos. F30, F34, G15
Asset Pricing, International Finance and Macroeconomics

It has been suggested that Mexican investors were the "front-runners" in the peso crisis of December 1994, turning pessimistic before international investors. Different expectations about their own economy, perhaps attributable to asymmetric information, prompted Mexican investors to be the first ones to leave the country. This paper uses data from three Mexican country funds to investigate the hypothesis of "divergent expectations." We find that right before the devaluation, Mexican fund Net Asset Values (NAVs, mainly driven by Mexican investors) dropped faster than Mexican country fund prices (mainly driven by foreign investors). Moreover, we find that Mexican NAVs tend to Granger-cause the country fund prices. This suggests that causality, in some sense, flows from the Mexico City investor community to the Wall Street investor community. More generally, we propose an asymmetric information approach that differs from the existing explanations of country fund discounts.

Is "Learning-by-Exporting" Important? Microdynamic Evidence from Colombia, Mexico, and Morocco

Sofronis Clerides, Saul Lach, and James Tybout

NBER Working Paper No. 5715
August 1996
International Trade and Investment

Is there any empirical evidence that firms become more efficient after becoming exporters? Do firms that become exporters generate positive spillovers for domestically oriented producers?

In this paper, we analyze the causal links between exporting and productivity using firm-level panel data from three semi-industrialized countries. Representing export market participation and production costs as jointly dependent autoregressive processes, we look for evidence that firms' stochastic cost processes shift when they break into foreign markets. We find that relatively efficient firms become exporters, but firms' unit costs are not affected by previous export market participation. So the well-known efficiency gap between exporters and nonexporters is caused by self-selection of the more efficient firms into the export market, rather than by learning by exporting. Further, we find some evidence that exporters reduce the costs of breaking into foreign markets for domestically oriented producers, but they do not appear to help these producers become more efficient.

The Response of Wages and Actual Hours Worked to the Reductions of Standard Hours

Jennifer Hunt

NBER Working Paper No. 5716
August 1996
JEL Nos. J31, J51
Labor Studies

A transformation of what had become a universal 40-hour standard work week in Germany began in 1985 with reductions negotiated in the metalworking and printing sectors. These reductions have continued through 1995, and were followed by reductions in other sectors. The union campaign aimed to increase employment through "work-sharing," and is being emulated in the United States with the launch of a reduced-hours campaign by the AFL–CIO. Using data from the German Socio-Economic Panel, I find that increased overtime or reduced short time was little used to offset the reduction in standard hours: a one-hour reduction in standard hours appears to have translated into a reduction in actual hours worked of between 0.85 hour and one hour for workers in manufacturing. One might expect this to have resulted in a loss of earnings for workers in affected industries. However, I substantiate the union claim of "full wage compensation": reductions in standard hours were

accompanied by a relative rise in the hourly straight-time wage of 2–3 percent for each hour fall in standard hours, enough to keep monthly earnings the same as in unaffected industries.

The Strategic Response by Pharmaceutical Firms to the Medicaid Most-Favored-Customer Rules

Fiona Scott Morton

NBER Working Paper No. 5717
August 1996
JEL Nos. L13, L41, L65
Industrial Organization

In 1990 the federal government included a Most Favored Customer (MFC) clause in the contract (OBRA 90) that would govern the prices paid to firms for pharmaceutical products supplied to Medicaid recipients. The firms had to give Medicaid their "best" (lowest) price in some cases, and a percentage below average price in others. Many theoretical models have shown that an MFC rule commits a firm to compete less aggressively in prices. We might expect prices to rise following the implementation of the MFC rule, yet the work done to date on OBRA 90 has found this result somewhat difficult to show empirically. I also conclude that the effects of the law are small and relatively weak; however, the results are strongest where the product's characteristics match the incentives in the law. I find that after the MFC rule was implemented, the average price of branded products facing generic competition rose: the median presentation's price rose about 4 percent. Brands protected by patents did not increase price significantly. Generics in concentrated markets should display a strategic response to the brand's adoption of the MFC. I find support for the strategic effect: generic firms raise their prices more as their markets become more concentrated. I find little change in hospital prices. The results suggest that the MFC rule resulted in higher prices to some non-Medicaid consumers of pharmaceuticals.

Wage Inequality and Segregation by Skill

Michael Kremer and Eric Maskin

NBER Working Paper No. 5718
August 1996
JEL Nos. D30, J31
Economic Fluctuations and Growth, Labor Studies

Evidence from the United States, Britain, and France suggests that recent growth in wage inequality has been accompanied by greater segregation of high- and low-skill workers into separate firms. A model in which workers of different skill levels are imperfect substitutes can account simultaneously for these increases in segregation and inequality, either through technological change or, more parsimoniously, through observed changes in the skill distribution.

Price Level Targeting Versus Inflation Targeting: A Free Lunch?

Lars E. O. Svensson

NBER Working Paper No. 5719
August 1996
JEL Nos. E42, E52, E58
International Finance and Macroeconomics, Monetary Economics

I compare price level targeting (without base drift) and inflation targeting (with base drift) under commitment and discretion, with persistence in unemployment. Price level targeting often is said to imply more short-run inflation variability, and thereby more employment variability, than inflation targeting. Counter to this conventional wisdom, under discretion a price level target results in *lower* inflation variability than an inflation target (if unemployment is at least moderately persistent). A price level target also eliminates the inflation bias under discretion and, as is well known, reduces long-term price variability. Society may be better off assigning a price level target to the central bank even if its preferences correspond to inflation targeting. A price level target thus appears to have more advantages than commonly acknowledged.

The Yen and Its East Asian Neighbors, 1980–95: Cooperation or Competition?

Shinji Takagi

NBER Working Paper No. 5720
August 1996
JEL Nos. F31, F33

By looking at how an East Asian currency moves when the yen fluctuates sharply against the U.S. dollar, we sometimes find that the reaction has been much more significant than would be suggested by the econometric estimates of the weight of the yen in nominal exchange rate determination. Moreover, the Korean won and the Malaysian ringgit have tended to move more closely with a depreciating yen, suggesting the countries' emphasis on export promotion. The Singapore dollar, on the other hand, has tended to move more closely with an appreciating yen, underscoring the importance attached to price stability. The paper concludes that, given the trend appreciation of the yen during the recent past, emphasis on price stability has contributed more to monetary cooperation in Asia than has emphasis on export promotion.

Technology, Employment, and the Business Cycle: Do Technology Shocks Explain Aggregate Fluctuations?

Jordi Galí

NBER Working Paper No. 5721
August 1996
JEL Nos. E32, E24
Economic Fluctuations and Growth

Using data for the G7 countries, I estimate *conditional* correlations of employment and productivity, based on a decomposition of the two series into technology and nontechnology components. The picture that emerges is hard to reconcile with the predictions of the standard Real Business Cycle model. For a majority of countries the following results stand out: 1) *technology shocks* appear to induce a *negative* comovement between productivity and employment, counterbalanced by a *positive* comovement generated by *demand shocks*; 2) the impulse responses show a persistent *decline* of employment in response to a *positive* technology shock; and 3) measured productivity *increases* temporarily in response to a *positive* demand shock. More generally, the pattern of economic fluctuations attributed to technology shocks seems to be largely unrelated to major postwar cyclical episodes. A simple model with monopolistic competition, sticky prices, and variable effort is able to account for the empirical findings.

Technology, Factor Supplies, and International Specialization: Estimating the Neoclassical Model

James Harrigan

NBER Working Paper No. 5722
August 1996
JEL Nos. F1, F10, F11
International Trade and Investment

The standard neoclassical model of trade theory predicts that international specialization will be determined jointly by cross-country differences in relative factor endowments and relative technology levels. This paper uses duality theory combined with a flexible functional form to specify an empirical model of specialization consistent with the neoclassical explanation. According to the model, a sector's share in GDP depends on both relative factor supplies and relative technology differences; the estimated parameters of the model have a close and clear connection to theoretical parameters. I estimate the model for manufacturing sectors using a 20-year, 10-country panel of data on the OECD countries. I measure Hicks-neutral technology differences using an application of the theory of total factor productivity comparisons, and I measure factor supplies directly. The estimated model performs well in explaining variation in production across countries and over time, and the estimated parameters are generally in line with theory and previous empirical work on the factor proportions model. I find that relative technology levels are an important determinant of specialization.

