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In This Issue

Program Report

Labor Economics

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When the NBER instituted the Labor Studies Program some 20 years ago, labor economics was merely a tributary of economics. The main battleground of economic debate was macroeconomics, and most analyses focused on time-series data. Today, many of the big issues in economics are microeconomic labor problems, and their resolution requires analyses of large datasets. The topic that has attracted the greatest attention among NBER labor researchers is the change in the U.S. earnings distribution—the decline in the economic position of low-skilled workers relative to high-skilled workers—an area in which our colleagues in trade also have worked intensively. Many other labor issues, such as the effect of the minimum wage on employment and income, the effect of government training programs on worker skills, the relation between family background and the well-being of children, the return to schooling and even crime, can be viewed as part of a broad concern for the causes and consequences of inequality.

The high level of employment in the United States also has attracted much attention. Many Western Europeans look longingly on the "U.S. model" for its success in creating jobs. By the U.S. model, they do not mean U.S. macro or financial policy, or industrial organization, or trade policy; they mean our labor market. This is a significant change in thinking about the U.S. job market. Until the mid-1980s or so, the United States had higher unemployment rates than most European Union countries; the rate of joblessness in West Germany did not rise above the American rate until the 1990s. An Australian economist once remarked that when he was a student, he thought economic models based on the competitive U.S. labor market proved how badly economists understood labor markets. After all, Australia and Western Europe had markedly better unemployment records than the United States. But this

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is no longer the case. We may still misunderstand labor markets, but the facts that need explaining now are quite different.

NBER researchers have been examining foreign labor markets, and economic systems more broadly, in an effort to understand differences in outcomes across countries and to cast light on the virtues and vices of the U.S. labor market. They also have analyzed the organization of firms, asking what leads them to treat workers differently, and how labor relations and personnel policy, including compensation policy, contribute to firm performance.

Finally, mirroring the more central role of labor issues in economic analysis, the NBER Labor Studies Program has produced an extraordinarily large number of research papers since my last report (307 by my rough count), which made the preparation of this article more difficult than previous reports on the Program. Because of the plethora of papers, I have picked only some of the topics covered in the Program.

Further mirroring the increased importance of labor issues, the last two John Bates Clark Award medalists—David Card and Kevin M. Murphy—come from our ranks, of which we are proud.

Inequality and Related Issues

There is probably not a nook or cranny in the analysis of the rise in inequality in earnings in the United States that NBER researchers have not explored. They have contributed to documenting the facts [5202, 5832, 6213, 5823]; to examining the effects on immigration and how immigrants have fared in the economy [4972, 4955, 4866, 5454, 5763, 5927, 5388, 5837, 6195]; considered the role of trade [5924, 5940, 5621, 6209], unionization, technology [4255, 5534, 5956, 5107, 5941, 5606, 5657, 6166], increases in the supply of women and the labor supply responses of the family [5236, 5459]; and looked at the effect of neighborhoods and ethnic capital on outcomes [6175, 6176]. Whereas in some parts of the profession, the inequality issue is posed solely in terms of the effects of trade versus technology, labor researchers have been looking at diverse institutional influences as well [4224, 4678, 4945, 5093]. A nutshell summary of this research is that there is convincing evidence that most things that we expect to matter **do** in fact matter; that no single factor can explain the pattern of rising inequality; and that consensus about the relative magnitudes of different factors has not been reached. As in much economic analysis that seeks to determine the "sources of...", there is a sizeable residual, leaving an open field for judgement calls. An important tool in these analyses has been the NBER's CD-ROM on the out-going rotation group of the Current Population Survey.

Women have been the "exception to the rule" of rising earnings differentials; they have improved their position in the job market, particularly at the higher skill levels. A significant number of researchers have explored the improved position of women in the job market and the particular problems they face. These researchers have sought new ways to assess issues relating to the determinants and consequences of childbearing [4911, 4224, 5664, 5406, 5778, 6047, 6034]; examined the effect of school content [5580] and faculty composition [4874] on female progress in the job market; and looked at the changing pattern of organizing careers and families [5188], and why women are underrepresented in the field of economics [5299]. Francine Blau and Lawrence Kahn have linked gender pay differentials to the overall wage structure across countries [5664], highlighting the exceptional progress of American women.

How much might additional schooling help the workforce prospects of persons from low income backgrounds? Does class size matter in student performance after graduation and in the job market? Researchers have used data on twins, sought distinct "natural experiments," and used cross-state data and diverse instruments to study the effects of these inputs on educational outcomes [4874, 5144, 5708, 5450, 6051, 5331, 5353, 5274, 5288, 5548]. One important finding is that the instrumented, or natural experiment, estimates of school effects on earnings show that they remain relatively high. The effect of class size and resources on schooling is more controversial; there is no consensus there. Cecilia Rouse has given a modestly positive assessment of the effects of the Milwaukee parental choice program on student achievement [5964].

How much might family background matter in economic differences? Joseph Altonji, working with various co-authors, has examined both the effects and mechanisms by which family characteristics influence the young [5072, 5378, 5522]. Derek Neal has presented evidence that "pre-market factors" are very important in black-white differences [5124]. Several researchers have examined childbearing issues [5807, 5781] and the effect of various programs and interventions on children's well-being [5805, 5985]. Janet Currie currently heads the NBER's Program on (the Economics of) Children.

What is the link between crime and economic problems? Several researchers have explored issues relating to crime, examining the distribution of crimes across cities [5430]; the relation between crime and wages [5983]; domestic violence [4939]; and employment and crime [4794, 4910, 5451].

Labor Institutions

Following the completion of the NBER's Comparative Labor Project in 1995, many NBER researchers have continued to study labor markets in countries outside the United States [5237, 5003]. Robert Topel and I, working with Birgitta Swedenborg of SNS, directed a major study of the Swedish welfare state, that paired Swedish and American researchers: *The Welfare State in Transition: Reforming the Swedish Model* published by the University of Chicago Press for the NBER in 1997. This project highlighted both the pluses of the Swedish model (conquering poverty) and the negatives (in the form of microeconomic inefficiencies and the inability to escape high levels of unemployment in the 1990s). John Abowd, working with Francis Kramarz, David Margolis, and others has exploited fairly unique data files from France that follow workers across firms [4917, 5077, T180, 5493, 5551, 6109, 6110], allowing the researcher to control for firm and worker effects and thus to learn more about how the job market functions. In 1995, Abowd helped organize an international conference on the use of matched employee-employer panel datasets. Other researchers have examined German institutions in some detail [5988, 4808, 4825, 5716, 5724, 6167, 5208, 5829] and have contrasted the United States, Canada, and France [5487]. In winter 1996 the NBER held a conference, organized by David Blanchflower and me, on youth labor markets. It contrasted the United States and Germany, the United Kingdom, and Sweden [6031, 6078, 6102, 6105, 6111, 6142, 6212].

Looking at U.S. institutions per se, Patricia Anderson and Bruce Meyer have focused on unemployment insurance, which has a surprisingly low take-up rate in this country [4787, 4960] while Kate Baicker, Claudia Goldin, and Lawrence Katz [5889] have studied the development of that system over time. Jonathan Gruber, with co-authors, has examined the implications for labor supply of various social insurance programs [6041], while John Bound with co-authors has focused on disability insurance [5159, 5536, 5169].

Labor Demand and Firm Behavior

Many researchers have examined labor demand behavior and the internal organization of firms. Lawrence Katz has shown that wage subsidies can modestly improve the demand for disadvantaged workers [5679]. Daniel Hamermesh has examined the demand for hours of labor [4394, 5973]. Michael Kremer and Eric Maskin offered a demand-side analysis linking rising inequality to segregation by skill [5718]. Two studies have focused on worker characteristics, one on their impact on plant-level production [5626] and one on the effect of affirmative action on employee qualifications [5603].

Several researchers have looked at intrafirm issues, ranging from the theory of works councils and worker share ownership and worker cooperatives [4918, 5436, 6118] to other organizational issues [5705, 5802] to empirical studies of firm performance under alternative structures [6120, 5672]. Doug Kruse and Joseph Blasi have summarized what we know from many studies of the links among employee ownership and firm performance and employees' attitudes [5277]. Casey Ichniowski, Katharine Shaw, and Giovanna Prennushi have provided evidence that packages of human resource practices add more to firm productivity than individual practices [5333]. Robert Gibbons and Henry Farber organized a 1996 NBER-Universities Research Conference around the issue of the internal structure of firms, and this promises to be a growing topic in future years.

Econometric Issues

Huge datasets raise new potential for statistical testing and open the door for new strategies for determining behavioral responses to economic incentives. A striking pattern in much empirical work is the search for appropriate "instruments" from which to infer behavior. What researchers do is seek out factors that shift supply or demand incentives without directly affecting the relevant outcomes. Joshua Angrist, Guido Imbens, and Don Rubins have greatly enhanced our understanding of the advantages and limitations of instrumental variable analyses with a set of papers developing the notion of a local average treatment effect, or LATE [T118, T127, T181, 5192]. Angrist, Krueger, and Imbens have examined different ways to use instrumental variables [T150, T181, T172] while John Bound and David Jaeger have pointed out problems when instruments are only weakly correlated with the explanatory variable [5835]. James Heckman and coauthors have provided insightful analyses of the problems with social experiments [T166, T184, 5535].

What Next?

A visitor to labor studies from the rest of economics will notice immediately that the field is strikingly empirically-oriented, with researchers reacting to ongoing social problems and devoted to the "facts, ma'am, just the facts." This is a huge strength, but also in some ways a weakness. In the future, I expect more attention to be paid to the effects of trade on the labor market and to the contribution of labor markets to the distinct macroeconomic performance of the United States, which some researchers have explored [5822, 5538, 5538] and to further work on firms and institutional differences among countries. As it is difficult to analyze trade, macro issues, firms, or country institutions without some (albeit very different) theoretical basis, perhaps we will see labor researchers contributing more along the theoretical than they have in the past.

LIST OF SELECTED REFERENCES

For the rising pay of higher level workers, see:

WP 6213, 10/97, Brian J. Hall and Jeffrey B. Liebman
"Are CEOs Really Paid Like Bureaucrats?"

For the contribution of institutions to the distribution of wages, see:

WP 5093, 4/95, John DiNardo, Nicole M. Fortin, and Thomas Lemieux
"Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach"

For the effect of institutions on productivity and firm performance, see:

WP 5333, 11/95, Casey Ichniowski, Kathryn Shaw, and Giovanna Prennushi
"The Effects of Human Resource Management Practices on Productivity"

WP 5436, 1/96, Edward P. Lazear and Richard B. Freeman
"Relational Investing: The Worker's Perspective"

For the debate over the role of school resources on education, see:

WP 5708, 8/96, David Card and Alan Krueger
"School Resources and Student Outcomes: An Overview of the Literature and New Evidence from North and South Carolina"

WP 5288, 10/95, James Heckman, Anne Layne-Farrar, and Petra Todd
"The Schooling Quality-Earnings Relationship: Using Economic Theory to Interpret Functional Forms Consistent with the Evidence"

WP 5548, 4/96, Eric A. Hanushek, Steven G. Rivkin, and Lori L. Taylor
"Aggregation and the Estimated Effects of School Resources"

For macroeconomic issues, see:

WP 5822, 11/96, Olivier Blanchard and Lawrence F. Katz
"What We Know and Do Not Know About the Natural Rate of Unemployment"

For social insurance issues, see:

WP 5889, 1/97, Katherine Baicker, Claudia Goldin, and Lawrence F. Katz
"A Distinctive System: Origins and Impact of U.S. Unemployment Compensation"

WP 6041, 5/97, Jonathan Gruber and Aaron Yelowitz
"Public Health Insurance and Private Savings"

Research Summaries

Monetary Policy and Inflation Targeting

Lars E.O. Svensson*

In the 1990s, several countries shifted to a new monetary policy regime: an announced quantitative inflation target. The reason for this shift was the unsatisfactory performance under previous regimes. New Zealand, Canada, Australia, and Spain all introduced inflation targets under persistently high inflation; the United Kingdom, Sweden, and Finland did so after having abandoned fixed exchange rates, which had failed to achieve low and stable inflation and had been subject to dramatic speculative attacks. Inflation targeting has received much recent attention, both among policymakers and academics. In the United States and in Europe it is debated as a possible monetary policy strategy for the Federal Reserve System and the future European Central Bank, respectively. Academic research on inflation targeting, both theoretical and empirical, has grown quickly.[1] My own research in the last few years has largely dealt with understanding inflation targeting in relation to other monetary policy regimes and investigating how practical monetary policy can best be conducted under inflation targeting.

Practical inflation targeting has several common characteristics: 1) an announced quantitative inflation target, varying across countries between 1.5 and 2.5 percent per year, in most countries with a tolerance band of plus/minus 1 percentage point around the target; 2) no explicit rule on how the central bank shall set its instrument; 3) a floating exchange rate (except for Finland and Spain, which are members of the Exchange Rate Mechanism, although the wide exchange rate bands there so far have not created any conflict between the inflation target and the exchange rate target); and 4) a high degree of transparency and accountability. Commentators also often describe inflation targeting as a regime without an intermediate target for monetary policy (instead, targeting inflation "directly"). I have argued in some of my research that this is misleading and that inflation targeting actually implies a particular intermediate target, namely the central bank's inflation forecast.

Inflation Targeting as a Remedy Against High Inflation

Inflation targeting can be seen as a potential remedy for persistent high inflation. Other remedies discussed and suggested in the literature include: 1) accepting that the long-run Phillips curve is vertical and implicitly, or explicitly, setting any output or employment target equal to (rather than above) the "natural" level; 2) creating an independent and conservative central bank; and 3) setting up a performance contract (an "inflation contract") for the central bank governor or governing board. In one of my papers, I examine the relation between inflation targeting and these remedies. Inflation targeting indeed can involve elements of all three remedies. By announcing a rather low inflation target and creating some degree of commitment to it, inflation targeting can help to reduce inflation, even if an inflationary bias remains, and if inflation more often exceeds than falls short of the target. This creates a "conservative" central bank in the sense of having a *lower inflation target* rather than, as is common in the literature since Rogoff's classic 1985 article, identifying "conservatism" with a *larger weight* on a *given* inflation target.

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Incidentally, this interpretation of conservatism solves an empirical puzzle about independent central banks, inflation, and output variability. If independent central banks are more conservative in that they give more weight to a specific inflation target, then lower inflation should be correlated with higher variability of output. A large literature instead has stated that more independent central banks in industrialized countries are associated with lower inflation rates, but *not* with higher variability of output. This finding is instead consistent with independent central banks simply having lower inflation targets.[2]

Price-Level Targeting versus Inflation Targeting

Inflation targeting implies "base drift" of the price level, even if the target is set at zero: if inflation overshoots its target, then the target for the next period is related to the new price level. This base drift means that the price level has a unit root; it also means that the variance of the future price level increases without bound with the horizon. Therefore, to say that (successful) inflation targeting leads to "price stability" is not quite correct. Nevertheless, the terminology has stuck.

Genuine price-level targeting is different: monetary policy then aims at keeping the price level constant, or around a steady increasing path. Price-level targeting need not imply zero inflation, if a positive inflation rate is deemed desirable. The big difference vis-a-vis inflation targeting is that the variance of the price level does not increase with the horizon. Thus, the uncertainty about the price level in the distant future is less than under inflation targeting, which should facilitate long-term decisions about savings and investment, and improve resource allocation.

The conventional wisdom is that price-level targeting would lead to increased inflation variability, as excessive inflation eventually would be followed by too little inflation in order to get the price level back in line. Such variability might then show up in increased output variability.

Closer study reveals that this issue is more complicated. In one of my papers, I show that price-level targeting very well may succeed in achieving lower variability of *both* the price level *and* inflation, when the different incentives for monetary policy under inflation and price-level targeting, as well as the different expectations of future inflation and price levels, are taken into account. Experiments in large empirical macro models also have produced this result.

At present, more than half a dozen countries practice explicit inflation targeting (and certainly quite a few practice implicit inflation targeting, including Germany, the United States, and Switzerland). But there is only one historical example of price-level targeting: the successful but short experiment in Sweden in the 1930s. In the next few years, a move to inflation targeting may be sufficiently challenging for central banks. In about another decade, when central banks hopefully master all the intricacies of inflation targeting, the time might be ripe for seriously considering the pros and cons of the potentially more demanding alternative: price-level targeting.[3]

Implementing Inflation Targeting

How can inflation targeting overcome the major difficulty that central banks do not have perfect control over inflation? Inflation reacts with "long and variable lags" and with variable magnitude to changes in the monetary policy instrument. Inflation also is affected by factors other than monetary policy, and sometimes with a shorter lag than monetary policy.

Given these lags and imperfect control, the central bank necessarily must adopt a forward-looking perspective, attempting to control inflation one to two years ahead. Forecasts (projections) of crucial macrovariables become central, and inflation targeting becomes "inflation-forecast targeting": the bank's internal inflation forecast, conditional on current information and a given path for the monetary policy instrument, becomes the intermediate target. If the inflation forecast is above (below) the inflation target, monetary policy should become more restrictive (expansionary).

The effect on the conditional inflation forecast is also the main decision criterion when new information arrives. If the new information is deemed to shift the inflation forecast at a horizon of one to two years, the policy instrument should be adjusted to dampen or nullify that shift. If the new information has no effect on the forecast, there is no need to react to it. In practice, inflation-targeting central banks construct their forecasts partly from structural models, partly from forecasting models, but also from judgements and extraneous information. Thus, inflation targeting uses all relevant information.[4]

Therefore, the implicit instrument rule that follows from inflation forecast targeting generally will differ from the well-known Taylor Rule, according to which the monetary policy instrument would react only to current inflation and output.

Strict or Flexible Inflation Targeting?

Under inflation targeting, what is the scope for stabilizing macrovariables other than inflation: for instance, output, employment, or the real exchange rate? Under "strict" inflation targeting, the central bank is only concerned with achieving the inflation target; under "flexible" inflation targeting, the central bank is also, to some extent, concerned with the stability of output and/or the real exchange rate. If inflation has deviated from its target, under strict inflation targeting the bank tries to get inflation back to target as quickly as possible. This requires considerable instrument movements which also are likely to move output or real exchange rates. Under flexible inflation targeting, concern about output and real exchange rate variability would lead the bank to take inflation back to the target at a more gradual pace. Indeed, I find that concern about output and real exchange rate variability translates into targeting inflation at a longer horizon, say 2.5 years rather than 1.5 years.[5]

Concern about output and real exchange rate variability is not the only reason for a longer horizon and a more gradual adjustment of inflation towards the target. Uncertainty about the lags and magnitudes in the transmission mechanism, that is, model uncertainty, as well as concern about interest variability (central banks seem eager to avoid whip-sawing the interest rate and prefer considerable smoothing) produce the same results.[6] Hence, strict inflation targeting is an extreme case. Indeed it appears that real-world central banks pursue flexible inflation targeting and to some extent, stabilize output and real exchange rates, or at least smooth interest rates. All inflation targeting economies are very open. In an open economy, the exchange rate provides an additional channel for the transmission of monetary policy. There is also a choice between targeting domestic inflation (in the GDP deflator, for instance) or CPI inflation (the latter also takes the prices of imported final goods into account). All inflation targeting countries have opted for targeting CPI inflation rather than domestic inflation (in most cases some specific components are excluded from the index, for instance mortgage costs). Flexible CPI-inflation targeting appears to be better than targeting domestic inflation when it comes to stabilizing both domestic inflation and real exchange rates.[7]

Monitoring Inflation Targeting

As mentioned earlier, inflation-targeting regimes may entail a high degree of transparency and accountability. Inflation-targeting central banks regularly issue "Inflation Reports," explaining and motivating their policy to the general public. In New Zealand, the Reserve Bank Governor's job is at risk if inflation is higher than 3 percent per year or lower than zero. In the United Kingdom, the Chancellor of Exchequer recently announced that if inflation deviates more than 1 percentage point from the inflation target, the Bank of England's Governor must explain in an open letter why the divergence has occurred and what steps the Bank is taking to deal with it. In the other inflation-targeting countries, the central bank's governor and board certainly suffer considerable embarrassment and criticism when inflation moves outside its designated tolerance interval.

An explicit inflation target and an informative inflation report make it relatively easy to monitor central-bank performance. The quality and results of the bank's analysis can be scrutinized by external experts and observers in order to discover biased arguments or wishful thinking. Even if the bank chooses to—or is not required to—publish any inflation report at all, interested observers can collect inflation forecasts from reputable external forecasters and can check whether they are in line with the inflation target at an appropriate horizon.[8]

Transparency allows the private sector to better assess both the competence of the central bank and its commitment to the inflation target. If the bank's competence and commitment are deemed adequate, its credibility improves, and it is easier for the bank to fulfill its target, since private sector price- and wage-setting then adapts to the target. At the time, a lack of transparency may give the bank more discretion to pursue any idiosyncratic goals. The incentive for the bank to make monetary policy more or less transparent thus depends in an intricate way on its competence and its commitment. Since transparency normally seems to be socially desirable, conflicts of interest between the bank and society cannot be excluded.[9]

Still Too Early to Tell

Explicit inflation targeting appears to have many advantages compared to the available alternatives. Monetary policy becomes goal-directed, incentive-compatible, and transparent. Yet, flexible inflation targeting allows some concern about stability of output, employment, and real exchange rates to influence policymaking. Inflation-targeting central banks are improving their ability to control inflation. More research adds to the understanding of the strong and weak sides of this regime, and to the central bankers' knowledge of how to best operate it. Still, these regimes are very young; the oldest one, in New Zealand, is barely 7 years of age. Any evaluation must be highly preliminary; we will have to wait for several more years of data, including several business cycles, until we can make a very reliable evaluation. Meanwhile, inflation targeting will provide ample opportunities for more research.

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[1] *See, for instance, L. Leiderman and L.E.O. Svensson,* Inflation Targets, *CEPR, London, 1995; A.G. Haldane,* Targeting

Inflation, *Bank of England, London, 1995;* Achieving Price Stability, *Federal Reserve Bank of Kansas City, 1996, and B.S. Bernanke and F.S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy,"* Journal of Economic Perspectives *11 (1997), pp. 97–116.*

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[4] *See L.E.O. Svensson, "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets,"* European Economic Review *41 (1997), pp. 1111–46. Under inflation targeting, central banks will use a variety of indicators to extract useful information. A survey of ways of extracting information from financial markets is presented in P. Söderlind and L.E.O. Svensson, "New Techniques to Extract Market Expectations from Financial Instruments," NBER Working Paper No. 5877, January 1997, forthcoming in* Journal of Monetary Economics *40(2) (1997). Previously, I have worked on practical ways of estimating and interpreting forward interest rates for monetary policy purposes, see M. Dahlquist and L.E.O. Svensson, "Estimating the Term Structure of Interest Rates for Monetary Policy Analysis,"* Scandinavian Journal of Economics *98 (1996), pp. 163–83; L.E.O. Svensson, "Estimating and Interpreting Forward Interest Rates: Sweden 1992–94," NBER Working Paper No. 4871, September 1994; and L.E.O. Svensson, "Estimating Forward Interest Rates with the Extended Nelson & Siegel Method,"* Quarterly Review *3 (1995), pp. 13–26, Sveriges Riksbank.*

[5] *These results are derived and discussed in "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets,"* European Economic Review *41, op. cit. G. Rudebusch and L.E.O. Svensson, "Practical Inflation Targeting," mimeo, 1997, examine different forms of inflation targeting for the U.S.*

[6] *These results are derived and discussed in L.E.O. Svensson, "Inflation Targeting: Some Extensions," NBER Working Paper No. 5962, March 1997. The result for model uncertainty follows W. Brainard, "Uncertainty and the Effectiveness of Policy,"* American Economic Review *57, Papers and Proceedings (1967), pp. 411–25.*

[7] *These and other preliminary results for an open economy are reported in L.E.O. Svensson "Open-Economy Inflation Targeting," mimeo, 1997.*

[8] *These issues are further discussed in "Inflation Forecast Targeting: Inplementing and Monitoring Inflation Targets,"* European Economic Review, *op. cit.*

[9] *These issued are clarified and discussed more rigorously in J. Faust and L.E.O. Svensson, "Credibility and Transparency: Monetary Policy with Unobservable Goals," mimeo, 1997.*

Institutions for Fiscal Stability

Alberto Alesina*

The seventies and most of the eighties have been a period of fiscal profligacy in many countries around the world. Several OECD countries have accumulated debt/GDP ratios which are unprecedented, except for the aftermath of major wars. Low public savings have been at the root of Latin America's "lost decade," the eighties. Currently, the goal of achieving and maintaining fiscal stability is the main macroeconomic issue in many parts of the world.

This evolution of fiscal policy raises many intriguing questions: Why have many but not all countries abandoned fiscal discipline? What explains the very large cross-country variance in fiscal stance? Why did large and persistent deficits appear in the mid-seventies and not before? What explains the likelihood of success of fiscal adjustments? Why did certain countries make swift and very successful fiscal consolidations, while others are still struggling?

The answers to all of these ques-

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tions cannot rely purely on economic factors since economically similar countries exhibit very large differences in fiscal performance. In a series of recent papers, I have addressed these questions by considering politico-institutional explanations.

In a paper[1] coauthored with Roberto Perotti, I identify two critical institutional variables as important determinants of the fiscal policy stance: the degree of government fragmentation, and the nature of budget institutions. In terms of the former variable, we argue that coalition governments are more likely to delay the adoption of stabilization policies, because of inter-coalition struggles leading to legislative deadlocks. Thus, after the oil shocks of the seventies, countries ruled by fragmented coalitions reacted more slowly and less decisively, letting budget deficits accumulate. In a second paper,[2] we show that when coalition governments actually attempt to stabilize the budget, they often fail because they do not have the political strength to deal with structural budget cuts in social spending and government wages.

While this argument about government fragmentation is relatively well understood, the issue of budget institutions is more complex and multifaceted. In the last few years a vast research program to which I have contributed has investigated how different procedures influence fiscal outcomes, both in the OECD group of countries, and in a sample of Latin American countries and the American states. This research effort leads to the conclusion that budgetary institutions do matter as a determinant of fiscal outcomes, and therefore different choices about fiscal institutions may lead to a higher or lower propensity to run excessive deficits.

In a third paper,[3] Perotti and I identify several theoretical and empirical issues which are central for the discussion of how institutions affect fiscal outcomes. We define budget institutions as all of the rules and regulations according to which budgets are drafted, approved, and implemented. We focus mainly on three issues: balanced budget rules; procedural and voting rules; and transparency.

Balanced Budget Rules

Well-known economic arguments suggest that balanced budget rules are not optimal, because they do not allow deficits to fluctuate over the cycle and in the event of major and temporarily high spending needs. However, since for many political reasons politicians may have incentives to run excessive deficits, balanced budget rules may serve the purpose of correcting a politically induced distortion in fiscal policy. However, an unpleasant consequence of balanced budget rules is that they generate incentives for circumventing them. In so doing, policymakers engage in tactics of creative accounting which make the budget less transparent, creating additional obstacles to an effective control on fiscal discipline.

For all of these reasons, balanced budget rules at the national level may be counterproductive. Instead, fiscal discipline can be enhanced by appropriate procedural rules (discussed later) which do not require a numerical target on the budget balance. The same argument, however, may not apply to subnational levels of government, such as American states. Local and state governments may need less flexibility because their budget are less cyclically sensitive. Several authors have investigated the effects of restrictions on budget deficits in American states: this literature concludes that more stringent balanced budget rules lead to more fiscal discipline. My own contribution to the literature includes a paper with Tamim Bayoumi of the IMF.[4] In this article, we show that more stringent fiscal rules enforce fiscal discipline without any apparent negative effect on state output volatility.

Procedural Rules

One can identify three phases in the budget process: the formulation of a budget proposal within the executive; the approval of the budget in the legislature; the implementation of the budget within the bureaucracy. In my research I have focused almost exclusively on the first two points.

Voting procedures can be classified on a hierarchical-collegial dimension. Hierarchical procedures are those that, for instance, attribute strong prerogatives to the Prime Minister (or Treasury Minister) to overrule spending ministers in intragovernmental negotiations. Also, hierarchical institutions limit the latitude of legislative amendments on the budget. For instance, in some cases the legislature can change the proposed budget without affecting the balance. Even more stringent rules require the legislature not to increase either the level of spending or the deficit. Thus, in the latter case, the legislature can only change the budget allocation between spending programs. Collegial institutions have the opposite features: they emphasize "consensus" at every stage of the process, by enhancing the prerogative of all spending ministers in the government, the prerogative of the legislature vis-a-vis the government, and generally by upholding the right of the minority in every stage of the process.

One can identify a tradeoff between the two types of institutions. Hierarchical institutions are more likely to enforce fiscal restraint, to avoid large and persistent deficits, and to promote swift fiscal adjustments when needed. On the other hand, the same institutions are less respectful of the prerogative of the minority not in the government, and therefore are more likely to generate budgets tilted in favor of the governmental coalition. Collegial institutions have the opposite features.

One related important issue concerns the order of voting. In some cases the budget procedures imply that the legislature first has to approve a balance, often in the context of a macroeconomic scenario for the coming fiscal year. Then, in later votes the allocation among different programs is decided. The alternative procedure implies that the balance of the budget is the residual of a series of votes on specific programs. The Budget Act of 1974 in the United States implied, among other things, a switch from the latter system to the former. Intuitively one would think that the system where the balance is voted first should promote more fiscal restraint. Indeed, this is what the cross-country empirical evidence seems to suggest. However, the theoretical underpinnings for this result are not very strong, if one assumes rational and forward looking behavior of legislators.

Transparency of the Budget

The budgets of modern economies are very complex, but sometimes they are more complex than they need to be. This complexity, partly unavoidable, partly artificial, makes it possible to hide the real status of public finances, in particular the current and future burden for the taxpayers of various spending decisions. Politicians have incentives to hide taxes, emphasize the benefits of spending programs, and hide government liabilities, equivalent to future taxes, by using various forms of creative accounting procedures. The more complex is a budget document, the easier it is to confuse the public.

The importance of lack of transparency cannot be overemphasized. A variety of tricks are used to strategically influence the information/beliefs of the taxpayers-voters: 1) Overestimation of the expected growth in the economy, so as to overestimate tax revenues, and to underestimate the level of interest rates so as to underestimate outlays. At the end of the fiscal year, the "unexpected" deficits can be attributed to "bad luck." 2) Over optimistic forecasts of the budget effects of various policies. 3) Strategic use of what is kept in and out of the budget, often with a creative use of the budget of various public organizations. 4) Strategic use of multi-year budgets, to the effect that difficult policies are permanently postponed to year two or three of a multi-year program and always delayed.

Issues of transparency and creative accounting are, in fact, at the forefront of the fiscal debate in Europe. The discussion about which countries can join the European Monetary Union has paid much attention to how "real" or "creative" are the fiscal adjustments in many European countries that are reaching the required deficit target. Several observers have noted how Germany, France, and especially Italy in recent years have used various ingenious methods to make their deficits appear as low as possible.

In summary, this discussion suggests that "hierarchical-transparent" procedures should be associated with more fiscal discipline. Thus, difference in procedures can contribute to explaining the cross-country differences in fiscal policy stance that are documented here.

Empirical work on this issue shows the difficulty of measuring institutions. Work by von Hagen and his associates focused on European countries and concluded that fiscal institutions do matter in the expected direction. In my own work with coauthors, I have studied Latin American countries from this point of view.[5] Using the answers from a survey distributed to the budget directors of all Latin American countries, and the text of the budget laws, we constructed a comprehensive index which summarizes several characteristics of fiscal procedures, along the "hierarchical transparent" to the "collegial non-transparent" dimensions. We then discussed the relationship between the index and various components of it, and the level and evolution of budget deficits in this region. We also examined cases of changes in procedures, namely whether one can detect a difference in the fiscal position of a country before and after a reform of its fiscal procedures. Our results confirm that budget procedures do matter. After controlling for several economic determinants of budget deficits, our index of procedures was still significantly correlated with budget deficits in the expected direction. A particularly important feature of such procedures is the one that requires a vote on the size of the deficit ex ante, in the context of the approval of the macroeconomic plan for the year, before the legislative discussion on the composition and allocation of the budget even begins.

Finally, evidence drawn from American States, European countries, and Latin American countries all points in the same direction: different budget procedures influence fiscal outcomes. Two critical issues then follow. What determines institutional choice? Why do different countries or states choose different fiscal institutions and, therefore, what determines institutional change? In other words, the research can be moved one step backward by looking at the determinants of institutions. The second issue is normative: this research can shed light on how to design institutions which contribute to maintaining fiscal stability and limit the extent of politically induced distortions.

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[2] A. Alesina and R. Perotti, "Fiscal Expansions and Fiscal Adjustments in OECD Countries," NBER Working Paper No. 5214, August 1995.

[3] A. Alesina and R. Perotti, "Budget Deficits and Budget Institutions" NBER Working Paper No. 5556, May 1996. Forthcoming in a conference volume edited by James M. Poterba and Jurgen von Hagen and published by University of Chicago Press for NBER.

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The Economics of Cities

Edward L. Glaeser*

The fundamental questions of urban economics are: Why do cities exist? How does density—or agglomeration—affect people and firms? Why do some cities flourish and others decay? Why are social pathologies often more extreme in cities?

These questions address how spillovers actually operate. If the effects of agglomeration and local spillovers lie behind phenomena as important as economic growth, business cycles, and the formation of human capital (as many researchers now suspect), then urban economics has a special role to play in helping us to understand how these spillovers work in their rawest form. My work tries to use the evidence from cities both to understand urban density itself and to shed light on other topics that are hopefully of interest to the broader economics community.

The Causes and Extent of Agglomeration Economies

Cities now exist for three primary reasons: 1) they reduce transport costs for goods; 2) they eliminate the space between people; and 3) cities facilitate a faster flow of ideas. More precisely, dense agglomeration reduces the transport costs for goods, people, and ideas. These three different sources of "agglomeration economies" have equivalents in other literatures. For example, the role of reduced transport costs for goods in the formation of cities is similar to the idea that the comovement of output over the business cycle occurs because a productivity shock to one firm increases demand for other firms.

Albert Ades and I[1] measure causes of urban agglomeration using cross-county evidence by looking at the extent to which countries' populations are concentrated in a single city. We find that population is more spread out in countries where transport costs for physical goods are lower (measured by development of internal transport networks), and when external trade is smaller (which Paul Krugman and Raul Livas[2] argue is a further implication of transport cost models of urban agglomeration). While transport costs do matter, our results suggest that political factors, for example dictatorship and instability, are far more important in explaining which countries have concentration in a single city. For example, dictatorships have 50 percent more of the population in their largest cities than do stable democracies. When political systems are not stable and democratic, politicians respond to the rent-seeking activities of people who live in their cities by transferring rents to those cities, and population flows follow these rents.

To understand why people in the United States may be more productive in cities, David Maré and I[3] examine why workers are paid substantially higher wages in cities. The urban wage premium persists even after we control for a full battery of individual factors (education, race, age), job-related factors (industry and occupation dummies), and for differential selection into cities. Unless workers in cities were more productive, firms would leave. Thus, even though real wages seem to be constant over space (as evidence on real prices suggest that they are), we believe that there is a productivity premium in cities.

Surprisingly, and counter to many theories of agglomeration, the urban wage premium does not immediately accrue to workers who come to the city, and it does not disappear immediately (or at all) for workers who leave the city. Instead, there appears to be a slow but steady increase in the rate of wage growth for workers in cities relative to workers outside cities (the urban wage premium is also higher among older workers). One possible interpretation is that the urban wage premium works through faster skill accumulation in cities which accrues over time, and stays with workers when they leave cities. I[4] provide a theoretical analysis of this view and some suggestive evidence that shows that the individuals who choose to live in big cities are drawn disproportionately from groups who would presumably value the skill accumulation role of cities (that is, young, college educated persons).

Hedi Kallal, Jose Scheinkman, Andrei Shleifer, and I[5] examine the

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connection between local area characteristics and the growth of particular "city-industries" (for example steel in Detroit or retail trade in New York). We find that employment growth is faster in city industries that are highly competitive (where competition is the number of firms relative to total employment), not concentrated (where concentration is measured by the share of the city-industry in the total city's employment), and in diverse cities (where diversity is measured by employment concentration of the city in its largest industries). We interpret these findings as a test of growth theories; they may imply that diversity and competition, not industrial concentration, inculcate growth, presumably through the generation of new ideas.

Scheinkman, Shleifer, and I[6] extend this work and examine the connection between city-level characteristics, population growth, and income growth. Population growth and income growth have moved together at the city level over the past 40 years, and all of our results hold for either of these variables. Initial levels of schooling predict later growth. The connection between schooling and growth has increased since 1970, perhaps because the rise in returns to skill has made the intellectual spillovers that are available in high human capital cities more important. Cities with high unemployment levels that were concentrated in manufacturing have seen a substantial decline in both manufacturing and non-manufacturing employment. Few attributes of the public bundle (that is, the level of taxation, or types of spending) seem to influence the growth of particular cities.

Jess Gaspar and I[7] ask whether information technology will make cities obsolete. Improvements in telecommunications will shift time away from face-to-face contacts towards electronic contacts within a relationship, but these improvements also increase the overall number of relationships, and many of these new relationships also will involve face-to-face contact. The theoretical effect of telecommunications on cities is ambiguous. Empirically, we find that across countries and across areas within countries, urbanization and telephone usage go together, even after controlling for costs and income. Telephone contact is higher between regions that are close spatially. Business travel (another form of face-to-face contact) has soared as information technology has improved. Silicon Valley, which should have the best access to the newest telecommunications technology, is the textbook example of geographic concentration of industry. Still, there doesn't seem to be persuasive evidence that the internet will destroy the city.[8]

Glenn Ellison and I[9] attempt to measure agglomeration economies by developing an index of geographic concentration that measures the degree of concentration of particular industries. This index takes the overall concentration of manufacturing employment as given and corrects for the fact that the lumpiness of manufacturing will suggest geographic concentration whenever returns to scale dictate that production take place in a few large plants. We find that the famed geographic clusters of particular industries are exceptions rather than rules. While the famous examples are all quite observable in the data, the mass of industries display a statistically significant level of industrial concentration that appears (to us at least) to be relatively mild economically. The fact that industrial clusters appear to be relatively rare also can be interpreted as suggesting that many of the most important agglomeration economies occur across, rather than within, industries.

Guy Dumais, Ellison, and I[10] extend this work and use the Longitudinal Research Database (which provides almost complete information on every manufacturing industry in the United States) to examine the dynamic components of geographic concentration. We find a large amount of movement of particular industries across space (even among the most concentrated industries) which casts doubt on the general applicability of anecdotes used by theorists to suggest that geographic location often is determined by decades-old happenstance. The longitudinal research database also suggests that the geographic concentration of manufacturing is a delicate balance of the creation of new manufacturing plants, the expansion and contraction of pre-existing plants, and plant closures. Plant openings occur away from pre-existing industrial centers and act to lower geographic concentration. Plant closures act to reinforce concentration, because they are much more likely away from pre-existing industrial centers (even after controlling for the fact that these peripheral areas are likelier to have newer plants). We also find that while industries that share input-output relationships locate together, these effects are small. The dominant force in determining which manufacturing industries locate together is that they hire the same kinds of workers.

Urban Pathologies

American cities are not just technological wonderlands. Many urban centers face extreme poverty, crime, and other social problems. Fundamentally, the social problems of cities appear to be the result of many of the same agglomeration economies that fuel urban productivity. The same intellectual spillovers that make Silicon Valley also may lead to the transmission of ideas (or norms) about crime within the inner city.

Bruce Sacerdote and I[11] ask "Why

is there more crime in cities?" The connection between city size and crime rates is pervasive and longstanding. We find that only 15 percent of the connection between city size and crime appears to come from lower probability of arrest in cities, and 25 percent appears related to higher financial returns from criminal activity in cities. Almost 50 percent of the urban crime premium is related to the fact that the disadvantaged (particularly female heads of household) end up in cities.

The connection between growing up with one parent and crime is not nearly as strong as the connection between living in areas with large numbers of single parents and the level of crime. While this difference could be explained by omitted area-level variables that are correlated with single-parent families, it may also come from spillovers within those areas. Having one parent may not induce a child to become a criminal, but growing up in an area where all one's peers all have missing parents may create peer effects that lead to crime. Sacerdote, Scheinkman, and I[12] create a methodology for measuring the extent of social interaction based on a simple local interactions model. We find large amounts of social interaction in criminal behavior, and we believe that these social interactions explain the wide diversity of crime rates across space.

To further examine the role of local spillover effects, David Cutler and I ask whether ghettos are good or bad.[13] We document that young African-Americans growing up in segregated areas are more likely to be unemployed or idle (that is, neither at work nor in school), or to have a child out of wedlock, and are less likely to graduate from high school, than young African-Americans who grow up in less segregated areas. This is true even after controlling for city-specific characteristics and looking at the difference between white and African-American outcomes within cities. Furthermore, we use a variety of instruments (including number of governments and topographical barriers) in order to avoid the problem that individuals choose their neighborhoods. All of our results essentially confirm the striking negative effect of segregation on African-American outcomes in 1990. We suspect that the mechanism linking racial segregation with poor outcomes for non-whites is not physical access to jobs, but rather the intellectual and social isolation of disadvantaged communities which then works against the acquisition of human capital among youth.

Cutler, Jakob Vigdor, and I examine the roots of segregation and its current history.[14] We find that segregation rose during every decade between 1890 and 1960, but that it has declined quite substantially in the twenty years since 1970. Segregation cannot be explained by many city-level characteristics except for city size: bigger cities are generally more segregated. We use housing prices and survey evidence to determine the extent to which segregation occurs: because of a greater willingness among whites to pay to live in white neighborhoods (in which case, whites should be paying more in more segregated cities) or; because of "collective action racism," where whites collude to force blacks to live in particular neighborhoods (in which case, we would expect African-Americans to be paying more to live in more segregated cities). We find that in 1940, segregation was driven primarily by collective action racism (supported by legal devises including restrictive covenants), but that by 1990, the remaining segregation is driven primarily by white tastes for white neighborhoods.

Denise DiPasquale and I examine a final form of urban pathology: riots.[15] We find a strong connection between urbanization and rioting across countries, particularly among countries that are ethnically fragmented. Using a sample of race riots in the 1960s, we find regular evidence for basic economic hypotheses about rioting (higher unemployment increases rioting; police resources decrease rioting) and little evidence for more sociological hypotheses about relative poverty and deprivation. We do find, however, that ethnic diversity is deeply linked to conflict, both in the United States and around the world. The major role of ethnicity requires models that move beyond the cost of punishment and the opportunity cost of time into understanding the far-reaching effects of ethnic identity.

Some of my work has focused on policy responses to these problems. One paper published in 1996 suggests that property taxes provide better incentives for revenue maximizing local governments who would choose to maximize property values in an attempt to maximize total revenues.[16] In a forthcoming paper, I argue that indexing transfer payments to local price levels could lead to pernicious results because of migration effects.[17] In a work on my own[18] and with Erzo Luttmer,[19] I consider the effects of rent control on misallocating housing across consumers. Overall, though, my primary focus has been on the issues in the study of urban economies, not on the appropriate government response to these economies.

Conclusion

Cities are unique combinations of the best and worst features of modern society. Agglomeration effects appear to create faster learning and greater productivity, but they also seem to further crime, riots, segregation and ghetto poverty. Further research on cities can play a role in helping us to both understand how to improve urban areas and how agglomeration economies actually operate.

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[2] *P. Krugman and R. Livas, "Trade Policy and the Third World Metropolis," NBER Working Paper No. 4238, December 1992.*

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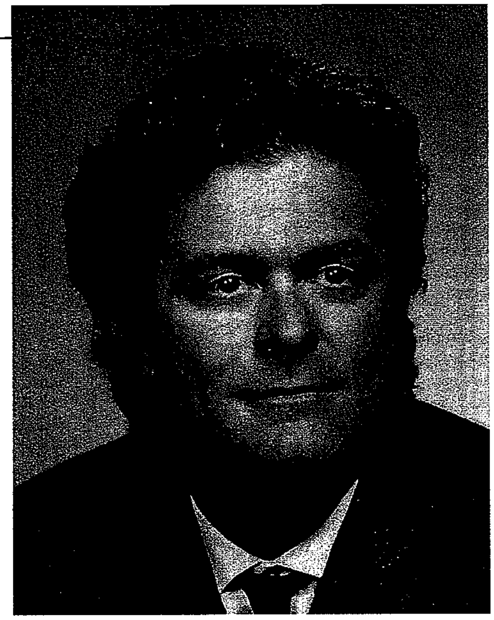
NBER Profile: *Alberto Alesina*



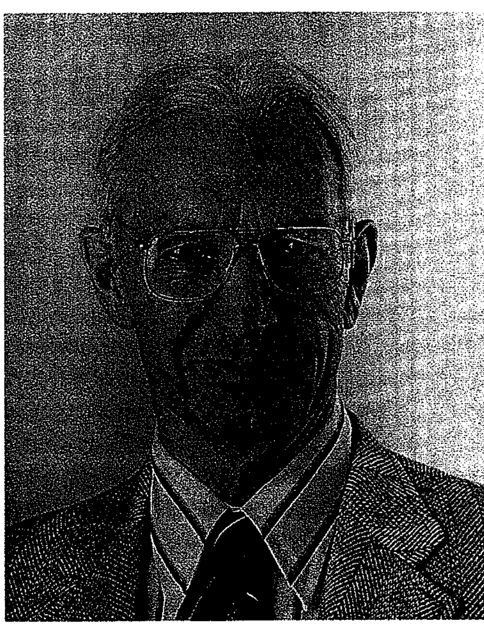
Alberto Alesina is an NBER Research Associate in the Monetary Economics Program and a professor of economics and government at Harvard University. He holds an undergraduate degree in economics from the Universita Bocconi in Milan and a Ph.D. in economics from Harvard.

Alesina began his teaching career at Carnegie-Mellon University in 1986. He joined the Harvard faculty as an assistant professor of economics and government in 1988, was named the Paul Sack Associate Professor of Political Economy in 1991, and became a full professor in 1993. He teaches macroeconomics and political economics.

Alesina was also an NBER Olin Fellow in 1989–90. In addition, he has been a senior associate at Harvard's Center for European Studies since July 1994. He is a consultant to the Italian Treasury Department, and has held visiting positions at the International Monetary Fund and the World Bank.

Alesina's research has been published in many journals and books. In addition, he is the coauthor with Nouriel Roubini and Gerald Cohen of *Political Cycles and the Macroeconomy,* which is forthcoming from the MIT Press, and with Howard Rosenthal of *Partisan Politics, Divided Government and the Economy,* Cambridge University Press, 1995.

Alesina is single, and lives in Boston's Back Bay. His hobbies are rock climbing, skiing and mountaineering, and listening to opera.



NBER Profile: *Carl F. Christ*

Carl F. Christ has been a member of the NBER's Board of Directors since 1975, and its Vice Chairman since 1996. He also served as chairman of the Universities-National Bureau Committee for Economic Research from 1967–74.

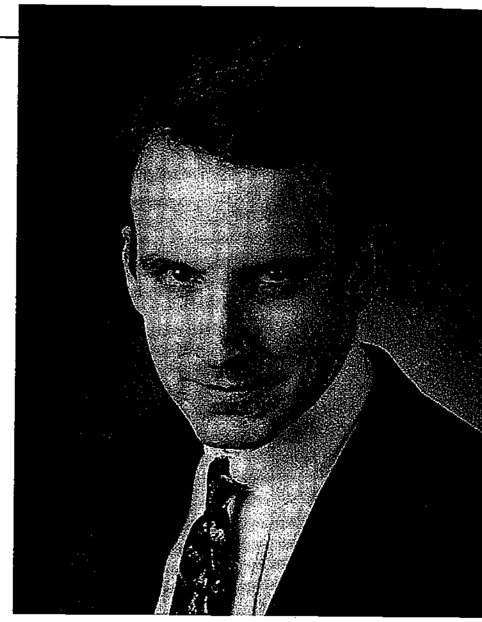
Christ was born in Chicago in 1923, and received his B.S. in physics from the University of Chicago. After working on the Manhattan Project from 1943–5 and being an instructor in physics at Princeton University from 1945–6, he "switched gears" and began graduate work in economics. He received his Ph.D. in economics from the University of Chicago in 1950.