Hong Kong's Currency Board and Changing Monetary Regimes

Yum K. Kwan and Francis T. Lui

NBER Working Paper No. 5723
August 1996
JEL Nos. E5, E6, F4

This paper discusses the historical background and institutional details of Hong Kong's currency board. We argue that its experience provides a good opportunity to test the macroeconomic implications of the currency board regime. Using the method of Blanchard and Quah (1989), we show that the parameters of the structural equations and the characteristics of supply and demand shocks have changed significantly since adopting the regime. Variance decomposition and impulse response analyses indicate Hong Kong's currency board is less susceptible to supply shocks, but demand shocks can cause greater short-term volatility under the system. The decent performance of Hong Kong's currency board is mainly attributable to the stable fiscal policy of its government. Counterfactual exercises also show that three-fourths of the reduction in observed output volatility and two-thirds of the reduction in observed inflation volatility are explained by the adoption of the currency board, while the remainder is explained by changes in the external environment. The improvement in stability does not rule out the possibility of monetary collapse, however.

Has Work-Sharing Worked in Germany?

Jennifer Hunt

NBER Working Paper No. 5724
August 1996
JEL No. J23
Labor Studies

Starting in 1985, (West) German unions began to reduce standard hours on an industry-by-industry basis in an attempt to lower unemployment. Whether "work-sharing" works—that is, whether employment rises when hours per worker are reduced—is theoretically ambiguous. I test this using both individual data from the German Socio-Economic Panel and industry data to exploit the variation in cross-section and time-series hours. For 1984–9 I find that, in response to a one-hour fall in standard hours, employment rose by 0.3–0.7 percent, but that total hours worked fell 2–3 percent, implying possible output losses. As a group, workers were better off however, as the wage bill rose. The employment growth implied by the

mean standard hours decline, at most 1.1 percent, was not enough to bring German employment growth close to the U.S. rate. Results for 1990–4 were more pessimistic.

Capital Account Liberalization as a Signal

Leonardo Bartolini and Allan Drazen

NBER Working Paper No. 5725
August 1996
JEL Nos. F21, C73
International Finance and Macroeconomics

We present a model in which a government's current policy on capital controls signals future policies. Controls on capital outflows evolve in response to news on technology, conditional on government attitudes toward taxation of capital. When there is uncertainty over government types, a policy of liberal capital outflows sends a favorable signal that may trigger a capital inflow. This prediction is consistent with the experience of several countries that have liberalized their capital account.

Market Segmentation and the Sources of Rents from Innovation: Personal Computers in the Late 1980s

Timothy F. Bresnahan, Scott Stern, and Manuel Trajtenberg

NBER Working Paper No. 5726
August 1996
JEL Nos. L1, O31
Industrial Organization, Productivity

This paper evaluates the sources of transitory market power in the market for personal computers (PCs) during the late 1980s. Our analysis is motivated by the coexistence of low entry barriers into the PC industry and high rates of innovative investment by a small number of PC manufacturers. We attempt to understand these phenomena by measuring the role played by different *principles of product differentiation* (PDs) in segmenting this dynamic market. Our first PD measures the substitutability between Frontier (386-based) and non-Frontier products, while the second PD measures the advantage afforded by a brand-name reputation (for example, by IBM). Building on advances in the measurement of product differentiation, we measure the separate roles that these PDs played in contributing to transitory market power. In so doing, this paper attempts to account precisely for the market origins of innovative rents in the PC industry.

Our principal finding is that, during the late 1980s, the PC market was highly segmented along both the Branded (B versus NB) and Frontier (F versus NF) dimensions. The effects of competitive events in any one cluster were confined mostly to that particular cluster, with little repercussion on other clusters. For example, less than 5 percent of the market share achieved by a hypothetical clone entrant would be market-stealing from other clusters. In addition, the product differentiation advantages of B and F were qualitatively different. The principal benefit associated with F was limited to the isolation it provided from the NF competitors; brandedness shifted out the product demand curve and segmented B products from NB competition. These results help to explain, in a precise way, how transitory market power (arising from market segmentation) shaped the underlying incentives for innovation in the PC industry during the mid- to late 1980s.

When Liberal Policies Reflect External Shocks, What Do We Learn?

Leonardo Bartolini and Allan Drazen

NBER Working Paper No. 5727
August 1996
JEL Nos. F21, C73
International Finance and Macroeconomics

We present a model in which policies of free capital mobility can signal governments' future policies, but the informativeness of the signal depends on the path of world interest rates. Capital flows to "emerging markets" reflect investors' perception of these markets' political risk. With low world interest rates, emerging markets experience a capital inflow and engage in a widespread policy of free capital mobility; with higher rates, only sufficiently committed countries allow free capital mobility, whereas others impose controls to trap capital onshore, thus signaling future policies affecting capital mobility. These predictions are consistent with the recent experience of capital flows and policies affecting capital mobility in developing countries.

Price Versus Quantity: Market Clearing Mechanisms When Sellers Differ in Quality

Andrew Metrick and Richard J. Zeckhauser

NBER Working Paper No. 5728
August 1996
JEL Nos. L11, L62, G20
Industrial Organization

High-quality producers in a vertically differentiated market can reap superior profits by charging higher prices, selling greater quantities, or both. If qualities are known by consumers and production costs are constant, then having a higher quality secures the producer both a higher price and higher quantity; if

marginal costs are rising, having a higher quality assures only higher price. If only some consumers can discern quality but others cannot, then high- and low-quality producers may set a common price, but the high-quality producer will sell more. In this context, quality begets quantity. Empirical analyses suggest that in both the mutual fund and the automobile industries, high-quality producers sell more units than their low-quality competitors, but at no higher price (or markup) per unit.

Unraveling in Assignment Markets

Li, Hao and Sherwin Rosen

NBER Working Paper No. 5729
August 1996
Labor Studies

We present a two-period model of the assignment market with uncertainty in the first period regarding productive characteristics of participants. We use this model to understand incentives toward early contracts or unraveling in labor markets for entry-level professionals. We study two contractual situations, one in which firms are bound by ex post unsuccessful early contracts, and the other in which they can buy out of unsuccessful early contracts. The economic benefit of unraveling is to provide insurance in the absence of complete markets, but it can come at the cost of inefficient assignments. Without reentry, unraveling need not occur. It is more likely, the smaller the applicant pool or the proportion of more promising applicants in the pool, and the greater the degree of heterogeneity in the pool. A ban on early contracts always hurts firms and benefits less promising applicants, but the welfare effects on more promising applicants depend on how the gains from early contracts are shared. With buyouts, inefficiencies in assignments are eliminated, and unraveling always occurs between firms and the more promising applicants. The efficiency gains of buyouts can be distributed unevenly and sometimes firms benefit from a ban on buyouts.

Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects

Alberto Alesina and Roberto Perotti

NBER Working Paper No. 5730
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JEL Nos. H1, H5, E62
Monetary Economics

This paper studies how the composition of fiscal adjustments influences the likelihood of their "success," defined as long-lasting deficit reduction, and their macroeconomic consequences. We find that fiscal adjustments that rely primarily on spending cuts in transfers and in the government wage will have a better chance of being successful, and are expansionary. On the contrary, fiscal adjustments that rely primarily on tax increases and cuts in public investment tend not to last, and are contractionary. We discuss alternative explanations for these findings by studying both a full sample of OECD countries and by focusing on three individual case studies: Denmark, Ireland, and Italy.

Private Consumption, Nontraded Goods, and Real Exchange Rate: A Cointegration–Euler Equation Approach

Kenneth S. Lin

NBER Working Paper No. 5731
August 1996

This paper presents an empirical study of real exchange rate movements from a consumer's perspective. Trade between two countries creates a link between the real exchange rate and the terms of trade. It is the private consumption of nontraded goods that induces an equilibrium relationship between the real exchange rate and the private consumption of both traded and nontraded goods. I use Ogaki and Park's (1989) cointegration–Euler equation approach to explore the long-run implications of the equilibrium relationship. Given the assumption of stationary preference shocks, the testable restriction is that the real exchange rate and private consumption of traded and nontraded goods in the home and foreign countries are cointegrated. The empirical evidence suggests that private consumption in the home and foreign countries accounts for a significant fraction of the long-run movements of the real exchange rate in South Korea and Taiwan. Accounting for real government consumption does not overturn the result.

Trade and Growth in East Asian Countries: Cause and Effect?

Jeffrey A. Frankel, David H. Romer, and Teresa Cyrus

NBER Working Paper No. 5732
August 1996
JEL Nos. O1, O4, O53
International Trade and Investment, International Finance and Macroeconomics, Economic Fluctuations and Growth

Estimates of growth equations have found that openness plays a role, particularly in explaining rapid growth among East Asian countries. But there have been major concerns about simultaneous causality between growth and trade. This study deals with the endogeneity of trade by using as instrumental variables the exogenous determinants from the gravity model of bilateral trade, such as proximity to trading partners. We find that the effect of openness on growth is even stronger when we correct for the endogeneity of open-

ness than it is in standard ordinary least squares estimates. We conclude with estimates of how much has been contributed to East Asian growth both by the exogenous or geographical component of openness and by the residual or policy component.