Christ taught political economy at the Johns Hopkins University from 1950 through 1955, when he became an associate professor of economics at the University of Chicago. In 1961, he returned to Johns Hopkins as a professor of economics. He was named the Abram G. Hutzler Professor of economics in 1977, a position he held until he partially retired in 1989. He also chaired the economics department in 1961–6 and again in 1969–70.

Christ has half a century of publications in print spanning three areas: econometrics, macroeconomics, and economic policy. He has also taught and lectured in many countries. Christ has been elected a Fellow by the Econometric Society and by the American Statistical Association. He is a member of Phi Beta Kappa and Sigma Xi.

Christ is married and the father of three. Collectively, his children have one Ph.D. (in art history) and five children of their own. In his leisure time, he enjoys travel and windsurfing.

NBER Profile: *Edward L. Glaeser*

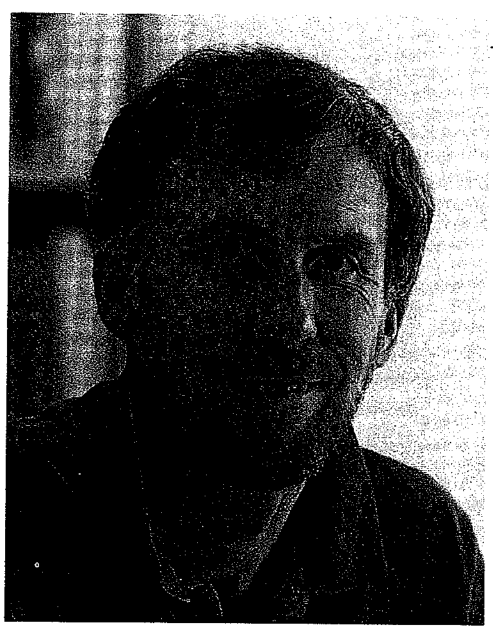


Edward Glaeser, the Paul Sack Associate Professor of Political Economy at Harvard University, has been a Faculty Research Fellow in the NBER's Program on Economic Fluctuations and Growth since 1993. He received his A.B. from Princeton in 1988 and his Ph.D. from the University of Chicago in 1992.

In 1994–5, Glaeser was the Arch W. Shaw National Fellow at Stanford University's Hoover Institution. Glaeser is also a Faculty Associate at Harvard's Institute for International Development, where he has worked on urban problems in Bolivia, and urban development in Chile. He does research on cities and other topics, ranging from usury laws to privatization to fairy tales.

Glaeser currently lives in Chicago with his wife, Jenny, and commutes into Boston during the week. During the winter and spring terms, he will be a Law and Economics Fellow at the University of Chicago Law School.

NBER Profile: *Lars E. O. Svensson*



Lars E.O. Svensson is a professor of international economics at the Institute for International Economic Studies, Stockholm University, and a Research Associate in the NBER's Programs on Asset Pricing, International Finance and Macroeconomics, and Monetary Economics. He received a M.Sc. in physics and applied mathematics from the Royal Institute of Technology, Stockholm, in 1971. Shifting fields, he received a B.A. in economics and economic history in 1973 and a Ph.D. in economics in 1976, both from Stockholm University. During his graduate studies, he benefited from a year as a Special Graduate Student at MIT in 1974–5. His primary research interests have varied over the years, from intertemporal general equilibrium theory and monetary theory via international trade theory to international finance, open-economy macroeconomics, and monetary policy.

Svensson is a fellow of the Econometric Society, a member of the Prize Committee for the Alfred Nobel Memorial Prize in Economic Sciences, and a member of Academia Europae. He has been visiting scholar or visiting professor at universities in France, Israel, Italy, New Zealand, and the United States. He regularly consults for several international, U.S., and Swedish agencies and is active as advisor to Sveriges Riksbank (Bank of Sweden).

In his leisure time, he enjoys good food and wine with friends, travelling, reading (John Le Carré and David Lodge are among his favorite authors), rock climbing, and spending time with his teenage son, Erik.

Conferences

Tax Policy and the Economy

The NBER's 12th Annual Conference on "Tax Policy and the Economy," organized by James M. Poterba who directs the NBER's research on taxation, took place in Washington on November 4. As always, the speakers were academic economists and the participants represented a cross section of government departments and agencies, corporations, foundations, and the press. This year the following papers were discussed:

David M. Cutler, NBER and Harvard University, "The Incidence of Cutting Medicare"

Jerry Hausman, NBER and MIT, "Taxation by Telecommunications Regulation" (NBER Working Paper No. 6260)

Caroline Minter Hoxby, NBER and Harvard University, "Tax Incentives for Higher Education"

Jeffrey B. Liebman, NBER and Harvard University, "The Impact of the Earned Income Tax Credit on Incentives and Income Distribution"

Leora Friedberg, NBER and University of California, San Diego, "The Social Security Earnings Test and Labor Supply of Older Men"

Cutler examines how reductions in hospital payments by Medicare affect hospital operations. He looks at two episodes of payment reductions—the late 1980s and the early 1990s—and finds a large difference in the impact of payment reductions in these two time periods. In the 1980s, reduced Medicare payments were offset dollar-for-dollar by increased prices to private insurers. In the 1990s, however, payment reductions result in lower hospital profits, which must ultimately reduce hospital costs. Hospitals have responded to the payment reductions by reducing the number of beds and nurses, and sometimes by closing entirely, but not by reduced acquisition of high-tech equipment.

Hausman analyzes the Congressional legislation which established a program for all U.S. public schools and libraries to receive subsidized service to the Internet. The cost of the program is currently estimated to be $2.25 billion per year, and the legislation directed all users of interstate telephone service to pay for the program. Using analytical methods from public finance, Hausman estimates the efficiency cost to the economy of the increased taxation of interstate telephone services to be at least $2.36 billion (in addition to the $2.25 billion of tax revenue). The efficiency loss to the economy for every $1 raised to pay for the Internet access discounts thus is an additional $1.05 to $1.25 beyond the money raised for the Internet discounts. This cost to the economy is extraordinarily high compared to other taxes used by the Federal government to raise revenues.

Hoxby investigates the economic effects of provisions in the Taxpayer Relief Act of 1997 related to higher education. She summarizes the major initiatives: Hope Tax Credits; Tax Credits for Lifelong Learning; Education IRAs; and tax deductibility of interest on student loans. She then describes the incentives that these provisions generate for attending college, and discusses whether the people who most need to attend college are the ones most likely to be induced to attend by the new initiatives. Then she synthesizes the existing literature on how federal government funds for higher education affect the tuition charged by colleges and universities, and assesses the likely consequences of the new provisions for tuition. Finally, she discusses the probable effects of the initiatives on family saving and on the degree of effort and planning that students put into college.

For more than three decades, economists have advocated the use of the tax system as a means of transferring income to low-income families. Studying the Earned Income Tax Credit (EITC) offers the opportunity to learn how well the tax system functions in roles traditionally handled by the welfare system. There are two features of the EITC that distinguish it from other U.S. income transfer programs. First, only taxpayers who work are eligible for the EITC. Second, the credit is administered through the tax system rather than through the welfare system, and is usually received as part of a taxpayer's annual tax refund. **Liebman** discusses these features of the EITC, and presents evidence that the EITC has increased labor force participation among single women with children, and has offset a significant share of recent increases in income inequality. The limited evidence available suggests that the labor supply impact of the phase out of the credit is minimal. Rates of noncompliance are falling, and are now similar to the overall rate of noncompliance for the individual income tax.

The Social Security earnings test reduces a 65–69 year old's benefits by one third and a 62–64 year old's benefits by one half, once earnings pass a threshold amount. These are among the highest marginal tax rates in the economy. **Friedberg** formulates a model of labor supply to incorporate the entire range of beneficiaries' responses to the earnings test. Her estimates imply substantial deadweight loss from older workers changing their labor supply in order to avoid taxation. She predicts a 5.3 percent boost to aggregate labor supply from eliminating the earnings test, and at a minimal fiscal cost. In contrast, only a slight decrease in labor supply is likely from the recently legislated increase in the exempt amount.

The papers and discussions from this conference will be published by the MIT Press in a conference volume. Its availability will be announced in a future issue of the NBER *Reporter.*

Behavioral Approaches to Law and Economics

A group of economists and academic lawyers gathered in Cambridge on November 14 for the NBER's first "Conference on Behavioral Approaches to Law and Economics." The conference was organized by Robert Gertner and Richard H. Thaler, of NBER and the University of Chicago; Christine M. Jolls, NBER and Harvard University; and Cass Sunstein, University of Chicago. The daylong program was:

Christine M. Jolls, Cass Sunstein, and **Richard H. Thaler,** "A Behavioral Approach to Law and Economics"
Discussant: Steven D. Levitt, NBER and University of Chicago

Russell Korobkin, University of Illinois, "The Status Quo Bias and Contract Default Rules"
Discussant: Richard Zeckhauser, NBER and Harvard University

Jeffrey Rachlinski, Cornell University, "A Positive Psychological Theory of Judging in Hindsight"
Discussant: Louis Kaplow, NBER and Harvard University

Daniel Kahneman, Princeton University; **David Schkade,** University of Texas, Austin; and **Cass Sunstein,** "Shared Outrage and Erratic Awards: the Psychology of Punitive Damages"
Discussant: Alan Schwartz, Yale University

Peter A. Diamond, NBER and MIT, "Efficiency Effects of Punitive Damages" and "Integrating Punishment and Efficiency Concerns in Punitive Damages for Reckless Disregard of Risks to Others"
Discussant: Robert Gertner

Linda Babcock and **Gregory Pogarsky,** Carnegie-Mellon University, "Damage Caps Cast a Long Shadow: An Experimental Investigation of Their Impact on Expectations and Settlement"
Discussant: Samuel Isaacharoff, University of Texas, Austin

Jolls, Sunstein, and **Thaler** offer a broad vision of how law and economics analysis may be improved by increased attention to insights about actual human behavior. Their analysis falls into three categories: positive, prescriptive, and normative. Positive analysis of law focuses on how agents behave in response to legal rules, and how legal rules are produced; here, they suggest that a behavioral approach improves predictions. Prescriptive analysis deals with what rules should be adopted to advance agreed-upon ends; here, they offer alternatives to standard law and economics prescriptions based on behavioral insights into the seemingly pernicious or counterproductive effects of the standard proposals. Finally, normative analysis attempts to assess more broadly the ends of the legal system: for example, should the system always respect people's choices, and what is the appropriate domain of paternalism?

The rich law and economics literature on contract default rules—that is, terms that govern relationships between contracting parties only if those parties do not explicitly agree to other terms—presumes that the legal system's choice of such rules will not affect individual negotiators' underlying preferences for contract terms. The literature suggests that if bargainers perceive default terms as part of the status quo, they will prefer the substantive content of those terms more than they would if other terms were the legal defaults. **Korobkin** presents a study designed to test this hypothesis: 151 law students were asked to provide advice to a client in a number of hypothetical contract negotiation scenarios, with the content of the default terms manipulated among experimental groups. The results suggest that the choice of legal default terms affects not only what terms contracting parties will agree upon but also what terms they actually prefer.

Rachlinski notes that past events frequently seem inevitable and predictable after they unfold, a tendency that cognitive psychologists have labeled the "hindsight bias." This bias affects judgments of liability in the legal system. For example, if adverse outcomes seem more predictable (and hence avoidable) than they really were, then defendants can be held liable for adverse outcomes that they could not have foreseen. In effect, judgments of liability made under a negligence standard thus resemble those made under a standard of strict liability. Courts, however, have historically shown an awareness of the hindsight bias and when possible, developed methods of making judgments that avoid reliance on it. These adaptations include barring from the decision-making process information acquired only later, and carefully enforcing any ex ante understanding about liability that parties may have had. When no such mechanisms are available, the courts choose sensibly among second-best solutions. The legal system thus incorporates and adapts to this limitation on human judgment.

Kahneman, Schkade, and **Sunstein** conducted an experimental study of punitive damage awards in personal injury cases, using jury-eligible respondents. There was substantial consensus on judgments of the outrageousness of a defendant's actions and of the appropriate severity of punishment. Judgments of dollar awards made by individuals and synthetic juries were much more erratic, though. These results are familiar characteristics of judgments made on scales of unbounded magnitude. The degree of harm suffered by the plaintiff and the size of the firm had a pronounced effect on awards.

In his first paper, **Diamond** develops a typology of different behaviors that might be viewed as outrageous by a jury and subjected to punitive damages. He then derives the level of punitive damages for achieving economic efficiency in four different situations: malice, and three settings where a jury might find reckless disregard—a rational response to insufficient compensatory damages; a nonrational disregard of risk; and a rational response when compensatory damages are adequate. In his second paper, Diamond explores the effects of punitive damages in situations of reckless disregard that might be viewed as outrageous. If the defendant were making a rational decision that reflected all of social costs, any level of punitive damages would lower efficiency. If there were inadequacies of compensatory damages, then costs borne by the defendant would be less than the full social costs. In that case, punitive damages might improve economic efficiency, as well as providing retribution.

A major issue in the current debate over litigation reform is whether to limit the amount of damages that plaintiffs can receive. In some jurisdictions in the United States, "damage caps" have been placed on payments for pain and suffering, punitive damages, and recovery of medical expenses. **Babcock** and **Pogarsky** present experimental evidence on the impact of these caps on the judgments and negotiating behavior of subjects assigned to be litigants in a pre-trial negotiation. Preliminary results from this experiment indicate that when the damage cap is relatively low, it causes the likelihood of settlement to increase. This is consistent with predictions of the standard legal-economic model of settlement. However, the legal-economic model offers an incomplete characterization of the settlement process by ignoring important psychological mechanisms of information processing and judgment formation.

Not-for-Profit Hospitals are Discussed

A group of NBER health economists and invited guests met on November 21 and 22 for a conference on not-for-profit hospitals. The conference was divided into five sessions, each of which included two papers; the sessions focused on managed care; the differential treatment of not-for-profit providers; the mission of not-for-profit hospitals; recent conversions from not-for-profit to for-profit status; and the productivity of medical care. NBER Research Associate David M. Cutler of Harvard University organized this program:

Dr. Sarah Feldman, Brigham and Women's Hospital, and **David Scharfstein**, NBER and MIT, "Outline of Managed Care, Quality, and Volume"

David Meltzer, NBER and University of Chicago, "Implications of Managed Care for Teaching Hospitals: Comparisons of Traditional and Managed Care Medical Services within a Single Institution"

Discussants: Laurence Baker, NBER and Stanford University, and Alan Weil, The Urban Institute

Tomas Philipson, NBER and University of Chicago, "Perfect Substitution and Organizational Form"

William M. Gentry, NBER and Columbia University, and **John Penrod**, Montreal General Hospital Research Institute, "The Tax Benefits of Not-for-Profit Hospitals"

Discussants: Judith Hellerstein, NBER and University of Maryland, and William Vogt, Carnegie-Mellon University

Jonathan Skinner, NBER and Dartmouth College, and **Jack Wennberg**, Dartmouth College, "On the Efficiency of Hospital Care in the Last Six Months of Life: A Tale of Three Cities"

Richard Frank, NBER and Harvard University, and **David Salkever**, Johns Hopkins University, "Market Forces, Diversification of Activity, and the Mission of Non-Profit Hospitals"

Discussants: Brad Gray, New York Academy of Medicine, and Frank R. Lichtenberg, NBER and Columbia University

Frank Sloan, NBER and Duke University, and **Donald H. Taylor, Jr.** and **Christopher Conover**, Duke University, "Hospital Conversions: Is the Purchase Price too Low?"

David M. Cutler, and **Jill Horwitz**, Harvard University, "Converting Hospitals from Not-for-Profit to For-Profit Status: Why and What Effects?"

Discussants: Kathy Kenyon, Deaconess Billings Clinic, and James Rebitzer, Case Western Reserve University

Douglas O. Staiger, NBER and Harvard University, and **Mark B. McClellan**, NBER and Stanford University, "Comparing Hospital Quality at For-Profit and Not-for-Profit Hospitals"

Susan Athey and **Scott Stern**, NBER and MIT, "Technology Adoption in Hospitals and in Public Emergency Response Systems: Substitutes or Complements?"

Discussants: Karen Norberg, NBER and Children's Hospital, and Catherine Wolfram, NBER and Harvard University

Feldman and **Scharfstein** compare the quality of care received by cancer patients in fee-for-service and managed care plans. For the purposes of this analysis, they use provider volume as a proxy for quality: many previous studies have shown that the patients of high-volume physicians and hospitals have better clinical outcomes than do other patients. Their dataset contains all Massachusetts hospital discharges in 1995; they compare the experiences of patients with breast cancer, colorectal cancer, and gynecologic cancer, because all three types of cancer typically are treated surgically. The authors find that managed care patients tend to be treated by physicians who perform relatively fewer surgeries, and that these patients receive their treatment in lower-volume hospitals. The differences across the seven managed care plans are substantial, with one of the plans actually sending its patients to higher volume providers than the fee-for-service plans.

Meltzer uses data on all admissions to a teaching hospital's internal medicine service over a year-and-a-half period to investigate the effect of the attending physician's financial incentives on the costs of care. Within the hospital, some "attendings" are employed by the managed care organization (MCO) while all others are employed by the hospital. The MCO attendings have much stronger financial incentives to reduce their patients' (almost all of whom are insured by the MCO) costs than do the physicians employed by the hospital. Meltzer finds that the patients of MCO attendings have significantly lower costs than do similar patients of hospital-employed physicians. The majority of this cost saving is accomplished through shorter lengths-of-stay. Physician workload also has a significant effect on patient discharge probabilities, and hospitals may increase their attending physicians' incentives to discharge patients quickly by reducing their house staff.

Philipson uses data from the U.S. National Nursing Home Survey to determine whether not-for-profit nursing homes have significantly higher prices than similar for-profit facilities. In a cross-sectional analysis of firms in both 1985 and 1995, Philipson finds no support for the presence of a not-for-profit premium. Instead, he finds a 5 percent for-profit premium in 1985 and no significant difference in price in 1995. These results suggest that there is perfect substitution on the demand side between not-for-profit and for-profit production.

Gentry and **Penrod** estimate the magnitude of the tax benefits given to not-for-profit (NFP) hospitals. NFP hospitals are exempt from corporate income taxes (federal and state); property taxes (state and local); have access to tax-exempt bond financing; and can receive charitable donations which are tax-deductible for the donor. Using data from the Health Care Financing Administration's 1995 public use file of Medicare Cost Reports, the authors estimate that the income tax exemption is worth $4.6 billion to not-for-profit hospitals, while the value of their property tax exemption is $1.6 billion. Their results suggest, however, that the net benefit of access to tax-exempt bonds is quite small and does not significantly reduce the cost of borrowing for NFP hospitals. The authors do point out that, if NFP hospitals engage in tax arbitrage by borrowing at tax-exempt interest rates and investing in financial assets with greater returns, then the magnitude of this benefit could be substantial.

Skinner and **Wennberg** compare Medicare expenditures and physician visits in the last six months of life across U.S. communities to investigate the productive and allocative efficiency of end-of-life medical care. Initially, the authors focus on Miami and Minneapolis, and find that average Medicare costs are substantially higher (by approximately a two-to-one margin) in Miami. They ascribe this to the differences in treatments of the chronically ill in the two areas. Next, the authors conduct a cross-sectional analysis of the 306 U.S. hospital referral regions, and find that regions with relatively more hospital beds and physician specialists have significantly greater end-of-life Medicare expenditures. They also find that Medicare patients in areas with a greater penetration of for-profit hospitals have significantly higher end-of-life spending. This greater spending does not appear to lead to improved outcomes, though, since mortality rates are not significantly related to intensity of care near the end of life.

Frank and **Salkever** explore the causes and effects of the diversification of activities by not-for-profit hospitals. The authors cite the recent reduction in the demand for inpatient care as an important reason for the increase in diversification and joint ventures by not-for-profit hospitals. Based on the results of three focus group discussions with executives from 14 (mainly NFP) hospitals in Boston and Chicago, they find that non-teaching, NFP hospitals diversify their activities and enter into joint ventures not only to offset reductions in inpatient revenues but also to gain market share, strengthen ties with physicians, and reduce the uncertainty in demand. Philanthropy constitutes a very small share (approximately 1 percent) of a typical not-for-profit hospital's budget, and these private donations fall when a hospital's financial performance improves. Finally, they find no evidence that diversification or a decline in private donations has reduced the provision of charity care by NFP hospitals.

Analyzing ten hospital conversions which occurred in North and South Carolina since 1981, **Sloan, Taylor,** and **Conover** investigate whether communities receive a "fair" price when selling a hospital. For their analysis, the authors obtained detailed information about hospital purchase prices, the use of the funds received, and the commitments made by the buyers to the local communities. They calculate appropriate prices under different assumptions about future cash flows, and take into account any community benefits which are not reflected in the transaction price. Their results suggest that communities which deal with a for-profit hospital corporation receive a price substantially above the fair price. Interestingly, the authors find the reverse when communities deal with not-for-profit or government organizations. Finally, they find that hospitals which convert to for-profit status do not reduce their provision of community benefits.

Cutler and **Horwitz** consider why two large not-for-profit hospitals converted to for-profit status, and what effects these conversions have had. For their analysis, the authors use several sources of information, including interviews with hospital personnel, newspaper articles, Medicare cost reports, and legal documents. Their results suggest two primary motivations for conversions to not-for-profit status: to gain access to cheaper sources of capital; and the culture of the NFP hospital, since hospitals run by businessmen may be much more likely than religious-affiliated or physician-run hospitals to convert. The conversions appear to have improved the financial performance of these hospitals by cutting hospital costs and increasing public sector reimbursement. The authors suggest that this second factor is attributable to the more skillful exploitation of Medicare loopholes by for-profit hospitals.

McClellan and **Staiger** compare quality at for-profit and not-for-profit hospitals using a dataset which contains all elderly Medicare beneficiaries who are hospitalized from 1984 through 1994 following their first heart attack, or hospitalized with ischemic heart disease from 1984 through 1991. They find a strong negative relationship between hospital volume and mortality rates. Also, not-for-profit hospitals have lower mortality than both for-profit and government hospitals. Further, differences in mortality rates between not-for-profit and for-profit hospitals increased between 1985 and 1994. The authors conclude that, within a specific market, for-profit hospitals actually have higher quality than do not-for-profit hospitals.

Athey and **Stern** explore the causes and effects of differences across communities in emergency services. Initially, the authors use a dataset with every ambulance ride in Pennsylvania during 1995 to explore the direct productivity benefits of a community's adopting a basic or advanced 911 system. Focusing on cases of cardiac incident, they find that both the time to reach an emergency site and the time elapsed from the site to the hospital is decreasing with the adoption of advanced 911 services. However, there is little evidence to suggest that mortality rates from cardiac incidents are related to the adoption of 911 services. The authors also find that a hospital's level of cardiac technology has an important impact on its share of cardiac patients within a market, but there is little evidence that the 911 system influences hospitals' technology investments. Finally, using a national-level dataset on the adoption of 911 technologies across communities, they find that places with a more conservative political orientation are less likely to adopt advanced 911 systems, and that state legislation governing the adoption of 911 has an important effect on communities' adoption decisions.

This article was prepared in large part by Mark Duggan of Harvard University, who also attended the conference. It is expected that these papers and the conference discussions will be published in a conference volume by the University of Chicago Press. Its availability will be announced in a future issue of the NBER *Reporter*.

Conference on Market Microstructure

The second formal meeting of the NBER's Market Microstructure Research Group, organized by NBER Research Associate Andrew Lo of MIT, took place in Cambridge on December 4. The discussion focused on the following papers:

Michael J. Fleming and **Eli Remolona**, Federal Reserve Bank of New York, "Price Formation and Liquidity in the U.S. Treasury Securities Market: The Response to Public Information"
Discussant: Torben Andersen, Northwestern University

Thomas Gehrig, University of Freiburg, and **Matthew Jackson**, Northwestern University, "Bid-Ask Spreads with Indirect Competition among Specialists"
Discussant: Eugene Kandel, Hebrew University

Martin Evans, Georgetown University, "The Microstructure of Foreign Exchange Dynamics"
Discussant: Richard K. Lyons, NBER and University of California, Berkeley

Rajesh Chakrabarti and **Richard Roll**, University of California, Los Angeles, "Learning from Others, Reacting, and Market Quality"
Discussant: Blake LeBaron, NBER and University of Wisconsin

Eric Ghysels, Pennsylvania State University, and **Mouna Cherkaoui**, University Mohammed V, "Microstructure Reforms of an Emerging Market: Do They Really Improve Trading Costs?"
Discussant: Geert Rouwenhorst, Yale University

Robert Neal, Indiana University, and **Simon Wheatley**, University of New South Wales, "Adverse Selection and Bid-Ask Spreads: Evidence from Closed-End Funds"
Discussant: Lawrence Harris, University of Southern California

Fleming and **Remolona** note that the arrival of public information in the U.S. Treasury securities market induces striking adjustment patterns for prices, trading volume, and bid-ask spreads. The release of a major macroeconomic announcement occasions a sharp and immediate price change with little trading volume, suggesting that price reactions to public information do not require trading. The bid-ask spread widens dramatically at announcement, and narrows shortly thereafter, apparently driven by inventory control rather than asymmetric information concerns. After the initial sharp price change, trading volume surges and persists with high price volatility and a slightly higher bid-ask spread, suggesting a sluggish process of price formation as the market reconciles investors differential private views.

Gehrig and **Jackson** examine the prices quoted by specialists (or dealers) who have monopoly power to set prices (bids and asks) for a given asset, but who face indirect competition from other specialists who trade in related assets. They compare the equilibrium spreads as the number (and factor structure) of the assets that each specialist controls varies. For some constellations of initial portfolio holdings and asset covariance, it is socially preferable to have competing specialists, while for others it is socially preferable to have actions coordinated (or to have one specialist control several assets). In some situations it is beneficial to have specialist power concentrated within industries; in other situations, across industries; and in other situations, not to be concentrated at all.

Evans studies the high frequency behavior of the interbank foreign exchange market with a newly created dataset that provides a comprehensive picture of activity across the market. His analysis indicates that trade activity within the interbank market is distinct from the posting of indicative quotes. Trading and quote-making decisions are linked, but the links are complicated and poorly understood. He also documents the existence of a strong relationship between exchange rate movements and a measure of excess dollar demand. Empirically, this effect appears important in the determination of exchange rates at both high frequencies and over the longer time spans that are relevant in international macroeconomics.

Traders in security markets take into account the actions of their peers in making their own trade decisions. In this paper, **Chakrabarti** and **Roll** compare a market in which traders "learn" from one another with a market in which they ignore each other's actions. The authors measure volatility, volume, and the accuracy of market price as a forecast of value in the "learning" and the "no learning" cases. While bubbles and cascades do arise some times, on average "learning" reduces price and return volatility and volume, and improves the accuracy of the market price as an indicator of value. The authors examine the marginal effects of different parameters on these market characteristics, and find that the "learning" process has a complex and nonlinear impact.

To enhance their understanding of emerging markets, **Ghysels** and **Cherkaoui** study an unusual dataset containing all the transaction records of a market over a long span. The market, which was included in 1996 in the International Finance Corporation database, operated under a dual trading system, consisting of an upstairs market for large block trades and a trading floor exchange. Transactions were recorded separately for both segments of the market. The authors: assess the quality of the market through the various stages of reform; examine the effect of microstructure reforms on the emergence of the market; and consider the price impact of large block trades. They also test whether the costs of trading have changed significantly since the stock market reforms. Their results show that the effective spreads and costs of trading have, if anything, increased except for the most actively traded stock.

Neal and **Wheatley** examine the performance of two commonly used empirical models for estimating the adverse selection component of a firm's bid-ask spread. They use the models to estimate the adverse selection components of a sample of closed-end funds and a matched sample of common stocks. In contrast to the stocks, closed-end funds report their net asset values weekly, all but eliminating uncertainty about their current liquidation values. Thus the authors expect the adverse selection component to be much smaller for the funds than for the stocks. Estimates of the component, however, are large and significant for both samples. This suggests that either adverse selection arises primarily from factors other than current liquidation value or that the empirical models are misspecified.

Competition and Organization in Technology Intensive Industries

One hundred economists from the United States, Canada, and Europe gathered in Cambridge on December 5 and 6 for the recent NBER-Universities Research Conference on technology-intensive industries. NBER Research Associate Shane Greenstein of Northwestern University and Faculty Research Fellow Scott Stern of MIT organized this program:

Ashish Arora, Carnegie Mellon University, **Andrea Fosfuri,** Universitat Pompeu Fabra, and **Alfonso Gambardella,** University of Urbino, "Division of Labor and Transmission of Growth"
Discussants: Adam Jaffe, NBER and Brandeis University, and Sam Kortum, NBER and Boston University

Joshua Lerner, NBER and Harvard University, and **Robert Merges,** Boalt Hall Law School, "The Control of Technology Alliances: an Empirical Analysis of the Biotechnology Industry"
Discussants: David Audretsch, Georgia State University, and Alfonso Gambardella

Bruce Blonigen, University of Oregon, and **Chris Taylor,** U.S. International Trade Commission, "R and D Activity and Acquisitions in High Technology Industries: Evidence from the U.S. Electronics Industry"
Discussants: Lee Branstetter, NBER and University of California, Davis, and Bronwyn Hall, NBER and University of California, Berkeley

Eugenio J. Miravete, INSEAD, and **Jose C. Pernias,** Universitat Jaume I, "Innovation Complementarities and Scale of Production"
Discussants: Rebecca Henderson, NBER and MIT, and Harumi Ito, NBER and Brown University

Eric Brynjolfsson, MIT, and **Lorin Hitt,** University of Pennsylvania, "Information Technology and Organizational Design: Some Evidence from Micro Data"
Discussants: Susan Athey, NBER and MIT, and Tom Hubbard, NBER and University of California, Los Angeles

George Deltas and **Eleftherios Zacharias,** University of Illinois, Urbana-Champaign, "Pricing Dispersion over the Product Cycle: The Transition from the 486 to the Pentium Processor"
Discussants: Iain Cockburn NBER and University of British Columbia, and Nancy Rose, NBER and MIT

Sangin Park, State University of New York at Stony Brook, "Quantitative Analysis of Network Externalities in Competing Technologies: the VCR Case"
Discussants: Neil Gandal, Tel Aviv University and Andrea Shepard, NBER and Stanford University

Louis Thomas, University of Pennsylvania, "Adopting Order of New Technologies in Evolving Markets"
Discussants: Steven Berry, NBER and Yale University, and Anita McGahan, Harvard University

Arora, Fosfuri, and **Gambardella** study how an independent, upstream capital good sector in a technology based industry can act as a mechanism for the transmission of growth across countries. Since the number of specialists is determined by the size of the downstream sector, the growth of the downstream sector in leading countries has beneficial effects for the growth of the downstream sector in follower countries (less developed countries, or LDCs). Using a comprehensive dataset of investments in chemical plants in the developing countries during the 1980s, the authors find that one additional specialized supplier in a given process technology would have increased the expected investment in LDCs by $100 million to $200 million, with the increases greater in more mature technologies, and for larger LDCS.

Lerner and **Merges** examine the determinants of control rights in technology alliances involving biotechnology firms. They undertake three case studies and a quantitative analysis of 200 alliances. Consistent with the framework they use, the allocation of control rights to the firm performing R and D increases with its financial resources. The empirical evidence is much more ambiguous on the relationship between the stage of the project at the time the alliance is signed and control rights.

Economic analysis of high-technology industries often assumes that firms' abilities to survive depend on their own internal R and D efforts. **Blonigen** and **Taylor** argue that high-technology firms may choose to specialize either in this internal growth (through R and D) strategy or in an external growth strategy of acquiring other firms or firms operations. Using a panel of 214 U.S. electronics firms over nine years to test the relationship between R and D intensity and the probability of acquisition, and controlling for traditional determinants of acquisition activity which include financial constraints, they find a strong and significant negative correlation between R and D intensity and the probability of acquisition. This suggests that electronics firms may be specializing in one activity or the other. Their results also suggest that firms with greater intangible assets, higher profitability, and lower debt-to-asset ratios are more likely to acquire.

Miravete and **Pernias** study the existence of strategic complementarity between product and process innovation for numerous firms in a wide range of industries. They show that general innovative strategies of Spanish firms can be considered mutually complementary and robust to the significant existence of firms unobservable heterogeneity. Their empirical evidence is consistent with small firms having a comparative advantage in succesfully implementing flexible manufacturing methods.

Brynjolfsson and **Hitt** examine the influence of organizational design on the demand for information technology (IT) and the productivity of IT investments using data from approximately 380 U.S. firms. They find greater demand for IT in firms with greater decentralization of decision rights (especially the use of self-managing teams), and greater investments in human capital, including training and screening by education. In addition, the output elasticity of IT is higher in firms that adopt a more decentralized and human capital-intensive work system. This relationship is robust to alternative productivity specifications and measures of work systems. These findings support the idea that organizational practices are important determinants of IT demand and productivity.

Using a high frequency dataset of advertised prices in the personal computer industry, **Deltas** and **Zacharias** find, after adjusting for all observable product characteristics, that firms which were late in introducing Pentium-based computers command a higher price premium as compared to early entrants. This is true even among firms which have the same price premium for their 486-processor-based computers. Over time, the difference in the Pentium price premiums of the late versus the early entrants declines to the level of the difference in the corresponding 486 price premiums. One explanation for these results might be that the late entrants reap short-run rents from consumers who are loyal enough to have waited for their entry into the market in order to purchase. This suggests that firm identity matters over and above any other product characteristics in determining consumer willingness to pay for the product.

Park develops a model of consumers' choices among incompatible technologies and producers' pricing in the presence of network externalities. He then applies the model to analyzing the extent to which network externalities and installed bases contributed to de facto standardization of the VHS format in the U.S. home VCR market. His results imply that: 1) the network advantage of VHS became increasingly important during 1981–3, and although there was a push of Betamax in 1983, the network advantage was the key reason that VHS has outsold Betamax since 1986; 2) the expected sales advantage was more important than the installed base advantage in the adoption of the VHS format, however, the installed base advantage became increasingly important as time passed; and 3) the increase in the network advantage of VHS, especially through the accumulation of a larger installed base, was an engine of tipping toward and de facto standardization of the VHS format.

Thomas empirically examines the order in which firms adopt new technologies in the computer disk drive industry. He finds that large firms and incumbents are more likely to adopt earlier than small ones and new entrants when innovation does not rapidly make obsolete existing technology and products. He also finds, in some cases, that small firms and new entrants adopt earlier than large ones and incumbents when innovation rapidly makes obsolete existing products. These results are consistent with the economics and strategy literatures on innovation.

Bureau News

Merton Shares '97 Nobel

Robert C. Merton, a Research Associate in the NBER's Program on Asset Pricing and professor of economics at Harvard Business School, and Myron S. Scholes, a professor emeritus at Stanford Business School and a former NBER Research Associate, won the Nobel Prize in Economics this year.

The Royal Swedish Academy of Sciences awarded the prize to Merton and Scholes for helping to devise a mathematical formula aimed at measuring the worth of an option. "Thousands of traders and investors now use this formula every day to value stock options in markets throughout the world," the Academy said in its announcement. Options are contracts that allow, but do not require, an investor to buy an asset, like a stock or oil, at a fixed price during a specified period of time.

Robert E. Lucas, Jr. and Robert W. Fogel, both NBER Research Associates and professors of economics at the University of Chicago, won the prize in 1995 and 1993, respectively. Other researchers who have been affiliated with the NBER over the years and won the Nobel Prize in Economics are Simon S. Kuznets, Milton Friedman, Theodore W. Schultz, George J. Stigler, and Gary S. Becker.

NBER Researcher is Newest Member of CEA

President Clinton recently named NBER Research Associate Rebecca M. Blank to be a member of his Council of Economic Advisers. Her nomination is subject to Senate confirmation.

Professor Blank is on leave from Northwestern University, where she teaches economics and directs the Northwestern/University of Chicago Joint Center for Poverty Research. She is also a member of the NBER's Program in Labor Studies and the Program on Children.

Blank holds a doctorate in economics from MIT, and has written extensively about government antipoverty programs.

Research Meeting of Economic Fluctuations and Growth Program

Nearly 70 members and guests of the NBER's Program on Economic Fluctuations and Growth met in Chicago on October 24 to discuss their recent research. Charles Jones, NBER and Stanford University, and James H. Stock, NBER and Harvard University, organized this program:

Francis X. Diebold, NBER and University of Pennsylvania; **Lee E. Ohanian**, Federal Reserve Bank of Minneapolis; and **Jeremy Berkowitz**, Federal Reserve Board, "Dynamic Equilibrium Economies: A Framework for Comparing Models and Data"

Discussant: Lars P. Hansen, NBER and University of Chicago

Daron Acemoglu, NBER and MIT, "Why Do New Technologies Complement Skills? Directed Technical Change and Wage Inequality"

Discussant: Kevin M. Murphy, NBER and University of Chicago

Jerome Adda, INRA, and **Russell Cooper**, NBER and Boston University, "Balladurette and Juppette: A Discrete Analysis of Scrapping Subsidies" (NBER Working Paper No. 6048)

Discussant: Janice Eberly, NBER and Northwestern University

David H. Romer, NBER and University of California, Berkeley, "Misconceptions and Political Outcomes" (NBER Working Paper No. 6117)

Discussant: Roberto Perotti, Columbia University

Wouter Den Haan, NBER and University of California, San Diego (UCSD); and **Garey Ramey** and **Joel Watson**, UCSD, "Job Destruction and Propagation of Shocks"

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

Robert E. Hall, NBER and Stanford University, "The Temporal Concentration of Job Destruction and Inventory Liquidation: A Theory of Recessions"

Discussant: John H. Cochrane, NBER and University of Chicago

(Continued on next page)

Diebold, Ohanian, and **Berkowitz** propose a framework for assessing whether dynamic equilibrium models and data agree. They evaluate the significance of deviations between the models and the data, and use goodness-of-fit criteria to produce estimators that optimize economically-relevant loss functions. They provide a detailed illustrative application to modeling the U.S. cattle cycle.

In an economy where skilled and unskilled workers use different technologies, the rate of improvement of each technology is determined by a profit-maximizing R and D sector. When there is a high proportion of skilled workers in the labor force, the market for skill-complementary technologies is larger, and more effort will be spent in upgrading the productivity of skilled workers. One implication of this theory is that when the relative supply of skilled workers increases, the skill premium decreases in the short run, but then increases, possibly *even above its initial value,* because the larger market for skill-complementary technologies has changed the direction of technical change. This suggests that the rapid increase in the proportion of college graduates in the U.S. labor force may have been causal in both the decline in the college premium during the 1970s and the large increase in inequality during the 1980s. **Acemoglu** also derives implications of directed technical change for residual wage inequality, and shows that calculations of the impact of international trade on inequality that ignore the change in the direction of technical progress may be misleading.

Adda and **Cooper** study the effects of subsidies on durable goods markets. In particular, they consider a recent policy in France in which the governments of Balladur and Juppe subsidized the replacement of old cars with new ones. They find that these policies do stimulate the automobile sector in the short run but, through the induced changes in the cross-sectional distribution of car ages, they create the basis for subsequent low activity. Further, while these policies increase government revenues in the short run, revenues in the long run are lower relative to a baseline without intervention.

A large recent literature shows that strategic interactions among actors with conflicting objectives can produce inefficient political decisions. **Romer** investigates an alternative explanation of such decisions: if individuals' errors in assessing the likely effects of proposed policies are correlated, then democratic decisionmaking can produce inefficient outcomes even in the absence of distributional conflicts or heterogeneous preferences. Choosing candidates from among the best informed members of the population does not remedy the problems created by such errors, but subsidizing information and exposing representatives to information after their election do. Concentration of power has ambiguous effects. Finally, the presence of correlated errors tends to create multiple equilibriums in political institutions.

Den Haan, Ramey, and **Watson** develop and quantitatively implement a dynamic general equilibrium model with labor market matching and endogenous job destruction. The model produces a close match with data on job creation and destruction. Cyclical fluctuations in the job destruction rate serve to magnify the effects of productivity shocks on output, as well as making the effects much more persistent. Interactions between household savings decisions and separation decisions in employment relationships play a key role in propagating shocks.

The most important event in a recession is a sharp drop in employment. At the same time, firms liquidate inventories; employment and production fall by more than sales. **Hall** interprets recessions in the following way: episodes of financial stress result in abnormally high discount rates for business decisions. At the same time, possibly for unrelated reasons, profitability falls in some important industries. An increase in the discount rate shifts the decision toward shutdown because the firm realizes immediate cash from liquidating inventories and other capital upon shutdown, whereas the foregone profit lies well into the future. A decline in profit also shifts the decision toward shutdown if it lowers profit in relation to liquidation value. The burst of job destruction and inventory decumulation that occurs during the sharp part of the typical contraction results from profit-maximizing decisions to shut down units in firms throughout the economy. The concentration of recessions during brief episodes is increased as a result of the heterogeneity of productive units. If an adverse shock hits at a time when there has been a buildup of units near the borderline of shutdown, the burst of job destruction and inventory liquidation will be more severe.

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Wage Inflation and Unemployment

On November 4, the NBER held a meeting on "Wage Inflation and Unemployment" in its Cambridge office which was unusual in that it brought together NBER researchers with government officials to discuss this important topic. In the morning session on "Measurement Issues and Market Evidence," NBER Research Associates Lawrence F. Katz and Alan B. Krueger, both members of the Labor Studies Program and former Chief Economists at the U.S. Department of Labor, presented their thoughts and questions on wage statistics. Then John Ruser of the Bureau of Labor Statistics explained how that agency constructs its compensation statistics, and what the numbers show.

In the afternoon discussion of "The Unemployment-Inflation Relation," NBER Research Associate Robert J. Gordon, a member of the Program on Economic Fluctuations and Growth, talked about the "Sectoral Origins of the Recent Decline in the NAIRU." His remarks were followed by a presentation by Roger Brinner of DRI/McGraw Hill, an economic consulting firm, and by a more general discussion that included: NBER macroeconomists Olivier J. Blanchard of MIT, Bureau President Martin Feldstein and James H. Stock, both of Harvard; members of the NBER's Program on Monetary Economics Steven G. Cecchetti (currently on leave from the NBER at the Federal Reserve Bank of New York), former Program Director Benjamin M. Friedman and current Program Director N. Gregory Mankiw, both of Harvard; Richard B. Freeman, Director of the NBER's Program on Labor Studies; as well as Steven Braun of the President's Council of Economic Advisers; David Stockton and William Wascher of the Federal Reserve Board of Governors; Daniel Sullivan of the Federal Reserve Bank of Chicago; and Francis Harris of the Bureau of Labor Statistics.

Public Economics Program Meeting

Members of the NBER's Program on Public Economics, directed by James M. Poterba of NBER and MIT, met in Cambridge on November 6 and 7. They discussed the following papers:

Alberto F. Alesina, NBER and Harvard University; **Rexa Baqir**, University of California, Berkeley; and **William Easterly**, The World Bank, "Public Goods and Ethnic Divisions" (NBER Working Paper No. 6009)
Discussant: Anne Case, NBER and Princeton University

Austan Goolsbee, NBER and University of Chicago, "What Happens When You Tax the Rich? Evidence from Executive Compensation"
Discussant: Brian Hall, NBER and Harvard University

Gary Becker, University of Chicago, and **Casey Mulligan**, NBER and University of Chicago, "Efficient Taxes, Efficient Spending, and Big Government"
Discussant: Robert P. Inman, NBER and University of Pennsylvania

Jerry Hausman, NBER and MIT, "Taxation by Telecommunications Regulation" (NBER Working Paper No. 6260. For a summary of this paper, see "Tax Policy Conference" earlier in this issue.)
Discussant: William D. Nordhaus, NBER and Yale University

David Altig, Federal Reserve Bank of Cleveland; **Alan J. Auerbach**, NBER and University of California, Berkeley; **Laurence J. Kotlikoff**, NBER and Boston University; and **Kent A. Smetters** and **Jan Walliser**, Congressional Budget Office, "Simulating U.S. Tax Reform"
Discussant: Gilbert E. Metcalf, NBER and Tufts University

David A. Wise, NBER and Harvard University, and **Jonathan Gruber**, NBER and MIT, "Social Security Programs and Retirement Around the World" (NBER Working Paper No. 6134)
Discussant: Pierre Pestieau, Cornell University

Thomas J. Nechyba, NBER and Stanford University, "Social Approval, Values, and AFDC: A Re-examination of the Illegitimacy Debate"
Discussant: Hilary W. Hoynes, NBER and University of California, Berkeley

Alesina, Baqir, and **Easterly** present a model that links differences in preferences across ethnic groups in a city to the amount and type of public good the city supplies. They test the model with three related datasets: U.S. cities, U.S. metropolitan areas, and U.S. urban counties. They find that productive public goods—education, roads, libraries, sewers, and trash pickup—in U.S. cities (metro areas/urban counties) are inversely related to the city's (metro area's/county's) ethnic fragmentation. Ethnic fragmentation is related negatively to the share of local spending on welfare. The results are driven mainly by observations in which majority whites are reacting to varying sizes of minority groups. The authors conclude that ethnic conflict is an important determinant of local public finances.

Goolsbee reexamines the responsiveness of taxable income to changes in marginal tax rates using detailed compensation data on several thousand corporate executives from 1991 to 1995. The data confirm that the higher marginal rates of 1993 led to a significant decline in taxable income. Indeed, this small group of executives can account for as much as 20 percent of the aggregate change in wage and salary income for the one million richest taxpayers, and one person alone can account for more than 2 percent. The decline, however, is almost entirely a short-run shift in the timing of compensation rather than a permanent reduction in taxable income. The short-run elasticity of taxable income with respect to the net-of-tax share exceeds one, but the elasticity after one year is at most 0.4, and is probably closer to zero. Disaggregating the data by source of income shows that the shift comes from a large increase in the exercising of options in the year before the tax change, followed by a decline in exercising in the year of the tax change, and is concentrated among executives at the top of the income distribution. Executives without stock options show six times less responsiveness to taxation. Other types of compensation, such as salary and bonus or nontaxed income, are either not responsive to tax rates or not large enough to make a difference. The estimated elasticities indicate that the dead weight loss of recent tax increases was at most one quarter of the revenue generated.

Becker and **Mulligan** provide a model for analyzing the effects of the tax system and spending programs on the determination of government spending and taxpayer welfare. They show that a tax system or spending program which is not optimal from one point of view still can improve taxpayer welfare, because the system creates additional political pressure for suppressing the growth of government. Relevant examples include the use of inflation taxes, capital taxes, excise taxes, deficit financing, and income taxes with many "loopholes." They show that in a broad sample of countries for 1972–90, "more efficient" tax systems—that is, systems that rely on broad-based taxes with fairly flat rate structures—are associated with larger governments. An analysis of defense spending—especially wartime spending—and oil shocks suggests that the cause and effect is not from spending to tax structures.

Auerbach and his coauthors compare the equity, efficiency, and macroeconomic effects of five alternatives to the current U.S. federal income tax: a proportional income tax; a proportional consumption tax; a flat tax; a flat tax with transition relief; and a progressive variant of the flat tax called the "X tax." Their model predicts major macroeconomic gains (including an 11 percent increase in long-run output) from replacing the federal tax system with a proportional consumption tax. Future middle- and upper-income classes gain from this policy, but initial older generations are hurt by the policy's implicit capital levy. Poor members of current and future generations also lose. The flat tax, which adds a standard deduction to the consumption tax, makes all members of future generations better off, but at a cost of halving the economy's long-run output gain and harming initial older generations. Insulating these older generations through transition relief further reduces the long-run gains from tax reform. Switching to a proportional income tax without deductions and exemptions hurts current and future low lifetime earners, but helps everyone else. It also raises long-run output by over 5 percent. The X tax makes everyone better off in the long run and also raises long-run output by 7.5 percent. But it harms initial older generations who bear its implicit wealth tax.