Women Helping Women? Role-Model and Mentoring Effects on Female Ph.D. Students in Economics

David Neumark and Rosella Gardecki

NBER Working Paper No. 5733
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JEL Nos. I20, J16, J24, J44
Labor Studies

One potential method for increasing the success of female graduate students in economics may be to encourage mentoring relationships between these students and female faculty members. Increased hiring of female faculty is viewed as one way to promote such mentoring relationships, perhaps because of role-model effects. A more direct method of promoting such relationships may be for female graduate students to have female faculty serve as dissertation chairs. The evidence in this paper addresses the question of whether either of these strategies results in more successful outcomes for female graduate students. The evidence is based on survey information on female graduate students and faculties of Ph.D.-producing economics departments, covering the mid-1970s to the early 1990s.

With respect to characteristics of the institutions at which students are placed when leaving graduate school, the empirical evidence provides no support for the hypothesis that outcomes for female graduate students are improved by adding female faculty members, or by having a female dissertation chair. However, with respect to time-to-complete-graduate-school, and the completion rate, there is some limited evidence of beneficial effects of female faculty members.

Administrative Costs in Public and Private Retirement Systems

Olivia S. Mitchell

NBER Working Paper No. 5734
August 1996
Aging

This paper collects and analyzes available information on administrative costs associated with public and private retirement systems. We analyze the expenses of the U.S. Social Security system and compare them with data from national systems in other countries. We find that administration costs of publicly run social security systems vary a great deal across countries and institutional settings. A key factor influencing the costs of public old-age programs is the scale of the system: plans with more assets and more participants are less expensive. We also investigate the expenses reported by U.S. pension plans and mutual funds, programs seen by many as alternative mechanisms for managing retirement saving. Based on an analysis of costs associated with retirement savings plans managed by financial institutions, we conclude that privately managed old-age retirement programs would be somewhat more costly to operate than current publicly managed programs, depending on the specific design of the program. Nevertheless, these costs would be accompanied by new services for participants.

The Time-Varying NAIRU and Its Implications for Economic Policy

Robert J. Gordon

NBER Working Paper No. 5735
August 1996
JEL Nos. E30, E31
Economic Fluctuations and Growth

This paper estimates the NAIRU (which stands for Non-Accelerating Inflation Rate of Unemployment) as a parameter that varies over time. The NAIRU is the unemployment rate that is consistent with a constant rate of inflation. Its value is determined in an econometric model in which the inflation rate depends on its own past values ("inertia"), demand shocks proxied by the difference between the actual unemployment rate and the estimated NAIRU, and a set of supply shock variables.

The estimated NAIRU for the U.S. economy differs somewhat for alternative measures of the inflation rate. The NAIRU estimated for the GDP deflator varies over the past 40 years within the narrow range of 5.7 to 6.4 percent; for the most recent quarter (1996:Q1) its estimated value is 5.7 percent. In that quarter, a lower NAIRU of 5.3 percent is obtained for the chain-weighted PCE deflator. I reject the recent research claiming that there is a 3-percentage-point range of uncertainty about the NAIRU as inconsistent with the behavior of the American economy in the late 1980s and early 1990s.

Are 401(k) Plans Replacing Other Employer-Provided Pensions? Evidence from Panel Data

Leslie E. Papke

NBER Working Paper No. 5736
August 1996
JEL No. H3
Aging, Public Economics

This paper examines whether sponsors of traditional defined-ben-

efit (DB) plans are replacing them with 401(k) or other defined-contribution (DC) plans. I compare pension plan offerings by sponsors of a DB plan in 1985 with their offerings in 1992, using Form 5500 filings from those two years. I find that 401(k) and other DC plans are substituting for terminated DB plans, and that offering a DC plan of any type increases the probability of a DB termination. Thus, it appears that, at the sponsor level, many of the new 401(k) plans may not be avenues for net saving but are replacements for the more traditional pension forms.

Using several specifications, I estimate that a sponsor that starts with no 401(k) or other DC plan and adds a 401(k) will reduce the number of DB plans offered by at least 0.3. That is, my estimates imply that one sponsor terminates a DB plan for about every three sponsors that offer one new 401(k) plan. I estimate that the addition of a non-401(k) DC plan reduces DB plan offerings by at least 0.4.

Plan-level point estimates indicate that if a 401(k) plan is added by a sponsor, the DB termination probability increases by about 18 percentage points, to 35 percent. The addition of a non-401(k) DC plan similarly increases the probability that an accompanying DB plan will be terminated.

Crime, Urban Flight, and the Consequences for Cities

Julie Berry Cullen and Steven D. Levitt

NBER Working Paper No. 5737
September 1996
JEL Nos. K42, R23, H71
Public Economics

This paper demonstrates that rising crime rates in cities are correlated with depopulation of the city. Instrumental variables estimates, which use measures of the certainty and severity of a state's criminal justice system as indicators of city crime rates, imply that crime causes urban flight. Using annual city-level panel data, we estimate that each additional reported crime is associated with a decline of one city resident. There is some evidence that increases in suburban crime tend to keep people in cities, although the magnitude of this effect is small. Analysis of individual-level data from the 1980 Census confirms the city-level results and demonstrates that almost all of the crime-related decline in population is attributable to increased outmigration rather than to a decrease in new arrivals to a city. Those households that leave the city because of crime are much more likely to remain within the SMSA than those leaving the city for other reasons. The migration decisions of high-income households and those with children are much more responsive to changes in crime than the decisions of other households. Crime-related mobility imposes costs on those who choose to remain in the city through declining property values and a shrinking tax base.

Cash Welfare as a Consumption-Smoothing Mechanism for Single Mothers

Jonathan Gruber

NBER Working Paper No. 5738
September 1996
Public Economics, Labor Studies

While there has been considerable research on the disincentive effects of cash welfare under the Aid to Families with Dependent Children (AFDC) program, there is little evidence on the benefits of the program for single mothers and their children. One potential benefit of this program is that it provides short-run consumption insurance for women at the point that they become single mothers. This is true, however, only to the extent that the program is not crowding out other sources of support, such as own savings, labor supply, or transfers from others. I assess the importance of this insurance mechanism by measuring the extent to which AFDC smooths the consumption of women who are making the transition to single motherhood. I use longitudinal data on family structure and consumption expenditures on food and housing from the Panel Study of Income Dynamics, matched to information on the welfare benefits available in each state and year from 1968–85. I find that raising potential benefits by one dollar raises the food and housing consumption of all women who become single mothers (and their families) by 30 cents. This estimate implies that for each dollar of AFDC received by this population, the consumption of these categories of goods rises by up to 95 cents. This consumption-smoothing benefit appears to be larger for women who become single mothers through marital dissolution, rather than through out-of-wedlock childbearing; this is attributable to increased housing expenditures of the former group but not of the latter.

Macroeconomic Policy in the Presence of Structural Maladjustment

Robert J. Gordon

NBER Working Paper No. 5739
September 1996
JEL Nos. E30, E50, E60
Economic Fluctuations and Growth

This paper analyzes two-way interactions between structural reform and macroeconomic policy. If structural reforms increase the flexibility of labor markets, then they are likely to improve the short-run inflation–unemployment trade-off, providing an incentive for policymakers to expand aggregate demand. In turn, the promise by policymakers

that they will encourage a decline in unemployment in response to good news on inflation can be used to strike a deal with political interests opposed to the introduction or extension of structural reform. Expansionary monetary policy also provides relief on the fiscal front, both directly by bringing the actual budget deficit closer to the structural budget deficit, and indirectly by encouraging stuctural reform, potentially reducing the structural budget deficit itself.

In 1992–3 several European countries dropped out of the Exchange Rate Mechanism to pursue more expansionary monetary policies. The difference in the performance of these countries versus those countries that maintained a peg between their currencies and the Deutschemark provides an important test case of the consequences of expansionary monetary policy. By 1995 the depreciating nations enjoyed a substantial relative acceleration of nominal GDP and, surprisingly, an even greater deceleration of inflation; their growth rate of real GDP accelerated more than their growth rate of nominal GDP in relation to the pegging countries. The continued deceleration of inflation in the depreciating countries shows that their natural unemployment rate has declined and that expansionary monetary policy has interacted beneficially with structural reform.