The populations in all industrialized countries are aging rapidly and individual life expectancies are increasing. Yet older workers are leaving the labor force at younger and younger ages. In some countries, the labor force participation rates of 60-to-64-year-old men have fallen by 75 percent over the past three decades. This decline in labor force participation magnifies population trends, further increasing the number of retirees relative to the number of persons who are working. Together these trends have put enormous pressure on the financial solvency of social security systems around the world. Ironically, the provisions of the social security systems themselves typically contribute to the labor force withdrawal.

Gruber and **Wise** summarize the evidence presented in a number of papers on eleven industrialized countries, and distill the key conclusions from the collective findings. They note a strong correspondence between the age at which benefits are available and departure from the labor force. In addition, the provisions of social security programs often imply large financial penalties on labor earnings beyond the social security early retirement age. Furthermore, in many countries disability and unemployment programs effectively provide early retirement benefits before the official social security early retirement age. Gruber and Wise conclude that provisions of social security programs indeed have contributed to the decline in the labor force participation of older persons, substantially reducing the potential productive capacity of the labor force.

Nechyba models the fertility decisions of individuals who differ in their wage rate and their preferences toward rearing children. More precisely, each type of person chooses her amount of leisure and whether to have a child out-of-wedlock. Children are considered "consumption goods," yielding utility but costing leisure time. Furthermore, how much utility individuals receive from having a child out-of-wedlock depends on the level of "social approval" that is associated with having out-of-wedlock children. This social approval is a function of the fraction of individuals in all previous generations who chose to have children out-of-wedlock, and the effect of each generation diminishes with time. Nechyba calculates a steady-state level of social approval in the absence of welfare programs, and then introduces a program similar to AFDC, and calculates a transition path to the new steady state. He demonstrates that along the transition path, observed cases of illegitimacy are rising both among the poor and the non-poor despite the fact that AFDC payments are constant or even falling. He then performs policy simulations of welfare reform proposals, from the steady state and at different points on the transition path. While the model is successful in replicating the stylized facts on AFDC and illegitimacy and establishes a link between the two through a government induced change in "values," it also demonstrates that welfare reform aimed at reducing the incentives for poor women to have out-of-wedlock births may not be as effective as policymakers who believe in a causal link between AFDC and illegitimacy might suspect. Finally, a spatial extension of the model could explain not only the stylized aggregate trends, but also the empirically important concentration of out-of-wedlock births in some communities.

Program Meeting on Asset Pricing

The NBER's Program on Asset Pricing met on November 7 in Philadelphia. A. Craig MacKinlay of the Wharton School organized the program, at which these papers were discussed:

Torben Andersen, Northwestern University, and **Timothy Bollerslev,** NBER and University of Virginia, "Answering the Skeptics: Yes, Standard Volatility Models Do Provide Accurate Forecasts" (NBER Working Paper No. 6023)
Discussant: Francis X. Diebold, NBER and University of Pennsylvania

Michael Brennan and **Avanidhar Subrahmanyam,** University of California, Los Angeles, and **Tarun Chordia,** Vanderbilt University, "A Re-Examination of Security Return Anomalies"
Discussant: Josef Lakonishok, NBER and University of Illinois

George M. Constantinides, NBER and University of Chicago; **John Donaldson,** Columbia University; and **Fajnish Mehra,** University of California, Santa Barbara, "Junior Can't Borrow: A New Perspective on the Equity Premium Puzzle"
Discussant: Domenico Cuoco, University of Pennsylvania

Sanford J. Grossman, NBER and University of Pennsylvania, and **Zhougquan Zhou,** QFS, "Incomplete Equitization and the Foreign Exchange Risk Premium"
Discussant: David Backus, NBER and New York University

Bernard Dumas, NBER and HEC School of Management; **Campbell R. Harvey,** NBER and Duke University; and **Pierre Ruiz,** HEC School of Management, "Are Common Swings in International Stock Returns Justified by Subsequent Changes in National Output?"
Discussant: Robert J. Hodrick, NBER and Columbia University

Stefano Athanasoulis, Iowa State University, and **Robert J. Shiller,** NBER and Yale University, "The Significance of the Market Portfolio" (NBER Technical Paper No. 209)
Discussant: Jesus Santo, University of Chicago

Volatility permeates modern financial theories and decisionmaking processes. As such, accurate measures and good forecasts of future volatility are critical for the implementation and evaluation of asset and derivative pricing theories, as well as for trading and hedging strategies. In response to this, a voluminous literature has emerged for modeling the temporal dependencies in financial market volatility at the daily and lower frequencies. Most of these studies find highly significant in-sample parameter estimates and pronounced intertemporal persistence of volatility. Meanwhile, when judged by standard forecast evaluation criteria, standard volatility models seemingly provide poor forecasts. **Andersen** and **Bollerslev** demonstrate that, contrary to this contention, in empirically realistic situations the models actually produce strikingly accurate interdaily forecasts for the latent volatility factor that is of interest in financial applications. They also present new methods for construction of more accurate and meaningful ex-post interdaily volatility measurements extracted from high-frequency intradaily data.

Brennan, Chordia, and **Subrahmanyam** re-examine the relationship between stock returns, measures of risk, and a set of other (non-risk) characteristics of securities, including the book-to-market ratio, firm size, the stock price, the dividend yield, and lagged returns. Their primary objective is to determine whether these other characteristics have marginal explanatory power relative to the APT benchmark. They use, in turn, the Connor and Korajczyk 1988 (CK) and the Fama and French 1993 (FF) approaches. Fama-MacBeth type regressions using risk adjusted returns provide evidence of return momentum, size, and book-to-market effects, together with a significant and negative relation between returns and trading volume, even after accounting for the CK factors. When the analysis is repeated using the FF factors, they find that the size and book-to-market effects are attenuated, and their significance is weakened as well, while the other effects persist. In addition, after adjusting for risk using either method, Nasdaq stocks show significant underperformance.

In the context of a stationary, overlapping generations economy in which consumers are subject to a borrowing constraint, **Constantinides, Donaldson,** and **Mehra** address ongoing questions on the historical mean and standard deviation of the return on equities and bonds and on the equilibrium demand for these securities. The constraint turns out to be binding for the young consumers and plays a different role than in models with infinitely-lived consumers. The model also highlights the function of equity as a hedge against future wage uncertainty, a property that has diminishing value as investors age.

Grossman and **Zhou** develop a simple dynamic general equilibrium model to explain: the excessive dependence of a country's consumption on its own income; the home equity bias; and the foreign exchange risk premium. These "anomalies" are seen to be a direct consequence of the fact that a country cannot completely equitize the future income derivable from its natural and human resources.

In an integrated world capital market, the same pricing kernel is applicable to all securities. If the kernel is excessively volatile, as has been found in some studies, it should translate into an excessive degree of correlation in the returns of different stock securities. **Dumas, Harvey,** and **Ruiz** apply this idea mostly to the stock returns of different countries. They determine first, for a given measured degree of commonality in country outputs, what should be the degree of correlation of stock returns. They then match the second moments of the combined model containing the statistical multivariate model for output and the financial model for stock returns. They find that, far from being excessive, the actual correlations fall below what they should be in a unified market. By way of comparison, they then study purely domestic data. They close the investigation with an examination of the hypothesis of market segmentation.

The market portfolio (world portfolio) is in one sense the least important portfolio to provide to investors; there is always a better portfolio for social planners to make available to them. In a J-agent one-period stochastic endowment economy, where preferences are quadratic, the market portfolio is never spanned by the optimal markets a social planner would create. With identical preferences, the market portfolio is orthogonal to all J-1 portfolios which achieve a first best solution. These conclusions rely on the assumption that the social planner has perfect information about agents utilities. **Athanasoulis** and **Shiller** also show that as the contract designer's information about agents utilities becomes more imperfect, the optimal contracts will approach contracts that weight individual endowments in proportion to elements of eigenvectors of the variance matrix of endowments. If there is a substantial market component to endowments then a social planner, for reasons of robustness and simplicity, may conclude that creating a contract to allow trading the market portfolio would be a significant innovation.

Program Meeting on Children

On November 13, the NBER's Program on Children, directed by Janet Currie of NBER and University of California, Los Angeles, met in Cambridge. They discussed the following papers:

Wei-Yin Hu, University of California, Los Angeles, "Welfare and Family Structure: Do Higher Benefits Cause Teenagers to Leave the Nest?"

Thomas S. Dee, Georgia Institute of Technology, and **William N. Evans**, NBER and University of Maryland, "Teen Drinking and Educational Attainment: Evidence from Two-Sample Instrumental Variables Estimates"

V. Joseph Hotz, NBER and University of California, Los Angeles, and **Seth Sanders**, Carnegie-Mellon University, "Teenage Childbearing and Its Life Cycle Consequences: Exploiting a Very Natural Experiment"

John Cawley and **Edward Vytalacil**, University of Chicago, and **James J. Heckman**, NBER and University of Chicago, "The Optimal Policy to Reward the Value Added by Educators"

Sanders Korenman, NBER and Baruch College, and **Robert Kaestner** and **Theodore S. Joyce**, NBER and City University of New York, "The Effect of Pregnancy Intentions on Child Development"

Karen Norberg, NBER and Boston Medical Center, "Children's Medical and Psychological Well-being: Questions and Data Sources"

David M. Blau, NBER and University of North Carolina, "The Effect of Child Care Characteristics on Child Development"

Hu tests whether teenagers' decisions to leave or stay in welfare families respond predictably to welfare benefits. He uses a unique dataset that is particularly attractive in two ways: 1) variation in welfare benefits arises from a controlled social experiment in California; and 2) the longitudinal survey provides information on the whereabouts of all children, including those who have left the household. Hu finds that teenagers with children of their own respond to higher benefits by moving out of their parents' households. These findings imply that increasing income through welfare benefits has a perverse destabilizing effect on poor families and alters the share of income received by different family members.

Recent research has suggested that one of the important, life-cycle consequences of teen drinking is reduced scholastic achievement. Furthermore, it has been argued that state excise taxes on beer and minimum legal drinking ages (MLDA) can have a positive impact on educational attainment. **Dee** and **Evans** use the increases in the state MLDA during the late 1970s and 1980s as a source of variation in teen drinking, and data from the 1977–92 Monitoring the Future surveys, to demonstrate that teens who faced an MLDA of 18 were substantially more likely to drink than teens who faced a higher drinking age. Then using data from over 1.3 million respondents who belong to the 1960–9 birth cohorts in the 1990 Public-Use Microdata Sample, they find that changes in the MLDA had small and statistically insignificant effects on measures of educational attainment such as high school completion, college entrance, and college completion. The authors conclude that teen drinking does not have an independent effect on educational attainment.

Hotz and **Sanders** have been engaged in a series of research projects that attempt to exploit a "natural experiment" associated with human reproduction to measure the causal effects and costs of early childbearing. In these papers, they compare the behavior of teen mothers with that of women who became pregnant as teenagers but suffered a miscarriage. The results do not support the common belief that childbearing during adolescence places the young mothers on a path permanently fraught with adversity, although they do suggest that a young woman's life changes in substantial ways. Although failure to delay childbearing significantly reduces the likelihood that women will obtain a high school diploma, teen mothers have a higher probability than others of obtaining a general equivalency diploma. Teenage childbearing does not lead to a reduction in self-sufficiency or to an increase in dependence on government-sponsored public assistance programs, they find. While teenage childbearing does reduce earnings and increase welfare use for a few years after the birth of the first child, later in life, as her children age and as women who delayed childbearing begin to have children of their own, a teen mother becomes more likely to work, will earn more income, and is less likely to participate in government-sponsored public assistance programs. In fact, by her early thirties, a teenage mother has worked thousands more hours, and as a consequence has substantially higher wages, than if she had delayed childbearing. The authors find that very little of the approximately $11.3 billion the government spends on various forms of public assistance for teen mothers could be saved if all women who bore their first child as a teen were to delay that birth by three to four years. Furthermore, once one takes account of the increased tax revenues that teenage mothers provide through greater work effort, government would have higher net public assistance costs if all teen births were postponed.

One current educational reform seeks to reward the "value added" by teachers and schools based on the average change in pupil test scores over time. A key assumption of this policy is that socioeconomic outcomes are a linear function of test scores. Using the National Longitudinal Survey of Youth, **Cawley, Heckman,** and **Vytlacil** find a nonlinear relationship between test scores and (log) wages. They find no consistent pattern in the curvature of log wage returns to test scores. This implies that, used alone, the average gain in test scores is an inadequate measure of school performance.

Joyce, Kaestner, and **Korenman** investigate the causal link between unintended pregnancy and child health and development, and parental behaviors related to child health and development. Their primary motivation is that past studies may not have controlled adequately for the confounding effects of family and social background. To address this problem, they include an extensive set of controls. In addition, they exploit information on siblings to control for unobserved factors related to both child outcomes and pregnancy intentions. An interesting finding of the analysis is that unwanted pregnancy is associated with less healthy prenatal and postpartum behaviors, but has little association with infant health or child cognitive outcomes. Women whose pregnancies are unwanted are more likely to delay prenatal care, smoke during pregnancy, and are less likely to breast feed than women whose pregnancies are wanted. Despite these associations, women whose pregnancies are unwanted have infants of similar birth weight, and children that experience no apparent cognitive deficits as compared to children from wanted pregnancies.

Norberg gave an overview of the features of a large number (40+) of publicly available, nationally representative databases which have information pertaining to children's health. (This information is now available on the NBER web page: from the NBER home page, click on "online data," and from the online data page, select "links to child health data sets"; this will take you to a table which presents general features of the available surveys. The table also includes active links to websites containing more information: variable lists, ordering information, and the like for each dataset.) She also discussed the use of vital statistics in assessing newborn health. For example, many studies continue to use "low birth weight" as an indicator of newborn health and the quality of medical care. However, improved medical care may increase the survival of extremely premature infants, thus lowering average birthweight of "liveborn" infants. Improved medical care also may improve the nutritional status of newborns of any given gestational age, thus increasing average birthweight. Prematurity and weight-for-gestational-age are separable newborn health characteristics, with different causes and different health and developmental consequences. (The "child health" webpage will also include access to a down-loadable SAS file which will allow researchers to use birthweight, gestational age, gender and ethnicity to classify children's nutritional status at birth.)

Blau estimates the effect of group size, staff-child ratio, training, and other characteristics of child care on the behavioral and mental development of children using data from the National Longitudinal Survey of Youth. In contrast to the data used in most previous research on this subject, the sample of children is large and nationally representative, the data contain good measures of the home environment, and there are repeated measures of the child development outcomes of interest. The results show that child care characteristics have little association with child development on average. Associations are found for some groups of children, but they are as likely to be of the "wrong sign" as they are to be of the sign predicted in the developmental psychology literature.

Program Meeting on Labor Studies

Fifty members and guests of the NBER's Program in Labor Studies met in Cambridge on November 14 to discuss some of their recent research. Program Director Richard B. Freeman and Research Associate Lawrence F. Katz, both of NBER and Harvard University, organized the meeting at which the following papers were discussed:

Lawrence F. Katz; Jeffrey Kling, MIT; and **Jeffrey Liebman,** NBER and Harvard University, "Do Housing Mobility Programs Work? The Impact of Moving to Opportunity on Boston Families"

Bruce D. Meyer, NBER and Northwestern University, and **Dan T. Rosenbaum,** Northwestern University, "Welfare, the EITC, and Women's Labor Supply"

Eli Berman, NBER and Boston University, and **Zaur Rzakhanov,** Brandeis University, "Migration and Fertility"

David Card, NBER and University of California, Berkeley, and **Abigail Payne,** University of Toronto, "School Finance Reform, the Distribution of School Spending, and the Distribution of SAT Scores"

James J. Heckman, NBER and University of Chicago; **Lance Lochner,** University of Chicago; and **Christopher Taber,** Northwestern University, "Rising Wage Inequality and the Effectiveness of Tuition Subsidy Policies: Explorations with a Dynamic General Equilibrium Model of Labor Earnings"

Katz, Kling, and **Liebman** examine the short-run impacts of a change in residential neighborhood on the well-being of low-income families. They look at the experiences of 540 families at the Boston site of Moving To Opportunity (MTO), a demonstration program currently underway in five cities. Families in eligible public housing projects in high poverty Census tracts can apply to MTO and are assigned by lottery to one of three groups. The Experimental group receives some counseling assistance and a Section 8 rental subsidy that can be used to move to a Census tract that had a poverty rate of less than 10 percent in 1990. The Section 8 Comparison group receives a geographically unrestricted rental subsidy. The Control group continues in public housing and receives no new rental assistance or services. The authors find that one to three years after participants enter the program, both Experimental and Section 8 Comparison families are fairly successful in using their subsidies to move out of high poverty neighborhoods: 48 percent of Experimental and 58 percent of Section 8 Comparison families move through the program. The Experimental group is much more likely to move to suburban and other wealthier communities, while regular Section 8 assistance is modestly more effective in getting a larger share of families out of the most distressed communities. Families in all groups report that the primary reason they want to move out of public housing is fear of crime. The Experimental program appears to have been rather successful in addressing this major concern of the participants: participants surveyed from one to three years after program enrollment indicate much lower criminal victimization rates and much higher neighborhood safety than members of the Control group. The Section 8 program group shows somewhat more modest improvements in safety and reductions in criminal victimization. Further, employment rates and earnings levels of household heads in all groups have essentially doubled from 1994 to 1997. Also, children in the Experimental and Section 8 Comparison groups attend schools with substantially higher test scores, but there appears little difference among groups on reported absenteeism from school or hours spent on homework.

In recent years, there have been enormous changes in welfare and tax policy. In particular, there have been large expansions of the Earned Income Tax Credit (EITC) and Medicaid, changes in the Aid to Families with Dependent Children program, and in related training and child care programs. Many of the changes were intended to encourage low income women to work. **Meyer** and **Rosenbaum** examine the effects of these changes on the employment of single mothers. They find that a large share of the sharp increase in work by single mothers in recent years can be attributed to the EITC, with smaller shares for welfare benefit reductions and other changes in welfare programs.

Why do countries have large, persistent differences in fertility that are not explained by income levels or by women's labor force participation? Applying Becker's intergenerational utility function to an analysis of migration as investment, **Berman** and **Rzakhanov** argue that migration costs and differences in altruism induce positive selection. They compare members of a single birth cohort who migrated in different periods from Eastern Europe to Israel. Migrants in the early period when migration was more costly average 0.9 more children over their lifetime. A comparison with women migrating after their fertile years shows that positive selection accounts for about two thirds of this large difference in fertility rates.

Card and **Payne** study the effects of school finance reforms on the distribution of school spending across richer and poorer districts, and the consequences of spending equalization for the distribution of SAT scores across children from different family backgrounds. Using school district data from the 1977 and 1992 Censuses of Governments to measure the correlation between state funding per pupil and median family income in each district, they find that states where the school finance system was declared unconstitutional in the 1980s increased the relative funding of low-income districts. Using micro samples of SAT scores from this same period, they find some evidence that the equalization of spending across districts leads to a narrowing of test score outcomes across family background groups.

Heckman, Lochner, and **Taber** develop and estimate a model of labor earnings, skill formation, and physical capital accumulation with different levels of human capital. The model analyzes both schooling choices and post-school on-the-job investment in skills in a framework in which different schooling levels serve as an index for different skills. They find that immigration of low skill workers contributes little to rising wage inequality. When they extend their model to account for the Baby Boom generation, they find that the same estimates of the supply of human capital that can explain the wage history of the last 15 years also explain the last 35 years of wage inequality.

NBER Monetary Economists Meet

Nearly 50 members and guests of the NBER's Program on Monetary Economics, directed by N. Gregory Mankiw of NBER and Harvard University, met in Cambridge on November 14 to discuss the following papers:

Lawrence Christiano and **Martin S. Eichenbaum**, NBER and Northwestern University, and **Charles Evans**, Federal Reserve Bank of Chicago, "Modeling Money"
Discussant: Eric Leeper, Indiana University

Valerie Ramey, NBER and University of California, San Diego, and **Matthew D. Shapiro,** NBER and University of Michigan, "Costly Capital Reallocation and the Effects of Government Spending"
Discussant: Marianne Baxter, NBER and University of Virginia

Frederic S. Mishkin, NBER and Columbia University, and **Adam Posen,** Institute for International Economics, "Inflation Targeting: Lessons from Four Countries" (NBER Working Paper No. 6126)
Discussant: Anna J. Schwartz, NBER

Michael Woodford, NBER and Princeton University, "Doing Without Money: Controlling Inflation in a Post-Monetary World"
Discussant: William Dupor, University of Pennsylvania

Casey Mulligan, NBER and University of Chicago, and **Xavier Sala-I-Martin,** NBER and Columbia University, "Extensive Margins and the Demand for Money"
Discussant: John Shea, NBER and University of Maryland

Christiano, Eichenbaum, and **Evans** develop and implement a strategy for assessing the plausibility of monetary business cycle models which focuses on a model's ability to reproduce empirical estimates of actual economies' responses to monetary policy shocks. Based on their results with Ml, they argue that models in which monetary non-neutralities only reflect the effects of unanticipated movements in money will fail this test. But their limited participation model of money does not fail this test.

Changes in government spending often lead to significant shifts in demand across sectors. **Ramey** and **Shapiro** estimate the effects of military buildups on a variety of macroeconomic variables using a new measure of military shocks. The behavior of macroeconomic aggregates is consistent with the predictions of a multi-sector neoclassical model. In particular, consumption, real product wages and manufacturing productivity fall in response to exogenous military buildups in the post-World War II United States.

In recent years, a number of central banks have announced numerical inflation targets as the basis for their monetary strategies. After outlining the reasons why such strategies might be adopted in the pursuit of price stability, **Mishkin** and **Posen** examine the adoption, operational design, and experience of inflation targeting as a framework for monetary policy in the first three countries to undertake such strategies: New Zealand, Canada, and the United Kingdom. They also analyze the operation of the long-standing German monetary targeting regime, which incorporated many of the same features as later inflation-targeting regimes. The key challenge for all these monetary frameworks has been the appropriate balancing of transparency and flexibility in policymaking. This study finds that all of the targeting countries examined have maintained low rates of inflation and increased the transparency of monetary policymaking without harming the real economy through policy rigidity in the face of economic developments. A convergence of design choices on the part of targeting countries with regard to operational questions emerges from this comparative study, suggesting some lines of best practice for inflation-targeting frameworks.

Woodford shows that it is possible to analyze equilibrium inflation determination without any reference to either money supply or demand, as long as one specifies policy in terms of a "Wicksellian" interest-rate feedback rule. His central result is a theorem that shows the existence, for a simple monetary model, of a well-behaved "cashless limit" in which the money balances held to facilitate transactions become negligible. The determination of equilibrium inflation in the cashless limit also provides a useful approximation of the case of an economy in which monetary frictions are present, but small, or in which monetary frictions vary over time, which may result in substantial instability of money demand in percentage terms. Inflation in the cashless limit is a function of the gap between the "natural rate" of interest, determined by the supply of goods and opportunities for intertemporal substitution, and a time-varying parameter of the interest-rate rule indicating the tightness of monetary policy. Inflation can be completely stabilized, in principle, by adjusting the policy parameter so as to track variation in the natural rate.

Mulligan and **Sala-I-Martin** argue that the relevant decision for the majority of U.S. households is not the fraction of assets to be held in interest bearing form, but whether to hold any such assets (we call this "the decision to adopt" the financial technology). They show that the key variable governing this decision is the product of the interest rate times the total amount of assets. The implication is that, instead of studying money demand using time series and looking at historical interest rate variations, one can look at a cross-section of households and analyze variations in the amount of assets held. The authors find that the elasticity of money demand is very small when the interest rate is low; the probability that a household holds any amount of interest bearing assets is related positively to the level of financial assets; and the cost of adopting financial technologies is related positively to age and negatively to the level of education. The finding that the elasticity is very small for interest rates below 5 percent suggests that the welfare costs of inflation are small. At interest rates of 6 percent, the elasticity is close to 0.5, and roughly one half of this elasticity can be attributed to the Baumol-Tobin or intensive margin, and half of it can be attributed to the new adopters or extensive margin. The intensive margin is less important at lower interest rates and more important at higher interest rates.

Behavioral Macroeconomics Discussed in Cambridge

Members and guests of the NBER's Project on Behavioral Macroeconomics gathered in Cambridge on November 15 to discuss a number of recent papers. The meeting, organized by George A. Akerlof of University of California, Berkeley, and Robert J. Shiller of NBER and Yale University, centered on these topics:

B. Douglas Bernheim, NBER and Stanford University; **Jonathan Skinner**, NBER and Dartmouth College; and **Steven Weinberg**, Stanford University, "What Accounts for the Variation in Retirement Wealth Among U.S. Households?" (NBER Working Paper No. 6227)
Discussant: Laurence J. Kotlikoff, NBER and Boston University

Peter A. Diamond, NBER and MIT, and **Daniel Kahneman**, Princeton University, "Wealth Illusion"
Discussant: Richard H. Thaler, NBER and University of Chicago

Rafael Di Tella, Harvard University; **Robert MacCulloch**, Oxford University; and **Andrew Oswald**, University of Warwick, "The Macroeconomics of Happiness"
Discussant: Benjamin M. Friedman, NBER and Harvard University

Robert J. Shiller, "Indexed Units of Account: Theory and Assessment of Historical Experience"
Discussant: Gil Mehrez, Georgetown University

David Laibson, NBER and Harvard University, "Hyperbolic Discount Functions and Time Preference Heterogeneity"
Discussant: John Shea, NBER and University of Maryland

Ernst Fehr, University of Zurich, and **Jean Robert Tyran**, University of St. Gallen, "Does Money Illusion Matter?"
Discussant: George A. Akerlof

(Continued on next page)

Household survey data consistently depict large variations in saving and wealth, even among households with similar socioeconomic characteristics. Within the context of the life cycle hypothesis, families with identical lifetime resources might choose to accumulate different levels of wealth for a variety of reasons, including variation in time preference rates, risk tolerance, exposure to uncertainty, relative tastes for work and leisure at advanced ages, income replacement rates, and so forth. These factors can be divided into a small number of classes, each with a distinctive implication concerning the relation between accumulated wealth and the shape of the consumption profile. By examining this relation empirically, one can test for the presence or absence of these particular explanations for differences in wealth. Using the Panel Study of Income Dynamics and the Consumer Expenditure Survey, **Bernheim, Skinner,** and **Weinberg** find very little support for life cycle models that rely on the above factors to explain wealth variation. The data are, however, consistent with "rule of thumb" or "mental accounting" theories of wealth accumulation.

"Wealth illusion" refers to the tendency of some people to overvalue a stock of wealth relative to the income flow it can finance. **Diamond** and **Kahneman** report on a pilot study that asked people about the wealth and annuitized real income needed for an adequate retirement income for a couple described to them. Among the preliminary results of the pilot study are: 1) The coefficient of variation tended to be larger for the wealth question than the income question, reflecting the greater difficulty in thinking about the wealth needed for retirement than the income needed for retirement. 2) A sizable fraction of the population implicitly priced annuities in a way that was considerably off a reasonable market price, although many people were in a reasonable range. The sequence of questions asked affected the answers. 3) Women tended to have lower wealth answers for a given income question than men. 4) People in the highest income bracket tended to have higher wealth answers relative to lower income people.

Di Tella, MacCulloch, and **Oswald** use data on the reported well-being levels of approximately one quarter of a million randomly sampled Europeans and Americans from the 1970s to the 1990s. After controlling for personal characteristics, year dummies, and country fixed effects, they find that the data trace out a function that is approximately a linearly additive "misery index." They also calculate the implied dollar value of a low inflation rate, and examine the structure of happiness equations across countries and time.

Shiller discusses the Unidad de Fomento (UF), an indexed unit of account, which has been used in Chile since 1967, and which has been copied in Colombia, Ecuador, Mexico, and Uruguay. The UF is a sort of money that has guaranteed real purchasing power, although it is not a currency and is not used as a medium of exchange. Shiller argues that important practical problems in implementing indexation are solved by creating such units of account. The use of the units in wagesetting need not be inflationary, if the units are defined properly.

Studies of animal and human behavior suggest that discount functions are approximately hyperbolic. **Laibson** integrates the literature on hyperbolic preferences with the literature on buffer stock consumption behavior, and uses this relationship to show that measured levels of patience in this economy exhibit a substantial degree of variation, both across individuals, and within a single individual's lifespan. He predicts that measured levels of patience will increase with wealth and age. The variation arises because the effective horizons of consumers also vary over the life-cycle of a buffer stock consumer. For hyperbolic consumers, long-horizons are associated with choices that appear patient, while short horizons are associated with choices that appear impatient. By contrast, consumers with exponential discount functions make equilibrium choices which are uniformly patient and exhibit no interpersonal or intrapersonal variation.

"Money illusion" means that people behave differently when the same objective situation is represented in nominal versus real terms. To examine the behavioral impact of money illusion, **Fehr** and **Tyran** study the adjustment process of nominal prices after a fully anticipated negative nominal shock in an experimental setting with strategic complementarity. They show that seemingly innocuous differences in payoff presentation cause large differences in behavior. In particular, if the payoff information is presented to subjects in nominal terms, then price stickiness and real effects are much more pronounced than when payoff information is presented in real terms. The driving force behind differences in real outcomes is that subjects expect much more nominal inertia in the nominal payoff condition. Because of strategic complementarity, these expectations induce subjects to adjust rather slowly to the shock.

Corporate Finance Meeting

The NBER's Program on Corporate Finance, directed by Robert Vishny of the University of Chicago, met in Cambridge on November 21 to discuss the following papers:

Rafael LaPorta, Harvard University; **Florencio Lopez de Silanes** and **Andrei Shleifer,** NBER and Harvard University; and **Robert W. Vishny,** "Agency Problems and Dividend Policies Around the World"
Discussant: Kose John, New York University

Josef Lakonishok, NBER and University of Illinois, and **Inmoo Lee,** Case Western Reserve University, "Are Insiders' Trades Informative?"
Discussant: Joshua Lerner, NBER and Harvard University

Zsuzsanna Fluck, New York University; **Douglas Holtz-Eakin,** NBER and Syracuse University; and **Harvey S. Rosen,** NBER and Princeton University, "Where Does the Money Come From? The Financing of Small Entrepreneurial Enterprises"
Discussant: Mitchell Petersen, Northwestern University

Armando Gomes, University of Pennsylvania, "Going Public with Assymetric Information, Agency Costs and Dynamic Trading"
Discussant: Jeremy C. Stein, NBER and MIT

Charles Himmelberg and **Darius Palia,** Columbia University, and **R. Glenn Hubbard,** NBER and Columbia University, "Understanding the Determinants of Managerial Ownership and the Link Between Ownership and Performance"
Discussant: Karen Wruck, Harvard University

LaPorta and his coauthors analyze why firms pay dividends, the so-called "dividend puzzle," from the agency perspective. They outline two agency models of dividends: 1) "the outcomes" model, in which dividends are the result of effective pressure by minority shareholders to force corporate insiders to disgorge cash—in this model, stronger minority shareholder rights should be associated with higher dividends; and 2) "the substitutes" model, in which insiders choose to pay dividends to establish a reputation for decent treatment of minority shareholders, so that firms can raise equity finance in the future. Under this model, stronger minority shareholder rights reduce the need for establishing a reputation, and should be associated with lower dividends. The authors compare these models on a cross-section of 4,000 companies from around the world, in countries with different levels of investor protection, and therefore different strength of minority shareholder rights. Their findings on payout levels, as well as other results, support the outcomes model of dividends.

Lakonishok and **Lee** document insider trading activities of all companies listed on the NYSE, Amex, and Nasdaq exchanges during 1975–95. Insiders on average purchase shares worth 0.6 percent, and sell shares worth 1.3 percent, of their companies market capitalization each year. Large shareholders trading is much less frequent than, but its dollar volume is comparable to, managers' trading. In general, there is very little market movement in the period immediately around insiders trading; insiders in the aggregate are contrarian investors. However, they predict market movements better than a pure contrarian strategy. Insiders' purchases are better predictors of future long-term stock returns than insiders' sales. In addition, insiders' activities in smaller firms are more informative than their activities in larger firms.

Using data from the Wisconsin Entrepreneurial Climate Study, **Fluck, Holtz-Eakin,** and **Rosen** study the sources of finance during the very early stages of firms lives. They focus on the evolution of the mix of financial capital from "insiders" and "outsiders" as firms age. They find that at the beginning of firms' life cycles, the proportion of funds from internal sources increases with age, while the proportion from banks, venture capitalists, and private investors declines. There is also evidence that these patterns eventually reverse themselves, with the proportion of insider finance ultimately declining and the proportion of outsider finance increasing with age. These findings are consistent with elements of both reputation-based and monopoly-lender theories of firm finance.

Gomes studies the problem of going public in the presence of moral hazard, adverse selection, and multiple trading periods. In the multiperiod game, managers strategically choose the level of extraction of private benefits and can develop a good reputation for expropriating low levels of private benefits. The costs of going public can be reduced significantly because of this reputation effect, and this can be an important factor in sustaining emerging stock markets that offer weak protection to minority shareholders. Also, allowing controlling managers to issue nonvoting shares can increase the stock market efficiency, because the reputation effect is stronger when managers can divest more without losing control.

Firms are governed by a network of relationships representing, for example, contractual arrangements for financing, capital structure, and managerial ownership and compensation. Accordingly, it is difficult to focus on a single such arrangement and to identify the correspondence between the contractual choice and firm performance (as measured by accounting rates of return, or Tobin's Q, for example). Contractual choices and performance outcomes are determined endogenously by exogenous (and, in some case, unobserved) changes in the firm's contracting environment. **Himmelberg, Hubbard,** and **Palia** confront this problem in the context of the firm's compensation contract for managers. Because managerial equity stakes are an important and well-known mechanism used to align the incentives of management with ownership, the authors examine the determinants of managerial ownership as a function of the contracting environment. They find that managerial ownership is explained by key variables in the contracting environment and that, once they control for observed firm characteristics and firm fixed effects, there is no effect of changes in firm managerial ownership on performance.

Productivity Program Meeting

NBER Research Associates John C. Haltiwanger, University of Maryland; Ariel Pakes, Yale University; and Mark J. Roberts, Pennsylvania State University, organized the most recent meeting of the NBER's Program on Productivity. The agenda for the December 12 gathering was:

Michael Greenstone, Princeton University, "The Marginal Effects of Environmental Regulations on the Manufacturing Sector: Evidence from the 1970 and 1977 Clean Air Amendments"
Discussant: Christopher Timmins, Yale University

Randy Becker, Brown University, and **J. Vernon Henderson,** NBER and Brown University, "Effects of Air Quality Regulations on Polluting Industries" (NBER Working Paper No. 6160)
Discussant: Robert Schwab, University of Maryland

Sofronis Clerides, Yale University; **Saul Lach,** NBER and Hebrew University; and **James Tybout,** Georgetown University, "Is Learning-by-Exporting Important? Microdynamic Evidence from Colombia, Mexico, and Morocco"
Discussants: Andrew Bernard, NBER and Yale University, and Jensen, Carnegie-Mellon University

Lanier Benkard, Yale University, "Learning and Forgetting: the Dynamics of Aircraft Production"
Discussant: Dennis Epple, Carnegie-Mellon University

Brent Boning, Carnegie-Mellon University; **Casey Ichniowski,** NBER and Columbia University; and **Kathryn Shaw,** NBER and Carnegie-Mellon University, "Incentive Pay for Production Workers: An Empirical Analysis"
Discussant: George Baker, Harvard University

Sandra E. Black, Federal Reserve Bank of New York, and **Lisa M. Lynch,** NBER and Tufts University, "The Impact of Workplace Practices and Information Technology on Productivity"
Discussant: Steven Olley, NBER and Georgetown University

Greenstone presents new evidence on the impact of federal environmental laws on the manufacturing sector by using pollution categories established by the EPA after the passage of the Clean Air Act Amendments of 1970. Specifically, the EPA designated high or low regulation status for four pollutants to each county, depending upon whether the national air quality standards were met there. Controlling for a wide set of factors, including transitory shocks to polluting industries and plant characteristics, Greenstone finds that a county's pollutant-specific high-regulation designation significantly affected the growth of employment, the rate of net investment, and the growth of shipments of polluting plants relative to non-polluting ones. Moreover, the effects differed across the four regulations and across plants decisions to enter, exit, expand or contract.

Using plant data for 1963 to 1992, **Becker** and **Henderson** examine the unintended effects of air quality regulation on decisions of major polluters. A key regulatory tool since 1978 is the annual designation of county air quality attainment status, where non-attainment status triggers specific equipment requirements for new and existing plants. In the later years of regulation, nonattainment status reduces expected "births" in polluting industries by 40–50 percent, resulting in a shift of polluting activity to cleaner, less populated attainment areas. Starting in the 1970s, effects appear first for industries with bigger plant sizes and then, within industries, first for corporate plants relative to the much smaller non-affiliate, or single-plant firm sector. In all industries, non-affiliates face less regulation than the bigger corporate plants, resulting in a permanent shift away from corporate plant production in some industries. Older plants benefit from grandfathering provisions, greatly enhancing survival probabilities. Finally, the negotiation and permitting process under regulation appears to induce much greater up-front investments by new plants, so that, in non-attainment areas, regulation induces 50–100 percent increases in initial plant sizes compared to attainment areas. But for plants over 10 years of age there are no size differences.

Do firms become more efficient after becoming exporters? Do exporters generate positive externalities for domestically-oriented producers? **Clerides, Lach,** and **Tybout** tackle these questions by analyzing the causal links between exporting and productivity using plant-level data. They look for evidence that cost processes of firms change after they break into foreign markets. They find that relatively efficient firms become exporters; however, in most industries, firms' costs are not affected by previous exporting activities. So the well-documented positive association between exporting and efficiency is explained by the self-selection of the more efficient firms into the export market. They also find some evidence of positive regional externalities.

Benkard introduces a new cost dataset for a commercial aircraft firm and uses it to analyze the dynamics of learning in commercial aircraft production. The dataset is not consistent with the simple learning hypothesis, and particularly the prediction that a firm's unit cost must decline with its cumulative production. Instead, there is strong support for the hypothesis of *organizational forgetting,* a slightly more general learning model in which unit costs are similarly dependent on a firm's past production experience, but where that experience depreciates over time.

The use of group-based incentive pay and problem-solving teams is increasingly common in manufacturing, yet there is little analysis that assesses the value of these practices. **Boning, Ichniowski,** and **Shaw** begin their assessment by developing a simple model in which employees decide on effort levels in two possible tasks: producing output and working on problem-solving teams. They show that the gains to these innovative incentive practices are likely to vary across different manufacturing environments. Using data from steel minimill production lines, they find that incentive plans and problem-solving efforts raise performance on the production line. However, problem-solving is most effective in mills that have more complex production processes.

Using data from a unique nationally representative sample of businesses, the Educational Quality of the Workforce National Employers Survey, matched with the Bureau of the Census Longitudinal Research Database, **Black** and **Lynch** examine the impact of workplace practices, information technology, and human capital investments on productivity. They use both cross section and panel data covering 1987–93, and find that what is associated with higher productivity is not so much whether or not an employer adopts a particular work practice, but rather how that work practice is actually implemented within the establishment. In addition, their results suggest that those unionized establishments that have adopted what have been called new or "transformed" industrial relations practices that promote joint decisionmaking, coupled with incentive-based compensation, have higher productivity than other similar non-union plants, while those businesses that are unionized but maintain more traditional labor management relations have lower productivity. They also find that the higher the average educational level of production workers or the greater the proportion of non-managerial workers who use computers, the higher is plant productivity.

Current Working Papers

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NBER Working Papers

Trade and Environment: Bargaining Outcomes from Linked Negotiations

Lisandro Abrego, Carlo Perroni, John Whalley, and Randall M. Wigle

NBER Working Paper No. 6216
October 1997
International Trade and Investment

Recent literature has explored both physical and policy linkage between trade and the environment. We explore linkage through leverage in bargaining, whereby developed countries can use trade policy threats to achieve improved environmental management in a developing country, while developing countries can use environmental concessions to achieve trade discipline in developed countries. We use a global numerical simulation model to compute bargaining outcomes from linked trade and environment negotiations, comparing developed-developing country bargaining only on trade policy with joint bargaining on both trade and domestic environmental policies. Our results indicate joint gains from expanding the trade bargaining set to include the environment, as opposed to the current developing country reluctance to negotiate in the World Trade Organization on this issue. However, compared to bargaining with cash side payments, linking trade and the environment through negotiation on policy instruments provides significantly inferior developing country outcomes. Thus, a trade and environment policy-linked negotiation may be better than an environment-only negotiation, but negotiating compensation to developing countries for environmental restraint would be better still. We provide sensitivity and other analysis of our results and indicate what factors could qualify our main finding, including the erosion of the most favored nation principle involved with environmentally based trade actions.

A House of Her Own: Old Age Assistance and the Living Arrangements of Older Nonmarried Women

Dora L. Costa

NBER Working Paper No. 6217
October 1997
JEL Nos. J14, N12
Aging, Development of the American Economy

I show that the trend towards single households among older nonmarried women, the majority of whom were widows, has been ongoing only since 1940. I investigate the factors that fostered the rise in separate living quarters since the middle of this century by examining the impact of Old Age Assistance on living arrangements in 1940 and 1950. I find that Old Age Assistance substantially increased the demand for separate living quarters, but that demand depended upon the rules of the program, in particular whether children were held legally responsible for the care of their aged parents. I argue that almost half of the decline in the fraction of older nonmarried women living with relatives from 1950 to 1990 can be attributed to rising Social Security benefits and expanded eligibility and to the fact that Social Security benefits were given with no strings attached.

Gradual Incorporation of Information into Stock Prices: Empirical Strategies

Sara Fisher Ellison and Wallace P. Mullin

NBER Working Paper No. 6218
October 1997
JEL Nos. G1, G14, C1, L00
Asset Pricing

This paper explores environments in which either the revelation or diffusion of information, or its incorporation into stock prices, is gradual. We also develop appropriate estimation techniques. Our paper has implications both for event study methodology and for understanding the process by which stock prices incorporate information. We highlight two environments.

First, information often is not revealed in one announcement but rather through a process of gradual public revelation, which may not

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Journal of Economic Literature (JEL) subject codes, when available, are listed after the date of the paper, followed by the program(s) of research represented by each paper. Papers not associated with an NBER program are listed as Miscellaneous. All Historical Factors in Long-Run Growth Papers are in the Development of the American Economy program.

Abstracts of all papers issued since October 1997 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.

be completely observable by a researcher. We examine the effect of the evolution of the Clinton health care reform proposal on pharmaceutical stock prices. We estimate by isotonic regression the expected path of market-adjusted pharmaceutical prices over September 1992–October 1993, and find that the major portion of the decline in stock prices occurred gradually, and did not correspond to identified news events.

Second, the trading process itself may incorporate private information into stock prices gradually. That is an implication of the Kyle [1985] model, in which one or a small number of informed traders use their market power over their private information to maximize profits dynamically. We use the functional form predictions from Kyle in our estimation, and the results from a sample of targets of tender offers are consistent with the model.

Discount Rate Heterogeneity and Social Security Reform

Andrew A. Samwick

NBER Working Paper No. 6219
October 1997
JEL Nos. H55, E21
Aging and Public Economics

As many countries consider the privatization of existing pay-as-you-go social security systems, the option to make participation in the new system voluntary may appeal to policymakers who need to have the political support of workers. One critical issue in evaluating such a reform and its economic consequences, though, is the extent of unknown differences in households' preferences for consumption. I estimate the distribution of rates of time preference from the wealth data in the 1992 Survey of Consumer Finances using a flexible life-cycle model of consumption under income uncertainty. I then apply this estimated distribution to a variety of reform proposals that incorporate a voluntary choice of how much to contribute to a dedicated retirement account and a rebate of the existing payroll tax that increases with the magnitude of the contribution. My main finding is that an appropriate menu of reform plans can induce the voluntary buyout of 84 percent of existing payroll taxes at an immediate cost to national saving of less than 0.25 percentage point.

The Misallocation of Housing Under Rent Control

Edward L. Glaeser and Erzo F. P. Luttmer

NBER Working Paper No. 6220
October 1997
JEL Nos. R20, D45, H80
Public Economics

When there are binding price controls, there are shortages, and the allocation of goods across consumers may not be efficient. In general, the costs of price controls in terms of misallocation are first order, while the classic welfare losses attributable to undersupply are second order. We present an empirical methodology for estimating the degree of misallocation of housing units caused by rent control in New York City. This methodology involves comparing the relative consumption of different demographic groups within the rent controlled area with the relative levels of consumption in a free market area. Our best estimate of the costs of rent control in New York attributable to the misallocation of rental apartments is $200 per apartment annually.

Jobless Growth: Appropriability, Factor Stabilization, and Unemployment

Ricardo J. Caballero and Mohamad L. Hammour

NBER Working Paper No. 6221
October 1997
JEL Nos. E0, E2, J6, O3
Economic Fluctuations and Growth

A central determinant of the political economy of capital-labor relations is the appropriability of specific quasi-rents. This paper is concerned with the general-equilibrium interaction of appropriability and the characteristics of technology: namely, the embodiment of technology in capital, and substitutability between capital and labor in the technological menu. Technological embodiment means that the supply of capital is effectively much less elastic in the short than in the long run, and therefore is more exposed to appropriability. Technology choice implies that an attempt at appropriating capital will induce a substitution away from labor in the long run, and this constitutes a mechanism for thwarting appropriation. Shifts in European labor relations in the last three decades offer a good laboratory for exploring the empirical relevance of those mechanisms. The evolution of the labor share, the profit rate, the capital/output ratio, and unemployment—which we examine more particularly in the case of France—appears highly supportive.

Option Hedging Using Empirical Pricing Kernels

Joshua V. Rosenberg and Robert F. Engle

NBER Working Paper No. 6222
October 1997
Asset Pricing

We develop a method for option hedging which is consistent with time-varying preferences and probabilities. The preferences are expressed in the form of an empirical pricing kernel (EPK), which measures the state price per unit probability. Probabilities are derived from an estimated stochastic volatility model of the form GARCH components with leverage. We estimate state prices using the flexible risk-neutral density method of Rosenberg [1995] and a daily cross-section of option premiums. Time-varying preferences over states are linked to a dynamic model of the underlying price of a one-day ahead forecast of derivative price distributions and minimum variance hedge ratios.

Our empirical results suggest that risk aversion over S&P500 return states is substantially higher than risk aversion implied by Black-Scholes state prices and probabilities using long-run estimates of S&P500 return moments. We also find that the daily level of risk aversion is strongly positively autocorrelated, negatively correlated with S&P500 price changes, and positively correlated with the spread between implied and objective volatilities.

Hedging results reveal that typical hedging techniques for out-of-the-money S&P500 index options, such as Black-Scholes or historical minimum variance hedging, are inferior to the EPK hedging method. Thus, time-varying preferences and probabilities appear to be an important factor in the day-to-day pricing of S&P500 options.

Trade and Security, I: Anarchy

James E. Anderson and Douglas Marcouiller

NBER Working Paper No. 6223
October 1997
JEL Nos. D7, F1
International Trade and Investment

Market exchange is subject to an endogenously determined level of predation which impedes specialization and gains from trade. We construct a model in which utility-maximizing agents choose between careers in production and careers in predation. Three types of equilibrium may emerge: autarky (with no predation and no defense); insecure exchange equilibriums (with predation and defense); and secure exchange equilibriums (in which defense completely deters predation). Trading equilibriums, two thirds of them secure, are supported only in a narrow range of security parameter values. Since changes in the technologies of defense and predation have terms-of-trade effects, some producers may be hurt by enhanced security. We show cases of "immiserizing security" in which producers in large poor countries are harmed by increased security.