Prices, Tobacco Control Policies, and Youth Smoking

Frank J. Chaloupka and Michael Grossman

NBER Working Paper No. 5740
September 1996
JEL No. I1
Health Economics

This paper examines how effective in discouraging cigarette smoking among youths are several tobacco control policies including: increased cigarette excise taxes (which result in higher cigarette prices); restrictions on smoking in public places and at private worksites; and limits on the availability of tobacco products to youths. We use data from the 1992, 1993, and 1994 surveys of eighth-, tenth-, and twelfth-grade students conducted by the University of Michigan's Institute for Social Research as part of the Monitoring the Future Project. We add site-specific cigarette prices and measures of tobacco-related policies to the survey data. The results indicate that tobacco control policies can be effective in reducing youth cigarette smoking. The average overall estimated price elasticity of youth cigarette demand of –1.313 indicates that large increases in cigarette excise taxes would lead to sharp reductions in youth smoking. Similarly, strong restrictions on smoking in public places would reduce the prevalence of smoking among youths, while limits on smoking in schools would reduce average cigarette consumption among young smokers. However, limits on youth access to tobacco products appear to have little impact on youth cigarette smoking. This is most likely the result of the relatively weak enforcement of these laws.

How to Count Patents and Value Intellectual Property: Uses of Patent Renewal and Application Data

Jean O. Lanjouw, Ariel Pakes, and Jonathan Putnam

NBER Working Paper No. 5741
September 1996
JEL Nos. O30, C81, L10
Productivity

Patent counts are very imperfect measures of innovative output. This paper discusses how additional data —the number of years a patent is renewed and the number of countries in which protection for the same invention is sought—can be used to improve on counts in studies that require a measure of the extent of innovation. We propose a simple renewal-based weighting scheme that may remove half of the noise in patent counts as a measure of innovative output. The paper also illustrates how these data can be used to estimate the value of the proprietary rights created by the patent laws. The parameters estimated in this analysis can be used to answer a series of questions related to the value of patents. We illustrate with estimates of how the value of patent protection would vary under alternative legal rules and renewal fees, and with estimates of the international flows of returns from the patent system. Recent progress in the development of databases has increased the potential for this type of analysis.

International Capital Mobility in History: Purchasing Power Parity in the Long Run

Alan M. Taylor

NBER Working Paper No. 5742
September 1996
JEL Nos. N20, F30
International Finance and Macroeconomics, Development of the American Economy

This paper investigates purchasing power parity (PPP) since the late nineteenth century for a sample of 20 countries, a broader sample of pooled annual data than has been studied before. Econometric results for time-series and panel samples allow us to test the robustness of the PPP hypothesis in different eras: the gold standard, interwar, Bretton Woods, and the recent float. The evidence for PPP is mixed: strong PPP, entailing stationarity of the real exchange rate, is not supported broadly, and real-exchange-rate dis-

persion exhibits counterintuitive historical patterns. However, not-much-weaker forms of PPP can be supported, with evidence of cointegration among different countries' common-currency price levels. Residual variances confirm the conventional wisdom that the interwar period, particularly the Great Depression, represented the nadir of international capital market integration in the modern era.

International Capital Mobility in History: The Saving–Investment Relationship

Alan M. Taylor

NBER Working Paper No. 5743
September 1996
JEL Nos. F30, N20
International Finance and Macroeconomics, Development of the American Economy

Economic historians have been concerned with the evolution of international capital markets over the long run, but empirical testing of market integration has been limited. This paper augments the literature by investigating long- and short-run criteria for capital mobility, using time-series and cross-section analysis of the saving–investment correlation for 12 countries since 1850. The results present a nuanced picture of capital market evolution. The sample shows considerable cross-country heterogeneity. Broadly speaking, the interwar period, and especially the Great Depression, emerge as an era of diminishing capital mobility. Only recently can we observe a tentative return to the degree of capital mobility witnessed during the late nineteenth century.

The Proper Scope of Government: Theory and an Application to Prisons

Oliver Hart, Andrei Shleifer, and Robert W. Vishny

NBER Working Paper No. 5744
September 1996
JEL Nos. O23, H11
Corporate Finance, Public Economics

When should a government provide a service "in-house" and when should it contract out? We develop a model in which the provider can invest in improving the quality of service or in reducing cost. If contracts are incomplete, then the private provider has a stronger incentive to engage in both quality improvement and cost reduction than a government does. However, the private contractor's incentive to engage in cost reduction is typically too strong, because he ignores the adverse effect on noncontractible quality. We apply the model to understanding the costs and benefits of prison privatization.

Auction Design and the Market for Sulfur Dioxide Emissions

Paul L. Joskow, Richard Schmalensee, and Elizabeth M. Bailey

NBER Working Paper No. 5745
September 1996
JEL No. D44
Industrial Organization

Title IV of the Clean Air Act Amendments of 1990 created a market for electric utility emissions of sulfur dioxide (SO_2). Recent papers have argued that flaws in the design of the auctions that are part of this market have affected its performance adversely. However, these papers incorrectly assume that trade can occur only at auctions. Our empirical analysis of the SO_2 emissions market shows that the auctions have become a small part of a relatively efficient market and that the auction design problems that have attracted the most attention have had no effect on actual market prices.

Environmental Change and Hedonic Cost Functions for Automobiles

Steven Berry, Samuel Kortum, and Ariel Pakes

NBER Working Paper No. 5746
September 1996
JEL Nos. D2, D24, L62
Industrial Organization, Productivity

This paper focuses on how changes in the economic and regulatory environment have affected production costs and product characteristics in the automobile industry. We estimate "hedonic cost functions" that relate product-level costs to their characteristics. Then we examine how this cost surface has changed over time and how these changes relate to changes in gas prices and in emission standard regulations. We also briefly consider the related questions of how changes in automobile characteristics, and in the rate of patenting, are related to regulations and gas prices.

Issues in Korean Exchange Rate Policy

Stanley W. Black

NBER Working Paper No. 5747
September 1996
JEL No. F3

Korea faces a number of unique problems that affect its exchange rate policy. Among these are its asymmetric competitive position vis-à-vis Japan, which is both its major supplier of machine tools and a leading competitor in third markets; the current policy of financial liberalization that goes along with democratic liberalization; and the implications of the potential future unification of the Korean peninsula. This paper considers the question of exchange rate policy for Korea in the face of fluctuations in the yen/dollar rate,

increasing competition from lower-cost Asian countries, and financial liberalization. The paper deals with external versus internal targets, choice of external comparison basket, and the effects of financial liberalization. I analyze the Korean choice of an independent exchange rate policy in terms of the trade-off between external shocks and inflation-fighting credibility of the central bank. Financial liberalization brings with it increased capital mobility. I also consider the possibility of a regional currency area, Korean unification, and long-run equilibrium.

The Equilibrium Approach to Exchange Rates: Theory and Tests

Prakash Apte, Piet Sercu, and Raman Uppal

NBER Working Paper No. 5748
September 1996
JEL No. F31

We characterize the equilibrium exchange rate in a general equilibrium economy without imposing strong restrictions on the output processes, preferences, or commodity market imperfections. The nominal exchange rate is determined by differences in initial wealths—the currencies of richer countries tend to be overvalued by purchasing power parity (PPP) standards—and by differences in marginal indirect utilities of total nominal spending. Changes in the exchange rate mirror differences in growth rates of real spending weighted by relative risk aversion (which can vary over time and can differ across countries), and in the case of nonhomothetic utility functions, differences in inflation rates computed from marginal spending weights. Thus, standard regression or cointegration tests of PPP suffer from missing-variables biases and ignore variations in risk aversions across countries and over time. We also present cointegration tests of the version of the model with constant relative risk aversion (CRRA) and homothetic preferences. When nominal spending is given an independent role (next to prices) in the short-term dynamics, both PPP and the CRRA model become acceptable.

Exchange Rate Pass-Through and Industry Characteristics: The Case of Taiwan's Exports of Midstream Petrochemical Products

Kuo-Liang Wang and Chung-Shu Wu

NBER Working Paper No. 5749
September 1996
JEL Nos. F31, F12, L1

Based on 1986–92 survey data of 22 midstream petrochemical industries in Taiwan, we show that Taiwan's petrochemical firms absorb only a small portion of a given weighted exchange rate change in their export prices, markup ratios, and price–cost margins. This implies that Taiwan's petrochemical firms have a weak pricing-to-market pattern. These empirical results may be explained by the volatility of profitability, high market concentration, and small export/domestic production share. However, the impacts of the exchange rate change on the export price, markup ratio, and price–cost margin have a tendency to increase during 1987 to 1992. The tendency might be attributed to increasing competition of the petrochemical markets in the world, or to Taiwanese firms' gradual realization of the importance of holding their world market shares in response to the change in the exchange rate.

Are Medical Prices Declining?

David M. Cutler, Mark McClellan, Joseph P. Newhouse, and Dahlia Remler

NBER Working Paper No. 5750
September 1996
Aging, Productivity, Public Economics

We address long-standing problems in measuring health care prices by estimating two indexes of the price of medical care. The first, a Service Price Index, prices specific medical services, as does the current Consumer Price Index (CPI). The second, a Cost-of-Living Index, measures the net valuation of treating a health problem. We apply these indexes to heart attack treatment between 1983 and 1994. We find that because of technological change and increasing discounts, the current CPI overstates a chain-weighted price index by 3 percentage points annually. For plausible values of an additional year of life, the real Cost-of-Living Index fell by about 1 percent annually.

The Determinants of Technological Change in Heart Attack Treatment

David M. Cutler and Mark McClellan

NBER Working Paper No. 5751
September 1996
Aging, Health Care, Productivity, Public Economics

This paper examines the sources of expenditure growth in heart attack treatment. First we show that essentially all of the cost growth is a result of the diffusion of particular intensive technologies; the prices paid for a given level of technology have been constant or falling over time. Then we examine the reasons for this diffusion of technology and distinguish six factors that may influence it: organizational factors within hospitals; the insurance environment in which technology is reimbursed;

public policy regulating new technology; malpractice concerns; competitive or cooperative interactions among providers; and demographic composition. We conclude that insurance variables, technology regulation, and provider interactions have the largest quantitative effect on technological diffusion. These factors affect both technology acquisition and the frequency of technology use.

Heterogeneous Information Arrivals and Return Volatility Dynamics: Uncovering the Long Run in High-Frequency Returns

Torben G. Andersen and Tim Bollerslev

NBER Working Paper No. 5752
September 1996
JEL Nos. C22, C51, E44
Asset Pricing

Recent empirical evidence suggests that the long-run dependence in financial market volatility is characterized best by a slowly mean-reverting fractionally integrated process. At the same time, much shorter-lived volatility dependencies typically are observed with high-frequency intradaily returns. In rationalizing this behavior, this paper draws on the information arrival, or mixture-of-distributions hypothesis interpretation of the latent volatility process. By interpreting the overall volatility as the manifestation of numerous heterogeneous information arrivals, sudden bursts of volatility typically will have both short-run and long-run components. Over intradaily frequencies, the short-run decay stands out most clearly, while the impact of the highly persistent processes will be dominant over longer horizons. These ideas are confirmed by our empirical analysis of a one-year time series of intradaily five-minute Deutschemark–U.S. dollar returns. Whereas traditional time-series-based measures for the temporal dependencies in the absolute returns give rise to very conflicting results across different intradaily sampling frequencies, the corresponding semiparametric estimates for the order of fractional integration remain remarkably stable. Similarly, the autocorrelogram for the low-pass filtered absolute returns, obtained by annihilating periods of more than one day, exhibit a striking hyperbolic rate of decay.

The Government as Venture Capitalist: The Long-Run Impact of the SBIR Program

Josh Lerner

NBER Working Paper No. 5753
September 1996
Productivity

Public programs to provide early-stage financing to firms, particularly high-technology companies, have become commonplace in the United States and abroad. However, the long-run effectiveness of these programs has attracted little empirical scrutiny. This paper examines the impact of the largest U.S. public venture capital initiative, the Small Business Innovation Research (SBIR) program, which has provided over $6 billion to small high-technology firms between 1983 and 1995. Using a unique database of awardees compiled by the U.S. General Accounting Office, I show that SBIR awardees grew significantly faster than a matched set of firms over a ten-year period. The positive effects of SBIR awards were confined to firms based in zip codes with substantial venture capital activity. These findings are consistent with both the corporate finance literature on capital constraints and the growth literature on the importance of localization effects.

Fixing Capital Gains: Symmetry, Consistency, and Correctness in the Taxation of Financial Instruments

David F. Bradford

NBER Working Paper No. 5754
September 1996
JEL No. H24
Public Economics

An enormous amount of effort and ingenuity has been addressed to patching holes in the income tax attributable to realization accounting. A classic instance of the problem is the headaches created by capital gains, whereby the taxpayer can choose to postpone recognition of gain and accelerate recognition of loss (a practice known as cherry picking). Nowhere are the inconsistencies that result from realization accounting more pronounced than in the taxation of financial instruments, especially "derivatives" of familiar securities. This paper sets forth the requirements for income measurement rules based on realization that are "linear," in the sense that doubling a person's transactions will double the taxable income, while adding one set of transactions to another will result in the sum of the associated income. Under present realization conventions, the tax law cannot be linear, because then there would be no limit on tax arbitrage profit via variations on borrowing with deductible interest and lending tax exempt. To focus on the principles, I assume in this paper that transactions are costless. In that case, I show that to deal with the intertemporal aspect of the problem requires virtually universal imputation of taxable interest income to basis (the taxpayer's cost of an asset). To deal with the risk aspect of the problem (lock-in and cherry picking) requires simply that the effective rate of tax on gains and losses be the same (not necessarily

equal to the rate on intertemporal returns). I propose a new method that satisfies the requirements for linear income measurement. I show that the retroactive taxation of gain devised by Alan J. Auerbach is a special case of the new approach (involving a zero effective rate of tax on gains and losses).

"Basket" Cases: International Joint Ventures After the Tax Reform Act of 1986

Mihir A. Desai and James R. Hines, Jr.

NBER Working Paper No. 5755
September 1996
JEL Nos. H87, F23, H25, L23
Public Economics

This paper examines the impact of the Tax Reform Act of 1986 (TRA) on international joint ventures by American firms. The evidence suggests that TRA had a significant effect on the organizational form of U.S. business activity abroad. The TRA mandates the use of separate "baskets" in calculating foreign tax credits on income received from foreign corporations owned 50 percent or less by Americans. This limitation on worldwide averaging greatly reduces the attractiveness of joint ventures to American investors, particularly ventures in low-tax foreign countries. Aggregate data indicate that U.S. participation in international joint ventures fell sharply after 1986. The decline in U.S. joint venture activity is most pronounced in low-tax countries; this is consistent with the incentives created by the TRA. Moreover, joint ventures in low-tax countries use more debt and pay greater royalties to their U.S. parents after 1986, which reflects their incentives to economize on dividend payments.

The Determinants of the Choice Between Fixed and Flexible Exchange Rate Regimes

Sebastian Edwards

NBER Working Paper No. 5756
September 1996
JEL Nos. F31, F32, F33
International Finance and Macroeconomics

In recent years, analysts and policymakers have been evaluating the nexus between exchange rates and macroeconomic stability. Among the most important questions asked is why some countries have adopted rigid—including fixed—exchange rate regimes, while others have opted for more flexible systems. This paper addresses this question from a political economy perspective, both theoretically and empirically.

The model assumes that the monetary authority minimizes a quadratic loss function that captures the tradeoff between inflation and unemployment. This framework is applied initially to the case in which monetary authorities must choose between a (permanently) fixed and a flexible exchange rate regime. In selecting the regime, the authorities supposedly compare the expected losses under each scenario. The model subsequently is extended to cover the somewhat more complicated case in which the authorities must choose between fixed-but-adjustable and flexible exchange rate regimes. In this latter case, I take into account the potential political costs of abandoning the pegged rate. In the empirical section of the paper I use an unbalanced panel dataset of 63 countries from 1980–92 to estimate a series of probit models, with a binary exchange rate regime index as the dependent variable. Among the most important explanatory variables are measures of countries' historical degrees of political instability, various measures of the probability of abandoning pegged rates, and variables related to the relative importance of real (unemployment) targets in the preferences of monetary authorities. The regression results support the political economy approach developed in the theoretical discussion.

The Macroeconomics of Specificity

Ricardo J. Caballero and Mohamad L. Hammour

NBER Working Paper No. 5757
September 1996
JEL Nos. E1, O10, D52
Economic Fluctuations and Growth

Specific quasi-rents build up in a wide variety of economic relationships, and are exposed to opportunism unless they are protected fully by contract. The recognition that such contracts are often incomplete has yielded major insights into the organization of microeconomic exchange. Rent appropriation, we argue, also has important *macroeconomic* implications. Resources are underutilized, factor markets are segmented, production suffers from technological "sclerosis," job destruction is out of balance with creation, recessions are excessively sharp, and expansions run into bottlenecks. Depending on the nature of the shock, expansions may require reinforcement or stabilization, but recessions always should be softened. In the long run, institutions—such as those governing capital–labor relations—may evolve to alleviate the problem by balancing appropriation. Technology choice also will be affected, with the appropriated factor partially "excluding" the other from production to reduce appropriation. This is manifested in the role that capital–labor substitution played in the rise of European unemployment.