Both Sides of Corporate Diversification: The Value Impacts of Geographic and Industrial Diversification

Gordon M. Bodnar, Charles Tang, and Joseph Weintrop

NBER Working Paper No. 6224
October 1997
JEL Nos. F3, G3
International Finance and Macroeconomics

We examine the effect of geographic and industrial diversification on firm value for a sample of over

20,000 (firm-year) observations of U.S. corporations from 1987–93. We find that the average value of a firm with international operations is 2.2 percent higher than that of comparable domestic single-activity firms, while the average value of a firm with activities in multiple industrial segments is 5.4 percent lower than a portfolio of comparable focused domestic firms in similar activities. More importantly, we demonstrate that failure to control simultaneously for both dimensions of diversification results in overestimation of the negative value impact of industrial diversification, but has little impact on estimates of the positive value impact of geographic diversification.

Consumption Versus Production of Insurance

Tomas Philipson and George Zanjani

NBER Working Paper No. 6225
October 1997
JEL No. I1
Health Care

Many forms of insurance are produced by groups themselves rather than purchased in the market. For example, coverage for workers' compensation provided by employers often is produced by the employer, in the sense that the employer bears some or all of the financial risk associated with the insurance. We generalize the theory of insurance to analyze what factors determine whether groups produce insurance internally by self-insuring or instead consume it by purchasing coverage in the market. The theory makes cross-sectional predictions on which firms will choose to produce insurance, as well as on how prices and loss experience will vary with the production decision. The theory also predicts which lines of insurance are likely to be associated with internal production and which lines will have coverage provided entirely by the market. Furthermore, we analyze the time-series properties of claims under various degrees of internal production, and reveal a more pronounced lag structure for claims under partial riskbearing than under full self-insurance or market insurance. These predictions are generated by a fundamental diseconomy of scale that offsets the standard scale economy associated with risk-pooling. The tradeoff facing a group in its make-or-buy decision is that self-insurance rewards self-protection but forgoes the pooling of risk with members outside the group.

The Surprising Symmetry of Gross Job Flows

Christopher L. Foote

NBER Working Paper No. 6226
October 1997
JEL No. E32
Labor Studies and Monetary Economics

A large literature attempts to explain the asymmetric behavior of job destruction and job creation over the business cycle. This paper contends that much of this asymmetry is spurious. Analyzing gross flows in relation to the net flow virtually eliminates cyclical asymmetry in annual data and substantially reduces it in quarterly data. To the extent that gross flows are symmetric, there is a fundamental identification problem in moving between gross flows and the net flow that is reminiscent of the earlier empirical literature on sectoral shifts.

What Accounts for the Variation in Retirement Wealth Among U.S. Households?

B. Douglas Bernheim, Jonathan Skinner, and Steven Weinberg

NBER Working Paper No. 6227
October 1997
JEL Nos. E2, D1
Aging and Public Economics

Household survey data consistently depict large variations in saving and wealth, even among households with similar socioeconomic characteristics. Within the context of the life-cycle hypothesis, families with identical lifetime resources might choose to accumulate different levels of wealth for a variety of reasons, including variation in time preference rates, risk tolerance, exposure to uncertainty, relative tastes for work and leisure at advanced ages, income replacement rates, and so forth. These factors can be divided into a small number of classes, each with a distinctive implication for the relationship between accumulated wealth and the shape of the consumption profile. By empirically examining this relation, one can test for the presence or absence of particular explanations for differences in wealth. Using the Panel Study of Income Dynamics and the Consumer Expenditure Survey, we find very little support for life-cycle models that rely on these factors to explain variation in wealth. However, the data are consistent with "rule of thumb" or "mental accounting" theories of wealth accumulation.

Evaluating Density Forecasts of Inflation: The Survey of Professional Forecasters

Francis X. Diebold, Anthony S. Tay, and Kenneth F. Wallis

NBER Working Paper No. 6228
October 1997
JEL Nos. E3, C1
Economic Fluctuations and Growth

Since 1968, the Survey of Professional Forecasters has asked respondents to provide a complete probability distribution of expected future inflation. We evaluate the adequacy of those density forecasts using the framework of Diebold, Gunther, and Tay [1997]. The analysis reveals several interesting features, and several deficiencies of the density forecasts in relation to realized inflation. The probability of a large negative inflation shock generally is overestimated, and in more recent years the probability of a large shock of either sign is overestimated. Inflation surprises are serially correlated, although agents eventually adapt. Expectations of low inflation are associated with reduced uncertainty. The results suggest several promising directions for future research.

The Value of Children and Immigrants in a Pay-As-You-Go Pension System: A Proposal for a Partial Transition to a Funded System

Hans-Werner Sinn

NBER Working Paper No. 6229
October 1997
JEL Nos. H55, J6
Public Economics

I show that the net fiscal externality created by an additional member of a pay-as-you-go pension system that is endowed with individual accounts equals the gross contributions of this member. In Germany, this is an amount of about DM 175,000. I use this information to design a hybrid funded system that avoids this externality and improves the public pension system under equity and efficiency considerations.

Business Cycles Observed and Assessed: Why and How They Matter

Victor Zarnowitz

NBER Working Paper No. 6230
October 1997
JEL Nos. E32, E37
Economic Fluctuations and Growth

Business cycles on the whole are well defined and described, yet they have no generally accepted explanation. Whether in spite of, or because of, proliferation of abstract and fragmented models in this field, the theory of business cycles is long on questions but short on answers. Natural disasters and then financial crises constituted the earliest perceived reasons for economic instability. Classical literature on the subject, developed in the second half of the nineteenth and first half of the twentieth century favored for the most part the concept of self-sustaining or endogenous fluctuations, but recent models again stress outside factors and exogenous random shocks.

In an ideal world under the assumptions of perfect competition, flexible prices, national expectations, and money neutrality, there is room for real business cycles because of shocks to technology and possibly also shocks to tastes, relative prices, and fiscal variables. In the real world, however, there is ample evidence that many sticky prices and wages coexist with many flexible prices and wages. Movements in levels of prices can be stabilizing, even while movements in expected changes of prices are destabilizing. Cyclical movements in nominal aggregates point to the role of money. The premise of passive money clashes with the popular view that monetary policy is highly important. The lesson of recent history is that monetary factors influence the course of economic activity along with real and expectational variables.

There are incentives for learning how to avoid biased forecasts, but data and models are not good enough to assure that rational expectations are achieved and maintained. Individuals' rational plans are not necessarily collectively consistent. Unstable and adverse conditions can exist even under the extreme assumptions of perfect flexibility of all prices and perfect foresight.

Highly aggregative models, while attractively simple and articulated, are not able to deal with the diversity of causes and consequences of business cycles. Disaggregation is essential for theories that emphasize endogenous processes of spending, saving, borrowing, and investing.

Trend and cycles are interrelated and have common causes. Periods and countries with *high* growth had *low* instability.

Certain variables have long been critically important in business cycles, as shown by historical studies within and across countries: profits, investment, interest rates, money, and credit. Leads and lags, nonlinearities and asymmetries, also had demonstrably eminent roles, which they retain. Multiple-shock models are superior to single-shock models.

Finally, recessions have high social costs in terms of unemployment and depressed growth. Expansions can also be costly by causing imbalances and excesses. Structural and policy problems may seem to be separable from these cyclical problems but often are not.

Trade versus Investment Liberalization

James R. Markusen

NBER Working Paper No. 6231
October 1997
JEL Nos. F12, F23
International Trade and Investment

Despite several theoretical contributions and considerable informal empirical evidence to the contrary, the notion that trade and investment are substitutes persists in trade policy analysis. This paper considers the liberalization of commodity trade versus liberalization that allows direct investment versus the two together. For an economy with a relative scarcity of skilled labor, trade and investment liberalization are quite different, and the two together in a sense are complements. The intuition may be that direct investment provides such a country with crucial inputs (knowledge-intensive producer services) without which the country cannot effectively exploit its abundant factors in certain industries.

Liberalization and Incentives for Labor Migration: Theory with Applications to NAFTA

James R. Markusen and Stephen Zahniser

NBER Working Paper No. 6232
October 1997
JEL Nos. F22, F15
International Trade and Investment

One of the motivations for NAFTA from the U.S. point of view was to reduce the incentives for Mexican migration into the United States. Unskilled rural males are a primary source of illegal immigration and are also Mexico's relatively abundant factor. This group therefore should be made better off by trade and investment liberalization, according to the traditional Heckscher-Ohlin model. Existing evidence, along with the best guesses of many experts in the area, suggest that NAFTA is unlikely to have a significant positive impact on this group, at least not within the time frame of several decades. We draw on a number of recent theoretical contributions in order to offer reasons why NAFTA may not raise the wages of unskilled Mexican workers.

A Strategy for Launching the Euro

Maurice Obstfeld

NBER Working Paper No. 6233
October 1997
JEL Nos. F31, F33, E42
International Finance and Macroeconomics

This paper analyzes the constraints that European Union (EU) law places on the January 1, 1999 choices of irrevocably fixed conversion rates between the Euro and the currencies of European Monetary Union (EMU) member states. Current EU legislation, notably the Maastricht treaty, requires that the bilateral currency conversion factors implied by the January 1, 1999 choices equal closing market exchange rates on December 31, 1998. Given that legal constraint, there still exist several strategies for choosing the relative prices of EMU member currencies against the Euro. Unfortunately, most of these have potentially damaging side effects. One approach, based on official Stage 2 offers of contingent Euro-forward contracts with value dates at the start of Stage 3, allows a highly credible preannouncement of the bilateral currency conversion factors to be set at the start of EMU. That approach assumes, however, that no prospective EMU members can withdraw between their selection in May 1998 and the start of Stage 3.

The Determinants and Implications of Corporate Cash Holdings

Tim Opler, Lee Pinkowitz, René Stulz, and Rohan Williamson

NBER Working Paper No. 6234
October 1997
Corporate Finance

We examine the determinants and implications of holdings of cash and marketable securities by publicly traded U.S. firms in the 1971–94 period. Firms with strong growth opportunities and riskier cash flows hold relatively high ratios of cash to total assets. Firms that have the greatest access to the capital markets (for example, large firms and those with credit ratings) tend to hold lower ratios of cash to total assets. These results are consistent with the view that firms hold liquid assets in order to insure that they will be able to keep investing when cash flow is too low relative to planned investment and when outside funds are expensive. The short-run impact of excess cash on capital expenditures, acquisition spending, and payouts to shareholders is small. The main reason that firms experience large changes in excess cash is the occurrence of operating losses. There is no evidence that risk management and cash holdings are substitutes.

Firm-level Evidence on Productivity Differentials, Turnover, and Exports in Taiwanese Manufacturing

Bee Yan Aw, Xiaomin Chen, and Mark J. Roberts

NBER Working Paper No. 6235
October 1997
JEL Nos. O12, D24
Productivity

The manufacturing sector in Taiwan has a market structure with large numbers of small firms, a heavy focus on less capital-intensive industries, and a dense network of firms that specialize in subcontracting and trading services. These features may lower the start-up costs of new manufacturing firms. Recent theoretical models of market evolution emphasize that low sunk costs of entry and exit speed firm turnover by facilitating entry and increasing the pressure on inefficient firms to exit. As a result, low-cost entry and exit may contribute to aggregate improvements in productivity by facilitating the rapid transfer of resources from less to more efficient producers within an industry. Using comprehensive firm-level panel data from the Taiwanese Census of Manufactures for 1981, 1986, and 1991, we measure differences in total factor productivity among entering, exiting, and continuing firms, and quantify the contribution of firm turnover to improvements in industry productivity.

We find significant differences in productivity across manufacturing firms that are reflected in turnover patterns in both the domestic and export market. Cohorts of new firms have lower average productivity than incumbents, but are themselves a heterogeneous group. The more productive members of the group, on average, survive and in many cases their productivity converges to the level of incumbents. Exiting firms are less productive than survivors. Exporters, including firms that exited the export market recently, are more productive than nonexporters. These patterns are consistent with the view that both the domestic and the export market sort out high-productivity from low-productivity firms and that the export market is a tougher screen. The productivity differential between entering and exiting firms is an important source of industry-level productivity growth in Taiwanese manufacturing, accounting for as much as half of industry improvement in some industries and time periods.

Finance and Development in an Emerging Market: Argentina in the Interwar Period

Gerardo della Paolera and Alan M. Taylor

NBER Working Paper No. 6236
October 1997
International Finance and Macroeconomics

The long-run economic performance of Argentina since World War I has been relatively disappointing until recently. Yet in the interwar period, signs of future retardation and recurring crises were not obvious. It is often claimed that the remarkably rapid growth of domestic financial markets was an unmitigated success. In conventional models, such "financial deepening" would help to accelerate development, especially in an industrializing economy such as Argentina's. Yet the promise of this trend was unfulfilled: first the outbreak of World War I and then the Great Depression proved setbacks for the fledgling financial system, and a long-run deterioration set in after 1940. In this paper we trace the course of financial development using historical and international comparisons, and we analyze both macro- and microeconomic aspects of financial intermediation.

State Fiscal Institutions and the U.S. Municipal Bond Market

James M. Poterba and Kim S. Rueben

NBER Working Paper No. 6237
October 1997
JEL Nos. H61, H74
Public Economics

This paper presents new evidence on the effect of state fiscal institutions, particularly balanced-budget rules and restrictions on state debt issuance, on the yields on state general obligation bonds. We analyze information from the Chubb Relative Value Survey, which contains relative tax-exempt yields on the bonds issued by different states over the period 1973–96. We find that states with tighter anti-deficit rules, and more restrictive provisions on the authority of state legislatures to issue debt, pay lower interest rates on their bonds. The interest rate differential between a state with a very strict anti-deficit fiscal constitution, and one with a lax constitution, is between 15 and 20 basis points. States with binding revenue limitation measures tend to face higher borrowing rates by approximately the same amount, while states with expenditure limits face lower borrowing costs. Thus fiscal restraints that control expenditures are viewed favorably by bond market participants, while those that restrict taxes, and therefore might interfere with the state's ability to repay interest, result in higher borrowing costs. The effect of strict fiscal institutions is particularly evident when a state's economy is weak. These results provide important evidence that bond market participants consider fiscal institutions in assessing the risk characteristics of tax-exempt bonds, and further support the view that fiscal institutions have real effects on fiscal policy outcomes.

Is Bank-Centered Corporate Governance Worth It? A Cross-Sectional Analysis of the Performance of Japanese Firms during the Asset Price Deflation

Jun-Koo Kang and René M. Stulz

NBER Working Paper No. 6238
October 1997
Corporate Finance

We examine the determinants of firm stock-price performance from 1990 to 1993 in Japan. During that period, the typical firm on the Tokyo Stock Exchange lost more than half its value, and banks experienced severe adverse shocks. We show that firms whose debt had a higher fraction of bank loans in 1989 performed worse from 1990 to 1993. This effect is statistically as well as economically significant and holds when we control for a variety of variables that affect performance during this period. We find that firms that were more bank-dependent also invested less during this period than other firms. This points to an adverse effect of bank-centered corporate governance, namely that firms suffer when their banks are experiencing difficulties.

Higher Tariffs, Lower Revenues? Analyzing the Fiscal Aspects of the "Great Tariff Debate of 1888"

Douglas A. Irwin

NBER Working Paper No. 6239
October 1997
JEL Nos. N71, H6, F13
Development of the American Economy and International Trade and Investment

After the Civil War, Congress justified high import tariffs (relative to their prewar levels) as necessary in order to raise sufficient revenue to pay off the public debt. By the early 1880s, the federal government was running large and seemingly intractable fiscal surpluses: revenues exceeded expenditures (including debt service and repurchases) by over 40 percent during that decade. The political parties proposed alternative plans to deal with the surplus: the Democrats proposed a tariff reduction to reduce customs revenue, the Republicans offered higher tariffs to reduce imports and customs revenue. This paper examines this debate and attempts to determine the revenue effects of the proposed tariff changes. The results indicate that, given the height of the tariff and the price elasticity of U.S. import demand during the 1880s, the actual tariff was below the maximum revenue rate, and therefore a tariff reduction would have reduced customs revenue.

Projected Retirement Wealth and Savings Adequacy in the Health and Retirement Study

James F. Moore and Olivia S. Mitchell

NBER Working Paper No. 6240
October 1997
JEL Nos. J14, G23, H55
Aging

Low saving rates raise questions about Americans' ability to maintain consumption levels in old age. Using the Health and Retirement Study, this paper explores asset holdings among a nationally representative sample of people on the verge of retirement. Making reasonable projections about asset growth, we assess how much more people would need to save in order to preserve consumption levels after retirement. We find that the median older household has current wealth of approximately $325,000 including pensions, Social Security, housing, and other financial wealth, an amount projected to grow to about $380,000 by retirement at age 62. Nevertheless, our model suggests that this median household will still need to save 16 percent of annual earnings to preserve pre-retirement consumption. For retirement at age 65, assets are expected to be about $420,000 and required additional saving totalling 7 percent of earnings per year. These summary statistics conceal extraordinary heterogeneity in both assets and saving needs in the older population. Older high wealth households have 45 times more assets than the poorest decile, and this disparity increases with age. There are also large differences in prescribed saving targets, ranging from 38 percent of annual earnings for those in the lowest wealth decile to negative rates for the wealthiest decile.

Foreign Direct Investment as a Catalyst for Industrial Development

James R. Markusen and Anthony J. Venables

NBER Working Paper No. 6241
October 1997
International Trade and Investment

How does a foreign direct investment (FDI) project affect local firms in the same industry? Competition in the product and factor markets tends to reduce profits of local firms, but linkage effects to supplier industries may reduce input costs and raise profits. This paper develops an analytical framework for assessing these effects. We establish circumstances in which FDI is complementary to local industry, and show how FDI may lead to the establishment of local industrial sectors. These sectors may grow to the point where local production overtakes and forces out FDI plants. Our results are consistent with the experience of a number of industrial sectors in the newly industrializing countries.

Impact of a Managed Behavioral Health Care Carve-Out: A Case Study of One HMO

Anne E. Brisson, Richard G. Frank, Elizabeth S. Notman, and Julie A. Gazmararian

NBER Working Paper No. 6242
October 1997
JEL No. I11
Health Care

We examine a case study of a carve-out for mental health (MH) and substance abuse (SA) services between a local plan of a national HMO (N=120,213) and a local managed behavioral health care vendor (MBHC). This is one of the first studies which estimates the impact of an HMO carve-out on costs and patterns of MH/SA care. Three years of insurance claims data (1993–5) were used for the analyses, with a new carve-out contract implemented in May 1994. The new carve-out arrangement included a new vendor, a change in the organizational structure of clinical services, and increased financial risk to the vendor for inpatient care. Descriptive and empirical analyses are reported on a continuously enrolled population (N=49,529). The analyses show that the new carve-out arrangements had a significant impact on spending and utilization of services. Enrollees were 20 percent less likely to use MH/SA services after the implementation of the new carve-out, and inpatient MH/SA utilization dropped 50 percent under the new carve-out. Overall, MH/SA spending per enrollee dropped from approximately $4.90 per month to $2.20 per month. Outpatient MH/SA spending per user dropped 35 percent after the implementation of the new carve-out. Further research should be conducted to evaluate the impact on access and quality of care, given the substantial decrease in utilization and spending.

International Competition and Exchange Rate Shocks: A Cross-Country Industry Analysis of Stock Returns

John M. Griffin and René M. Stulz

NBER Working Paper No. 6243
October 1997
Asset Pricing

It is widely accepted that, for some industries, competition across countries is economically important, and competition is affected strongly by exchange rate changes. We explore the validity of this view using weekly stock return data on 320 industry pairs in six countries from 1975 to 1997. We find that common shocks to industries across countries are more important than competitive shocks. Weekly exchange rate shocks explain almost none of the relative performance of industries. Based on returns measured over longer horizons, the importance of exchange rate shocks increases slightly, and the importance of common shocks to industries increases more substantially. Both industry and exchange rate shocks are more important for industries that produce goods traded internationally, but the importance of these shocks is economically small for those industries as well.

Growth, Distribution and Demography: Some Lessons from History

Jeffrey G. Williamson

NBER Working Paper No. 6244
October 1997
JEL Nos. D3, F1, J1, N3, O1
Development of the American Economy

If we have learned anything from the recent outpouring of empirical growth equations, it is that life is far too complex to expect "unconditional" convergence among all countries and at all times. This fact motivates two questions. First, why has it taken economists so long to learn the same lesson from the Kuznets Curve debate? No economist should expect an "unconditional" Kuznets Curve to emerge from the growth experience of all countries and at all times. The forces of the industrial revolution thought to have an impact on inequality can be offset or reinforced by demography, skill supply, and globalization. This paper assesses the role of globalization and demography via mass migrations.

Second, why has it taken economists so long to learn that demography influences growth? When treated properly, demography can be shown to have a significant impact on the per capita growth of GDP. I seek to answer these two questions by looking at inequality and growth experience in the Old World, the New World, and Asia over the last century and a half.

Consumer Beliefs and Buyer and Seller Behavior in the Vehicle Inspection Market

Thomas N. Hubbard

NBER Working Paper No. 6245
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JEL Nos. L14, L15, D83
Industrial Organization

The California vehicle emission inspection market offers a rare opportunity to examine how incentives operate in "diagnosis-cure" markets. I investigate why sellers help vehicles pass inspections, focusing on multiperiod mechanisms such as those in reputation models. I show that the demand faced by individual firms is sensitive to inspection outcomes. Consumers are 30 percent more likely to return to a firm at which they previously passed inspection than one at which they previously failed. If, over the long run, an independent garage fails one additional vehicle per month, this decreases demand by 5.6 inspections per month on average. This figure is lower for service stations and new car dealers. Consumers' behavior is consistent with a learning model in which they have diffuse initial priors regarding the probability that they fail at individual firms, and "Bayesian update" using two to three inspection outcomes at each firm.

Explaining National Differences in the Size and Industry Distribution of Employment

Steven J. Davis and Magnus Henrekson

NBER Working Paper No. 6246
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JEL Nos. L52, J21, H30
Labor Studies

What factors determine national differences in the size and industry distribution of employment? We stress the role of the economic policy environment as determined by business taxes, employment security laws, credit market regulations, the national pension system, wage-setting institutions, and the size of the public sector. We characterize these aspects of the policy environment in Sweden prior to 1990–1 and compare them to the situation in other European countries and the United States. Our characterization and international comparisons show that Swedish policies strongly disfavored less capital-intensive firms, smaller firms, entry by new firms, and individual and family ownership of business.

We also compile evidence that these policies affect outcomes. Taking the U.S. industry distribution as a benchmark that reflects a comparatively neutral set of policies and institutions, Sweden's employment distribution in the mid-1980s is sharply tilted away from low-wage industries and industries with greater employment shares for smaller firms and establishments. Compared to other European countries, Sweden has an unusually high share of employment in large firms. Furthermore, the Swedish rate of self-employment in the 1970s and 1980s is the lowest among all OECD countries.

The institutional and policy factors emphasized by our study differ greatly across countries. This fact suggests that our approach can be fruitfully applied to other studies of national differences in industry and size structures and their evolution over time. As an example, the tax reform wave of the 1980s—which largely evened out cross-country differences in corporate taxation among OECD countries—offers some basis for projecting a movement towards greater similarity among wealthy countries in the size and industry distribution of employment.

Capital Mobility and Exchange Market Intervention in Developing Countries

Michael P. Dooley, Donald J. Mathieson, and Liliana Rojas-Suarez

NBER Working Paper No. 6247
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JEL Nos. F32, F36, F4
International Finance and Macroeconomics

This paper develops a new technique for measuring changes in the degree of capital mobility confronting a developing country that has restrictions on capital flows and official ceilings on domestic interest rates. Because such official controls rule out the use of traditional interest rate parity conditions to measure changes in the degree of capital mobility, the analysis first examines an intertemporal model of an open economy. This model describes the linkages between the cost of undertaking disguised capital flows, the current account, capital controls, domestic and external financial market conditions, and the authorities' foreign exchange market interventions. The model suggests a means of measuring changes in the cost of undertaking disguised capital flows, based on the past history of differentials between external interest rates (adjusted for exchange rate changes) and domestic ceiling interest rates, provided that the authorities' foreign exchange market activities are incorporated into the analysis. Parameter estimates for Korea, Mexico, and the Philippines indicate that the real cost of undertaking disguised capital flows declined by nearly 70 percent on average between the early 1970s and the late 1980s.