Financial Dependence and Growth

Raghuram G. Rajan and Luigi Zingales

NBER Working Paper No. 5758
September 1996
Corporate Finance,
Economic Fluctuations and Growth

Does finance affect economic growth? A number of studies have identified a positive correlation between the level of development of a country's financial sector and the rate of growth of its per capita income. As has been noted elsewhere, the observed correlation does not necessarily imply a causal relationship. This paper asks whether financial development facilitates economic growth by scrutinizing one rationale for such a relationship: financial development reduces the costs of external finance to firms. Specifically, we ask whether industrial sectors that are relatively more in need of external finance develop disproportionately faster in countries with more developed financial markets. We find this to be true in a large sample of countries over the 1980s. We show that this result is not likely to be driven by omitted variables, outliers, or reverse causality.

The Effects of Tax-Based Saving Incentives on Saving and Wealth

Eric M. Engen, William G. Gale, and John Karl Scholz

NBER Working Paper No. 5759
September 1996
JEL Nos. H31, E21, H24
Public Economics

This paper evaluates existing research on the effects of tax-based saving incentives on private and national saving. Several factors make this an unusually difficult problem: First, households that participate in, or are eligible for, saving incentive plans have systematically stronger tastes for saving than other households. Second, the data indicate that households with saving incentives have taken on more debt than other households. Third, significant changes in the 1980s in financial markets, pensions, Social Security, and nonfinancial assets interacted with the expansion of saving incentives. Fourth, saving incentive accounts represent pretax balances, whereas conventional taxable accounts represent posttax balances. Fifth, the fact that employer contributions to saving incentive plans are a part of total employee compensation typically is ignored.

A major theme of this paper is that analyses that ignore these issues overstate the impact of saving incentives on saving. We show that accounting for these factors largely or completely eliminates the estimated positive impact found in the literature of saving incentives on saving. Thus, we conclude that little if any of the overall contributions to existing saving incentives have raised private or national saving.

Mortality Contingent Claims, Health Care, and Social Insurance

Tomas Philipson and Gary S. Becker

NBER Working Paper No. 5760
September 1996
JEL No. I01
Health Care

This paper analyzes the impacts on savings and health care of *mortality contingent claims*, defined here as income measures, such as annuities and life insurance, under which earned income is contingent on the length of one's life. The postwar increase in mandatory annuity and life insurance programs, as well as the rapid increase in life expectancy, motivates a better understanding of the effects that mortality contingent claims have on resources devoted to life extension. We analyze the incentives that such claims imply for life extension when resources may affect mortality endogenously, and we argue that these incentives dramatically alter the standard conclusions obtained when mortality is treated exogenously.

The Transition Path in Privatizing Social Security

Martin Feldstein and Andrew Samwick

NBER Working Paper No. 5761
September 1996
JEL No. H55
Public Economics

This paper analyzes the transition from the existing pay-as-you-go Social Security program to a system of funded Mandatory Individual Retirement Accounts (MIRAs). Because of the high return on real capital relative to the very low return in a mature pay-as-you-go program, the benefits that can be financed with the existing 12.4 percent payroll tax eventually could be funded with mandatory contributions of only 2.1 percent of payroll. A transition to that fully funded program could occur with a surcharge of less than 1.5 percent of payroll during the early part of the transition. After 25 years, the combination of financing the pay-as-you-go benefits and accumulating the funded accounts would require less than the current 12.4 percent of payroll. The paper also discusses how a MIRA system could deal with the benefits of low-income employees and with the risks associated with uncertain longevity and fluctuating market returns.

Individual Financial Decisions in Retirement Saving Plans and the Provision of Resources for Retirement

James M. Poterba and David A. Wise

NBER Working Paper No. 5762
September 1996
JEL Nos. J14, H55, E21
Aging, Public Economics

Proposals for mandatory private savings accounts differ in the degree of investment discretion provided to individual savers, and in their provisions for annuitization of accumulated assets. With respect to investment choices, some argue that individuals must be prevented from investing too conservatively and earning low returns over their accumulation period; others argue that individuals should be protected from recklessly investing their retirement assets. With respect to annuitization, there is concern that individuals might not choose annuities and thereby would expose themselves to a risk of outliving their assets in a privatized system. This paper draws on the existing experience with 401(k) plans and other defined-contribution pension plans to provide evidence on each of these issues. We find that the share of 401(k) plan assets held in corporate equities has increased substantially in recent years. We are able to provide only limited evidence on participant asset management, since many 401(k) plans have limited options in this regard. We do find, however, that a participant's education and income levels are related to asset allocation decisions, with less-educated and lower-income participants less inclined to invest in equity securities. We also analyze a unique database on TIAA–CREF participants and find several attributes of annuitization behavior that seem inconsistent with standard behavior in the life-cycle model.

The Wages and Language Skills of U.S. Immigrants

Geoffrey Carliner

NBER Working Paper No. 5763
September 1996
JEL Nos. J31, J15
Labor Studies

This paper finds that immigrants on average earned about 50 cents an hour less than native-born Americans in 1989. Immigrants from some regions earned considerably more than natives, while others, especially from Mexico, earned much less. This paper also finds that when immigrants first arrive in the United States they earn significantly less than native workers, but that they close the gap by about 0.8 percentage points with each added year of residence. As a result, the wage of the typical immigrant who arrived in the 1950s and 1960s eventually surpassed the average native wage. Improvements in English language skills contributed anywhere from 6 to 18 percent of this narrowing, depending on the sex and education level of the immigrant. The remainder came from unmeasured sources of assimilation.

However, since the 1950s and 1960s the wage gap between natives and newly arrived immigrants has widened by 0.2 to 0.6 percentage points annually. Because they start with a larger disadvantage, the more recent immigrants may never see their average wage exceed the average native wage. A decline in the average education of newly arrived immigrants accounts for 4 to 23 percent of the starting wage gap, and shifts in the source countries of new immigrants from Europe to Latin America and Asia account for 73 to 95 percent. Changes in English skills and in other factors have played little role in this relative decline.

This analysis also finds a significant return to skills in English. Even after controlling for education, region of origin, and years of U.S. residence, I find that workers are rewarded for speaking English well. Differences among each of the five English skill categories reported in the Census data are about the same as the return to an additional year of schooling.

What Does the Bundesbank Target?

Ben S. Bernanke and Ilian Mihov

NBER Working Paper No. 5764
September 1996
Economic Fluctuations and Growth, Monetary Economics

Although its primary ultimate objective is price stability, the Bundesbank has drawn a distinction between its money-focus strategy and the inflation-targeting approach recently adopted by a number of central banks. Holding constant the current forecast of inflation, we show that German monetary policy responds very little to changes in forecasted money growth; we conclude that the Bundesbank is much better described as an inflation targeter than as a money targeter.

This paper also applies our (1995) structural vector autoregression methods to a determination of the optimal indicator of German monetary policy. We find that the Lombard rate historically has been a good policy indicator, although the use of the call rate as an indicator cannot be rejected statistically.

Nonmonetary Exchange Within Firms and Industry

Canice Prendergast and Lars Stole

NBER Working Paper No. 5765
September 1996
JEL Nos. D8, J3, L1
Labor Studies

This paper considers why firms choose nonmonetary means of exchange, such as barter and the reciprocation of favors, despite the usual benefits of monetary transactions. We consider the chosen means of exchange when both monetary and nonmonetary exchange mechanisms are available. We illustrate three potential reasons for the emergence of nonmonetary trade. First, a willingness to barter may reveal information that cannot be revealed solely through monetary trade. Second, nonmonetary trade may constrain the ability of agents to engage in inefficient rent-seeking activities. Finally, nonmonetary trade improves the ability of agents to impose trade sanctions on those who act dishonestly. We consider a number of applications of each of these ideas.

A Model of Foreign Exchange Rate Indetermination

Charles M. Engel

NBER Working Paper No. 5766
September 1996
JEL No. F40
International Finance and Macroeconomics

Economic agents undertake actions to protect themselves from the short-run impact of foreign exchange rate fluctuations: nominal goods prices are set in consumers' currencies, and firms hedge foreign exchange risk. I present a model that shows that these features of the economy can lead to indeterminacy in the nominal exchange rate in the short run. There can be noise in the exchange rate, unrelated to any fundamentals, essentially because the short-run fluctuations do not influence any rational agent's behavior. I explore empirical implications of this sort of noise.

Aggregate Employment Fluctuations with Microeconomic Asymmetries

Jeffrey R. Campbell and Jonas D. M. Fisher

NBER Working Paper No. 5767
September 1996
JEL No. E1
Economic Fluctuations and Growth

We provide a simple explanation for the observation that the variance of job destruction is greater than the variance of job creation: job creation is costlier at the margin than job destruction. As Caballero has argued, asymmetric employment adjustment costs at the establishment level need not imply asymmetric volatility of aggregate job flows. We construct an equilibrium model in which certain employment policies respond endogenously to aggregate shocks. The microeconomic asymmetries in the model can dampen the response of total job creation to an aggregate shock, and can cause it to be less volatile than total job destruction. This is so even though aggregate shocks are distributed symmetrically.

Trade and Environment Beyond Singapore

John Whalley

NBER Working Paper No. 5768
September 1996
International Trade and Investment

This paper discusses the likely evolution of the trade-and-environment issue in the World Trade Organization (WTO) after the upcoming ministerial meeting in Singapore this December. It makes a number of points: first, progress within the GATT/WTO on this issue is likely to be slow and painfully incremental, rather than bold, as environmental groups wish. Second, despite (and beyond) Singapore, one has to go further than the GATT/WTO to see the potential evolution of the trade-and-environment issue. In the next few years, developments are likely to be driven as much by factors outside the GATT/WTO as within it, as new global environmental arrangements—some with potentially large trade implications (such as carbon emission limitation agreements)—emerge.

Do Markets Respond More to More Reliable Labor Market Data? A Test of Market Rationality

Alan B. Krueger

NBER Working Paper No. 5769
September 1996
JEL Nos. G14, J10
Labor Studies

Since 1979, the Bureau of Labor Statistics (BLS) has nearly quadrupled the size of the sample used to estimate monthly employment changes. Although first-reported employment estimates are still noisy, the magnitude of sampling variability has declined in proportion to the increase in the sample size. A model of rational Bayesian updating predicts that investors would assign more weight to the BLS employment survey as it became more precise. However, a regression analysis of changes in interest rates on the day the employment data are released finds no evidence that the bond market's reaction to employment news intensified in the late 1980s or early 1990s. For the time period as a whole, an unexpected increase of 200,000 jobs is associated with an 8-basis-point increase in the interest rate on 30-year Treasury bonds, and a 9-basis-point increase in the interest rate on 3-month bills, all else

equal. Additionally, announced increases in the hourly wage are associated with higher long-term interest rates, while announced changes in the unemployment rate and revisions to past months' employment estimates have a statistically insignificant effect on long-term interest rates.

Estimating the Welfare Effects of Digital Infrastructure

Shane M. Greenstein and Pablo T. Spiller

NBER Working Paper No. 5770
September 1996
JEL Nos. L51, L96, O30
Productivity

While much economic policy presumes that more information infrastructure yields higher economic returns, little empirical work measures the magnitudes of these returns. We examine investment by local exchange telephone companies in fiber optic cable, ISDN lines, and signal seven software; this infrastructure plays an essential role in bringing digital technology to local telephone networks. We estimate the elasticity of the derived demand for infrastructure investment faced by local exchange companies, controlling for factors such as local economic activity and the political disposition of state regulators. Our model postulates a regulated profit-maximizing local exchange firm and a regulatory agency with predetermined political leanings in favor of consumer prices or firm profits. The model accounts for variation in state regulation and local economic conditions.

In all our estimates, we find that consumer demand is sensitive to investment in modern infrastructure, particularly as represented by fiber optic cable. Our estimates imply that infrastructure investment is responsible for a substantial fraction of the recent growth in consumer surplus and business revenue in local telecommunication services.

The Exchange Value of the Renminbi and China's Balance of Trade: An Empirical Study

Zhaoyong Zhang

NBER Working Paper No. 5771
September 1996
JEL Nos. F31, F14, P22

This paper uses some recent econometric techniques designed to evaluate the existence and the direction of causality to assess the relationship between the exchange value of the Chinese Renminbi (RMB) and China's trade balance. I find that changes in the trade balance and in each of its components "Granger-cause" changes in the exchange rate, but there is no evidence of a causal link running from the exchange rate to the trade balance. These results support the accommodative role of the exchange rate proposed by the modern theory of trade balance determination; they do not support the existence of a J-curve in China's trade balance. The bidirectional causal relationship between the real exchange rate and the price variables confirms the presence of a "vicious circle" following currency devaluation. This has important implications for the impacts of RMB devaluation on China's trade balance.

Debt, Cash Flow, and Inflation Incentives: A Swedish Example

Mats Persson, Torsten Persson, and Lars E. O. Svensson

NBER Working Paper No. 5772
September 1996
JEL Nos. E31, E62, H62, H63
International Finance and Macroeconomics, Monetary Economics, Public Economics

The fiscal gains from, and hence the political incentives for, an increase in the inflation rate of 10 percentage points may be substantial: with Swedish data from 1994, these gains are estimated at an annual real flow of 3–4 percent of GDP, or a capitalized value of nearly 100 percent of GDP. They would have arisen mainly from the nominalistic features of the tax and transfer systems, rather than from the traditional sources: seignorage and real depreciation of the public debt. The welfare costs of such an increase in inflation would have been even larger, however, and thus would have reduced net welfare. We present and discuss possible institutional reforms aimed at making the political costs of inflation more equal to the social costs.

Diffusion of General Purpose Technologies

Elhanan Helpman and Manuel Trajtenberg

NBER Working Paper No. 5773
September 1996
JEL Nos. O10, O30, O41, E32
Productivity

History and theory alike suggest that General Purpose Technologies (GPTs), such as the steam engine or electricity, may play a key role in economic growth. In a previous paper (1994) we incorporated this notion into a Grossman–Helpman growth model, and explored the economywide dynamics that a GPT generates. This paper deals with the

diffusion of the GPT over heterogeneous final-good sectors. We show that the gradual adoption of the GPT by each user sector generates a sequence of two-phased cycles, culminating in a "second wave": after all sectors adopt, they again engage in R and D, bringing about a spell of sustained growth. We also analyze the welfare implications of the *order* of adoption, by way of numerical simulations. As a "reality check," we sketch the early diffusion of the transistor (the first embodiment of semiconductors, the dominant GPT of our era) and seek to characterize both the early adopters and the laggards in terms of the parameters of the model.

The Decline of Welfare Benefits in the United States: The Role of Wage Inequality

Robert Moffitt, David Ribar, and Mark Wilhelm

NBER Working Paper No. 5774
September 1996
JEL Nos. H72, I38
Public Economics

Welfare benefits in the United States have experienced a much-studied secular decline since the mid-1970s. We explore a new hypothesis for this decline related to the increase in wage inequality in the labor market and to the decline of real wages at the bottom of the distribution: we posit that voters prefer benefits that are tied to low-skilled wages. We test the hypothesis using a 1969–92 panel of state-level data. Our analysis also uses General Social Survey data on voter preferences for welfare, which we combine with Current Population Survey data to determine the voter in each state who has the median preferred level of welfare benefits. We find considerable evidence of a role for declining real wages in the decline of welfare benefits.

Driving Forces and Employment Fluctuations

Steven J. Davis and John C. Haltiwanger

NBER Working Paper No. 5775
September 1996
JEL Nos. E32, J63
Economic Fluctuations and Growth

We rely on a decomposition of changes in employment into job creation and job destruction components—and a novel set of identifying restrictions that this decomposition permits—to develop new evidence about the driving forces behind aggregate fluctuations and the channels through which they operate. We implement our approach using quarterly postwar U.S. data on oil shocks, monetary shocks, and manufacturing rates of job creation and destruction. Our analysis results in several inferences:

1. The data favor a characterization of fluctuations in employment and job reallocation involving many shocks.

2. In order to fit the data, theories of employment fluctuations that attribute a predominant role to aggregate shocks must involve contemporaneous effects on job destruction at least as large as the effects on job creation.

3. Theories in which aggregate shocks primarily affect the first moment of the cross-sectional density of employment growth imply that allocative shocks have bigger contemporaneous effects on destruction than on creation; hence, allocative shocks reduce aggregate employment.

4. Allocative shocks drive most fluctuations in the intensity of job reallocation.

5. Oil shocks drive employment fluctuations through a mixture of allocative and aggregate channels.

6. Monetary shocks trigger job creation and destruction dynamics that fit the profile of an aggregate shock.

Simulating the Privatization of Social Security in General Equilibrium

Laurence J. Kotlikoff

NBER Working Paper No. 5776
September 1996
JEL No. H55
Aging, Public Economics

This paper studies the macroeconomic and efficiency effects of privatizing Social Security. It does so by simulating alternative privatization schemes using the Auerbach–Kotlikoff Dynamic Life-Cycle Model. The simulations indicate three things. First, privatizing Social Security can generate very major long-run increases in output and living standards. Second, although the long-run gains from privatization are larger if privatization redistributes resources from initial to future generations, the pure efficiency gains from privatization are also substantial. (Efficiency gains refer to the welfare improvement available to future generations after existing generations have been compensated fully for their losses from privatization. The precise size of the efficiency gain depends on the existing tax structure, the linkage between benefits and taxes under the existing Social Security system, and the method chosen to finance benefits during the transition.) Third, at least in the long run, privatizing Social Security is likely to be progressive, in that it improves the well-being of the "lifetime poor" relative to that of the "lifetime rich."

Historical Factors in Long-Run Growth

Compulsory Schooling Legislation and School Attendance in Turn-of-the-Century America: A "Natural Experiment" Approach

Robert A. Margo and T. Aldrich Finegan

NBER Historical Paper No. 89
July 1996
JEL No. N31

Recent research by Joshua D. Angrist and Alan B. Krueger has used information on exact dates of birth in the 1960 to 1980 federal Censuses to study the impact of compulsory schooling laws on school attendance. This paper modifies their methodology to analyze similar data in the 1900 federal Census to measure the impact of turn-of-the-century compulsory schooling laws. Using data on 14-year-olds from the 1900 Census public use microdata sample, we compare attendance rates of children born after January 1, 1900 with those born before that date, across states with and without compulsory schooling laws. In states that combined school-leaving with child labor laws, we find, compulsion significantly raised attendance rates.

What Determines the Allocation of National Government Grants to the States?

John Joseph Wallis

NBER Historical Paper No. 90
July 1996
JEL Nos. H77, N42
Public Economics

During the New Deal, the federal government initiated a policy of massive grants to states for support of social welfare and other programs. Since that time grants have come to be an integral part of the U.S. fiscal system, and scholars have continued to debate whether the allocation of federal grants among the states is motivated primarily by political, or by social and economic objectives. This paper shows that, during the 1930s, both political and economic effects determined grant allocation, but that the congressional factors considered by Anderson and Tollison were not important, while the presidential factors considered by Wright were. When I extend the analysis to 1932 to 1982, however, congressional influences do seem to be important. On the other hand, the dominant influence on federal grant policy over the longer sample appears to be state government expenditures, with both political and economic influences playing a smaller role.

"Location, Location, Location!" The Market for Vacant Urban Land: New York, 1835–1900

Jeremy Atack and Robert A. Margo

NBER Historical Paper No. 91
August 1996
JEL No. R33

We present new archival evidence on the price of vacant land in New York City between 1835 and 1900. Before the Civil War, the price of land per square foot fell steeply with distance from New York's City Hall in the central business district (CBD). After the Civil War, the distance gradient flattened, and the fit of a simple regression of land price on distance from the CBD declined markedly. Average nominal land prices at the CBD increased at an average annual rate of over 3 percent per year between 1835 and 1895 before declining as the century came to an end.

Explaining the Rise in Antebellum Pauperism: New Evidence

Lynne L. Kiesling and Robert A. Margo

NBER Historical Paper No. 92
September 1996
JEL No. N31

The 1850s witnessed one of the earliest "welfare explosions" in American history. During that decade the "pauper rate"—the proportion of individuals receiving public assistance—increased from 5.8 to 10.2, or 76 percent. Previous attempts to explain the increase in antebellum pauperism have been hampered by the available published data, which are too aggregated to be of much use.

This paper explores the determinants of antebellum pauperism using previously unexploited archival data drawn from the manuscript censuses of social statistics. These records provided detailed evidence on the incidence of pauperism at the county level. We find that about half of the increase in pauperism can be attributed to falling real wages during the decade. Other contributing factors were increased immigration and urbanization.

Technical Papers

Asymptotics for GMM Estimators with Weak Instruments

James H. Stock and Jonathan Wright

NBER Technical Paper No. 198
July 1996
JEL Nos. C1, C3
Asset Pricing,
Economic Fluctuations and Growth

This paper develops asymptotic distribution theory for generalized-method-of-moments (GMM) estima-

tors and test statistics, given that some of the parameters are identified well, but others are identified poorly because of weak instruments. The asymptotic theory entails applying empirical process theory in order to obtain a limiting representation of the (concentrated) objective function as a stochastic process. The general results are then specialized to two leading cases: linear instrumental variables regression, and GMM estimation of Euler equations obtained from the consumption-based capital asset pricing model with power utility. Numerical results from the latter model confirm that finite sample distributions can deviate substantially from normality. These deviations are captured by the weak instrument asymptotic approximations.

An Introduction to Applicable Game Theory
Robert Gibbons

NBER Technical Paper No. 199
August 1996
JEL Nos. C72, D82
Labor Studies

This paper offers an introduction to game theory for applied economists. I try to give simple definitions and intuitive examples of the basic kinds of games and their solution concepts. There are four kinds of games: static or dynamic, and complete or incomplete information. ("Complete information" means there is no private information.) The corresponding solution concepts are: Nash equilibrium in static games of complete information; backward induction (or subgame-perfect Nash equilibrium) in dynamic games of complete information; Bayesian Nash equilibrium in static games with incomplete information; and perfect Bayesian (or sequential) equilibrium in dynamic games with incomplete information. The main theme of the paper is that these solution concepts are closely linked. As we consider progressively richer games, we progressively strengthen the solution concept, to rule out implausible equilibriums in the richer games that would survive if we applied the solution concepts available for simpler games. In each case, the stronger solution concept differs from the weaker concept only for the richer games, not for the simpler games.

Nonparametric Applications of Bayesian Inference
Gary Chamberlain and Guido W. Imbens

NBER Technical Paper No. 200
August 1996
Labor Studies

This paper evaluates the usefulness of a nonparametric approach — attributable to Ferguson (1973, 1974) and Rubin (1981)—to Bayesian inference. We present two applications: The first considers a problem of educational choice. We focus on obtaining a predictive distribution for earnings corresponding to various levels of schooling. This predictive distribution incorporates the parameter uncertainty, so that it is relevant for decisionmaking under uncertainty in the expected utility framework of microeconomics. The second application is to quantile regression. Our point here is to examine the potential of the nonparametric framework to provide inferences without making asymptotic approximations. Unlike in the first application, the standard asymptotic normal approximation turns out not to be a good guide. We also consider a comparison with a bootstrap approach.

Asymptotically Median Unbiased Estimation of Coefficient Variance in a Time-Varying Parameter Model
James H. Stock and Mark W. Watson

NBER Technical Paper No. 201
August 1996
Monetary Economics

This paper considers the estimation of the variance of coefficients in time-varying parameter models with stationary regressors. The maximum likelihood estimator (MLE) has large point mass at zero. We therefore develop asymptotically median unbiased estimators and confidence intervals by inverting median functions of regression-based parameter stability test statistics, computed under the constant-parameter null. These estimators have good asymptotic relative efficiencies for small to moderate amounts of parameter variability. We apply these results to an unobserved components model of trend growth in postwar U.S. GDP: the MLE implies that there has been no change in the trend rate, while the upper range of the median-unbiased point estimates implies that the annual trend growth rate has fallen by 0.7 percentage points over the postwar period.

Imposing Moment Restrictions from Auxiliary Data by Weighting
Guido W. Imbens and Judith K. Hellerstein

NBER Technical Paper No. 202
August 1996
Labor Studies

In this paper we analyze estimation of coefficients in regression models under moment restrictions that are derived from auxiliary data. Our approach is similar to those that

have been used in statistics for analyzing contingency tables with known marginals. These techniques are useful in cases in which data from a small, potentially nonrepresentative dataset can be supplemented with auxiliary information from another dataset that may be much larger and/or more representative of the target population of interest. The moment restrictions yield weights for each observation that subsequently can be used in weighted regression analysis. We discuss the interpretation of these weights both under the assumption that the target population (from which the moments are constructed) and the sampled population (from which the sample is drawn) are the same, as well as under the assumption that these populations differ.

We present an application based on omitted ability bias in estimation of wage regressions. The National Longitudinal Survey (NLS) Young Men's Cohort, in addition to containing information for each observation on earnings, education, and experience, records data on two test scores that may be considered proxies for ability. The NLS is a small dataset, however, with a high attrition rate. We investigate how to mitigate these problems in the NLS by forming moments from the joint distribution of education, experience, and earnings in the 1 percent sample of the 1980 U.S. Census, and using these moments to construct weights for weighted regression analysis of the NLS. We analyze the impacts of our weighted regression techniques on the estimated coefficients and standard errors on returns to education and experience in the NLS controlling for ability, with and without the assumption that the NLS and the Census samples are random samples from the same population.

Statistical Mechanics Approaches to Socioeconomic Behavior

Steven N. Durlauf

NBER Technical Paper No. 203
September 1996
JEL Nos. D1, E1, I3
Economic Fluctuations and Growth, Labor Studies

This paper provides a unified framework for interpreting a wide range of interactions models that have appeared in the economics literature. A formalization taken from the statistical mechanics literature encompasses a number of socioeconomic phenomena ranging from out-of-wedlock births to aggregate output to crime. The framework bears a close relationship to econometric models of discrete choice, and therefore holds the potential for rendering interactions models estimable. I suggest a number of new applications of statistical mechanics to socioeconomic problems.

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

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