Simulating U.S. Tax Reform

David Altig, Alan J. Auerbach, Laurence J. Kotlikoff, Kent A. Smetters, and Jan Walliser

NBER Working Paper No. 6248
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JEL Nos. H20, C68
Public Economics

We use a new large-scale dynamic simulation model to compare the equity, efficiency, and macroeconomic effects of five alternatives to the current U.S. federal income tax: a proportional income tax; a proportional consumption tax; a flat tax; a flat tax with transition relief; and a progressive variant of the flat tax called the "X tax." Our model incorporates intragenerational heterogeneity and kinked budget constraints. We predict major macroeconomic gains (including an 11 percent increase in long-run output) from replacing the federal tax system with a proportional consumption tax. Future middle- and upper-income classes gain from this policy, but initial older generations are hurt by the policy's implicit capital levy. Poor members of current and future generations also lose.

The flat tax, which adds a standard deduction to the consumption tax, makes all members of future generations better off, but halves the economy's long-run output gain and harms initial older generations. Insulating these older generations through transition relief further reduces the long-run gains from tax reform. Switching to a proportional income tax without deductions and exemptions hurts current and future low lifetime earners, but helps everyone else. It also raises long-run output by over 5 percent. The X tax makes everyone better off in the long run, and raises long-run output by 7.5 percent, but harms initial older generations who bear its implicit wealth tax.

Persistence of Medicare Expenditures Among Elderly Beneficiaries

Alan M. Garber, Thomas E. MaCurdy, and Mark C. McClellan

NBER Working Paper No. 6249
October 1997
JEL Nos. I11, J14, I18, H51
Aging and Health Care

The highly uneven distribution of Medicare payments among elderly beneficiaries, combined with the predictability of some of the expenditures, poses several challenges to the Medicare program. We present information about the distribution of Medicare expenditures among beneficiaries in specific years, accompanied by new evidence on the extent to which Medicare payments for the care of individual beneficiaries persist over long time periods. Our analysis is based on a longitudinal population of Medicare enrollees during the years from 1987 to 1995. We find that high-cost users accounted for a disproportionate share of the growth of Medicare Part A (hospital) payments during this period, but that an increase in the number of beneficiaries using covered services was largely responsible for the growth of Medicare Part B payments. Few beneficiaries are in the highest-cost categories for multiple years; the high mortality rates of individuals who use medical services heavily, whether the expenditures occur in one year or repeatedly, limits the extent of expenditure persistence. Even among survivors, it is unusual to remain in the highest-cost categories for multiple years. Nevertheless, individuals with high expenditures in one year are likely to have higher-than-average expenditures in other years, and expenditures are highly skewed even over a period of nine years. Any policy to reform Medicare will need to accommodate the persistence of expenditures in order to provide adequate coverage for all beneficiaries.

Pricing and Hedging Derivative Securities in Incomplete Markets: An ϵ-Arbitrage Approach

Dimitris Bertsimas, Leonid Kogan, and Andrew W. Lo

NBER Working Paper No. 6250
November 1997
JEL No. G13
Asset Pricing

Given a European derivative security with an arbitrary payoff function and a corresponding set of underlying securities on which the derivative security is based, we solve the dynamic replication problem: find a self-financing dynamic portfolio strategy—involving only the underlying securities—that most closely approximates the payoff function at maturity. By applying stochastic dynamic programming to the minimization of a mean-squared-error loss function under Markov state dynamics, we derive recursive expressions for the optimal replication strategy that are readily implemented in practice. The approximation error or "ϵ" of the optimal replication strategy is also given recursively and may be used to quantify the "degree" of market incompleteness. To investigate the practical significance of these ϵ-arbitrage strategies, we consider several numerical examples, including path-dependent options and options on assets with stochastic volatility and jumps.

On the Superiority of Corrective Taxes to Quantity Regulation

Louis Kaplow and Steven Shavell

NBER Working Paper No. 6251
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JEL Nos. H23, D62, K32, L51
Public Economics

The traditional view of economists has been that corrective taxes are superior to direct regulation of harmful externalities when the state's information about control costs is incomplete. In recent years, however, many economists seem to have adopted the view that either corrective taxes or quantity regulation could be superior to the other. One argument for this view, identified with Weitzman [1974], holds only if the state is constrained to use a fixed tax rate (a linear tax schedule) even when harm is nonlinear. Corrective taxes are indeed superior to quantity regulation if—as seems more plausible—the state can impose a nonlinear tax equal to the schedule of harm, or can adjust the tax rate upon learning that it diverges from marginal harm. Another argument, associated with Baumol and Oates [1988], is that quantity regulation gains appeal when the state is uncertain about the harm caused by an externality. In this case, however, a corrective tax schedule (equal to the expected harm schedule) is superior to quantity regulation.

I Just Ran Four Million Regressions

Xavier X. Sala-i-Martin

NBER Working Paper No. 6252
November 1997
JEL Nos. O51, O52, O53
Economic Fluctuations and Growth

In this paper, I try to move away from the extreme bounds method of identifying "robust" empirical relations in the economic growth literature. Instead of analyzing the extreme bounds of the estimates of the coefficient of a particular variable, I analyze the entire distribution. My claim in this paper is that, if we do this, the picture emerging from the empirical growth literature is not the pessimistic "nothing is robust" that we get with the extreme bound analysis. Instead, we find that a substantial number of variables can be found to be strongly related to growth.

Technology and Bilateral Trade

Jonathan Eaton and Samuel Kortum

NBER Working Paper No. 6253
November 1997
JEL Nos. F11, F17, O33
International Trade and Investment

We develop a Ricardian model to explore the role of trade in spreading the benefits of innovation. The theory delivers an equation for bilateral trade that, on its surface, resembles a gravity specification, but identifies underlying parameters of technology. We estimate the equation using trade in manufactures among the OECD. The parameter estimates allow us to simulate the model to investigate the role of trade in spreading the benefits of innovation and to examine the effects of lower trade barriers. Typically, foreigners benefit by only a tenth as much as the innovating country, but in some cases the benefits to close neighbors approach those of the innovator.

Monetary Policy Rules in Practice: Some International Evidence

Richard Clarida, Jordi Galí, and Mark Gertler

NBER Working Paper No. 6254
November 1997
JEL Nos. E58, F41
Economic Fluctuations and Growth, International Finance and Macroeconomics, and Monetary Economics

We estimate monetary policy reaction functions for two sets of countries: the G3 (Germany, Japan, and the United States) and the E3 (United Kingdom, France, and Italy). We find that since 1979, each of the G3 central banks has pursued an implicit form of inflation targeting, which may account for the broad success of monetary policy in those countries over this time period. The evidence also suggests that these central banks have been forward looking: they respond to anticipated inflation as opposed to lagged inflation. As for the E3, even prior to the emergence of the "hard ERM," their central banks were influenced heavily by German monetary policy. Further, using the Bundesbank's policy rule as a benchmark, we find that at the time of the EMS collapse, interest rates in each of the E3 countries were much higher than domestic macroeconomic conditions warranted. Taken together, the results support the view that some form of inflation targeting under certain circumstances may be superior to fixing exchange rates, as a means of gaining a nominal anchor for monetary policy.

Why is Corruption So Much More Taxing Than Tax? Arbitrariness Kills

Shang-Jin Wei

NBER Working Paper No. 6255
November 1997
JEL Nos. F20, F23, H3, O37
International Trade and Investment

This paper examines the effect of corruption-induced uncertainty on foreign direct investment. The measure of uncertainty is constructed based on unpublished individual survey responses about levels of corruption in host countries. The result is striking: the effect is negative, statistically significant, and quantitatively large. An increase in the uncertainty level from that of Singapore to that of Mexico, at the average level of corruption in the sample, is equivalent to raising the tax rate on multinational firms by 32 percentage points. Hence, the second-moment (uncertainty) effect can and does have first-order importance.

The Big Players in the Foreign Exchange Market: Do They Trade on Information or Noise?

Shang-Jin Wei and Jungshik Kim

NBER Working Paper No. 6256
November 1997
JEL No. F31
International Finance and Macroeconomics

We ask whether there is private information in the foreign exchange market, and whether speculation reduces or exacerbates volatility. We use a recent dataset on foreign currency positions of large market participants that includes their positions on options and other derivatives. This is the first dataset that describes comprehensive currency positions of market participants. We find first, that not only the absolute value of the options position, but also that of spot, forward, and futures positions of large participants "Granger-causes" exchange rate volatility. This suggests that the large participants' currency speculation does not stabilize exchange rate volatility. Second, our regression analyses do not find any positive association between large participants' position in a foreign currency and its subsequent appreciation. A non-parametric approach finds some weak support for a positive association but not on a systematic level. This casts doubt on the view that large participants have better information about the future movement of exchange rates. It further strengthens the case that the large players trade on noise rather than on information.

Econometric Models of Limit-Order Executions

Andrew W. Lo, A. Craig MacKinlay, and June Zhang

NBER Working Paper No. 6257
November 1997
JEL No. G23
Asset Pricing

Limit orders incur no price impact, however their execution time is uncertain. We develop several econometric models of limit-order execution times using survival analysis, and then estimate them with actual limit-order data. We estimate models for time-to-first-fill and time-to-completion, and for limit-sells and limit-buys, and we incorporate the effects of explanatory variables, such as the limit price, the limit size, the bid/offer spread, and market volatility. We find that execution times are very sensitive to limit price and several other explanatory variables, but are not sensitive to limit size. We also show that hypothetical limit-order executions, constructed either theoretically from first-passage times or empirically from transactions data, are very poor proxies for actual limit-order executions.

Generating Real Persistent Effects of Monetary Shocks: How Much Nominal Rigidity Do We Really Need?

Olivier Jeanne

NBER Working Paper No. 6258
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JEL Nos. E1, E3
Monetary Economics

This paper asks whether money can generate persistent economic fluctuations in dynamic general equilibrium models of the business cycle.

I show that a small nominal friction in the goods market can make the response of output to monetary shocks large and persistent if it is amplified by real wage rigidity in the labor market. I also argue that, given the level of real wage rigidity that is observed in developed countries, a small degree of nominal stickiness might be sufficient for money to produce economic fluctuations as persistent as those observed in the data.

On the Disutility and Discounting of Imprisonment and the Theory of Deterrence

A. Mitchell Polinsky and Steven Shavell

NBER Working Paper No. 6259
November 1997
JEL No. K14
Law and Economics

This article studies the implications for the theory of deterrence of: 1) the manner in which individuals' disutility from imprisonment varies with the length of the imprisonment term; and 2) discounting the future disutility and future public costs of imprisonment. We address two questions: Is deterrence enhanced more by increasing the length of imprisonment terms, or by raising the likelihood of imposing imprisonment? What is the optimal combination of the severity and probability of imprisonment sanctions?

Taxation by Telecommunications Regulation

Jerry Hausman

NBER Working Paper No. 6260
November 1997
JEL Nos. H21, L51
Industrial Organization and Public Economics

Telecommunications regulation in the United States is replete with a system of subsidies and taxes. Because of budgetary spending limits, Congress is increasingly unable to increase general taxes to pay for social programs. Thus we fund these programs from taxes on specific sectors of the economy. In this paper, I consider the Congressional legislation that established a program for all public schools and libraries in the United States to receive subsidized service to the Internet. The cost of the program currently is estimated to be $2.25 billion per year. Congress passed legislation that directed all users of interstate telephone service to pay for the program.

Using analytical methods from public finance, I calculate the efficiency cost to the economy of the increased taxation of interstate telephone services to fund the Internet access discounts. I estimate the cost to the economy of raising the $2.25 billion per year to be at least $2.36 billion (in addition to the $2.25 billion of tax revenue), or the efficiency loss to the economy for every $1 raised to pay for the Internet access discounts is an additional $1.05 to $1.25 beyond the money raised for the Internet discounts. This cost to the economy is extraordinarily high compared to other taxes used by the Federal government to raise revenues. I discuss an alternative method by which the FCC could have raised the revenue for the Internet discounts which would have a near zero cost to the economy.

The Role of Discretion in the Criminal Justice System

Daniel P. Kessler and Anne Morrison Piehl

NBER Working Paper No. 6261
November 1997
JEL Nos. K41, D73
Law and Economics

Although a substantial body of research suggests that individuals' discretion in the criminal justice system is important, there is disagreement in the existing literature about its specific role. The studies generally hypothesize that discretion either serves as the means by which changing broad social norms against crime causes changes in sentencing patterns; or it serves as the means by which internal social norms of the criminal justice system prevent the implementation of formal changes in laws.

We reject both of these hypotheses, using data on the sentencing of California prisoners before and after the passage of Proposition 8, which provided for sentence enhancements for those convicted of certain "serious" crimes with "qualifying" criminal histories. We find that an increase in the statutory sentence for a given crime cannot only increase sentence length for those charged with the crime, but also for those charged with factually "similar" crimes: a "similar" crime is defined as one that has legal elements in common with the given crime. These spillovers are consistent with neither broad social norms nor internal social norms. Thus, we conclude that discretion takes a less-well studied form, which we call "prosecutorial maximization."

International Trade and Labor-Demand Elasticities

Matthew J. Slaughter

NBER Working Paper No. 6262
November 1997
JEL Nos. F1, J3
International Trade and Investment

In this paper, I try to determine whether international trade has been increasing the own-price elasticity of demand for U.S. labor in recent decades. There are three main results. First, from 1960 through 1990, demand for U.S. production labor became more elastic in manufacturing overall, and in five of eight industries within manufacturing. Second, during this time the demand for U.S. nonproduction labor did not become more elastic in manufacturing overall, or in any of the eight industries within manufacturing. If anything, demand seems to be growing less elastic over time. Third, the hypothesis that trade contributed to increased elasticities has mixed support, at best. For production labor, many trade variables have the predicted effect for specifications with only industry controls. But these predicted effects disappear when time controls are included as well. For nonproduction labor, things are somewhat better, but time continues to be a very strong predictor of elasticity patterns. Thus the time series of labor-demand elasticities is explained largely by a residual, time itself. This result parallels the common finding in studies of rising wage inequality. Just as there appears to be a large unexplained residual for changing factor prices over time, there also appears to be a large unexplained residual for changing factor demand elasticities over time.

The Rate of Return to Corporate Capital and Factor Shares: New Estimates Using Revised National Income Accounts and Capital Stock Data

James M. Poterba

NBER Working Paper No. 6263
November 1997
JEL Nos. D24, D33, G31

This paper presents new evidence on the rate of return on tangible assets in the United States, incorporating the recently-revised national accounts as well as new estimates of the replacement cost of the reproducible physical capital stock. The pretax return on capital in the nonfinancial corporate sector has averaged 8.5 percent over the 1959–96 period. The paper also presents new estimates of the total tax burden on nonfinancial corporate capital, which averages 54.1 percent over this time period. For the 1990s, this tax rate, which includes corporate income and corporate property taxes, and taxes on stock- and bondholders, averages 42.1 percent of pretax profits. The average pretax rate of return for 1990–6 is 8.6 percent, and the average aftertax return is 5 percent. Although the accounting return to corporate capital has been higher in the mid-1990s than at any previous point in the last two decades, the substantial volatility in the return series makes it premature to conclude that these years represent a departure from past experience.

Aggregate Investment

Ricardo J. Caballero

NBER Working Paper No. 6264
November 1997
JEL Nos. E2, D9

The 1990s have witnessed a revival in economists' interest in and hope of explaining aggregate and microeconomic investment behavior. New theories, better econometric procedures, and more detailed panel datasets are behind this movement. Much of the progress has occurred at the level of microeconomic theories and evidence; however, progress in aggregation and general equilibrium aspects of the investment problem also has been significant. The concept of sunk costs is at the center of modern theories. The implications of these costs for investment go well beyond the neoclassical response to the irreversible-technological friction they represent, for they also can lead to first-order inefficiencies when interacting with informational and contractual problems.

Does Immigration Hurt African-American Self-Employment?

Robert W. Fairlie and Bruce D. Meyer

NBER Working Paper No. 6265
November 1997
JEL Nos. F22, J15

Previous studies tend to find that immigration has a weak negative effect on the employment and earnings of native-born workers. These studies generally overlook the effect of immigration on an important sector of the labor force, the self-employed. Anecdotal evidence suggests that immigrants, especially those from Asian countries, may displace black-owned business owners. We use Census of Population microdata to see whether black self-employment levels are lower in labor markets with a higher share of immigrants. We define labor markets as metropolitan areas (MAs), and we use the variation across 94 MAs in the United States to examine the relationship between black self-employment and immigration in 1980 and 1990. To control for permanent differences across MAs in other influences, we also estimate the effect of the change in immigration from 1980 to 1990 on the change in black self-employment over this period. In general we find that immigration has no effect, or only a small negative but statistically insignificant effect, on black male or female self-employment. Our findings are similar if we weight immigration rates by the propensity of immigrant groups to be self-employed; if we limit our sample of immigrants to those from only Asian countries; and if we try other alternative estimation techniques and specifications.

Slowdowns and Meltdowns: Postwar Growth Evidence from 74 Countries

Dan Ben-David and David H. Papell

NBER Working Paper No. 6266
November 1997
JEL Nos. C22, O1, O5, O47

We propose an explicit test for determining the significance and the timing of slowdowns in economic growth during the postwar period.

We examine a large sample of countries (both industrialized and developing) and find that a majority—though not all—exhibit a significant structural break in their postwar growth rates. In nearly all of these cases, the break was followed by a slowdown in growth. The breaks fall into two primary periods which delineate countries by developmental and regional characteristics as well as by the magnitude of the subsequent slowdowns. We find that most industrialized countries experienced postwar growth slowdowns in the early 1970s; the United States, Canada, and the United Kingdom did not; and developing countries (and in particular, Latin American countries) tended to experience much more severe slowdowns which, in contrast with the more developed countries, began nearly a decade later.

Convergence Clubs and Subsistence Economies

Dan Ben-David

NBER Working Paper No. 6267
November 1997
JEL Nos. E1, E2, O4

This paper focuses on one possible explanation for the empirical evidence of income convergence among the world's poorest and wealthiest countries, and income divergence among most of the remaining countries. The model incorporates the assumption of subsistence consumption into the neoclassical exogenous growth model, yielding outcomes that are consistent with the convergence-divergence empirical evidence. While subsistence consumption can lead to negative saving and disaccumulation of capital, it also can be associated with positive saving and the accumulation of capital. The model predicts that the poorer the country, the lower its saving rate. This result also appears to be borne out by the evidence I provide.

Demographic Transitions and Economic Miracles in Emerging Asia

David E. Bloom and Jeffrey G. Williamson

NBER Working Paper No. 6268
November 1997
JEL Nos. J1, O1, O4, O53

The demographic transition—a change from high to low rates of mortality and fertility—has been more dramatic in East Asia during this century than in any other region or historical period. By introducing demographic variables into an empirical model of economic growth, we show that this transition has contributed substantially to East Asia's so-called economic miracle. The "miracle" occurred in part because East Asia's demographic transition resulted in its working-age population growing at a much faster pace than its dependent population during 1965–90, thereby expanding the per capita productive capacity of East Asian economies. This effect was not inevitable; rather, it occurred because East Asian countries had social, economic, and political institutions and policies that allowed them to realize the growth potential created by the transition. The empirical analyses indicate that population growth has a purely transitional effect on economic growth; this effect operates only when the dependent and working-age populations are growing at different rates. An important implication of these results is that future demographic change will tend to depress growth rates in East Asia, while it will promote more rapid economic growth in Southeast and South Asia.

Strategic Bidding in a Multi-Unit Auction: An Empirical Analysis of Bids to Supply Electricity in England and Wales

Catherine D. Wolfram

NBER Working Paper No. 6269
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JEL Nos. D44, L94

This paper considers the bidding behavior of participants in the daily auction for supplying electricity in England and Wales. Every day, owners of generating capacity submit bids reflecting a price for power from their plants. The bid made by the last plant that is used to meet electricity needs in a given time period is the price paid for capacity from all plants. Theoretical work on such uniform-price multi-unit auctions suggests that bidders selling more than one unit of a good have an incentive to increase the prices they bid at high quantities. If a bid sets the equilibrium price, then the bidder receives a higher price for that unit, as well as for all inframarginal units. I find evidence of strategic increases in bids. Plants that are likely to be used only after a number of other plants are already operating will bid more. The larger supplier will submit higher bids, all else equal. Finally, there is some evidence that bids for given plants are higher when the suppliers have more available capacity.

Geographic Concentration as a Dynamic Process

Guy Dumais, Glenn Ellison, and Edward L. Glaeser

NBER Working Paper No. 6270
November 1997
JEL Nos. L60, R11

The degree of geographic concentration of individual manufacturing industries in the United States has declined only slightly in the last 20 years. At the same time, new plant births, plant expansions, contractions, and closures have shifted large quantities of employment across plants, firms, and locations. This paper uses data from the Census Bureau's Longitudinal Research Database to examine how relatively stable levels of geographic concentration emerge from this dynamic process. While industries' agglomeration levels tend to remain fairly constant, there is greater variation in the location of these agglomerations.

We decompose aggregate changes in concentration into those portions attributable to plant births, expansions, contractions, and closures, and find that the location choices of new firms and the differences in growth rates have played the most significant role in reducing levels of geographic concentration, while plant closures have tended to reinforce agglomeration. Finally, we look at coagglomeration patterns to test three of Marshall's theories of industry agglomeration: 1) agglomeration saves transport costs by proximity to input suppliers or final consumers; 2) agglomeration allows for labor market pooling; and 3) agglomeration facilitates intellectual spillovers. While there is some truth behind all three theories, we find that industrial location is driven far more by labor mix than by any of the other explanatory variables.

Learning in Cities

Edward L. Glaeser

NBER Working Paper No. 6271
November 1997
JEL Nos. J24, O15, R10

Alfred Marshall argues that industrial agglomerations exist in part because individuals can learn skills from each other when they live and work in close proximity. An increasing amount of evidence suggests that the informational role of cities is a primary reason for their continued existence. This paper formalizes Marshall's theory using a model in which individuals acquire skills by interacting, and dense urban areas increase the speed of interaction. The model predicts that cities will have a higher mean and variance of skills. Cities will attract young people who are not too risk averse and who benefit most from learning (for example, more patient people). Older, more skilled workers will stay in cities only if they can internalize some of the benefits that their presence creates for young people. The level of urbanization will rise when the demand for skills rises, when the ability to learn by imitation rises, or when the level of health in the economy rises. Empirical evidence on urban wages supports the learning view of cities and I corroborate empirically a variety of other implications of the theory.

Exceptional Exporter Performance: Cause, Effect, or Both?

Andrew B. Bernard and J. Bradford Jensen

NBER Working Paper No. 6272
November 1997
JEL Nos. F10, D21, L60

A growing body of empirical work has documented the superior performance characteristics of exporting plants and firms relative to those that do not export: employment, shipments, wages, productivity, and capital intensity are higher at exporters at any given moment. We ask whether good firms become exporters or instead that exporting improves firm performance. The evidence is quite clear on one point: good firms become exporters. Both growth rates and measures of levels of success are higher ex-ante for the exporters. The benefits of exporting for the firm are less clear. Employment growth and the probability of survival are higher for exporters; however, productivity and wage growth is not superior, particularly over longer horizons.

Survival of the Fittest or the Fattest? Exit and Financing in the Trucking Industry

Luigi Zingales

NBER Working Paper No. 6273
November 1997

This paper studies the impact of imperfections in the capital market on the natural selection of the most efficient firms. I estimate the effect of leverage before deregulation on the survival of trucking firms after the Carter deregulation, and find that highly leveraged carriers are less likely to survive the deregulation shock, even after I control for various measures of efficiency. This effect is stronger in the imperfectly competitive segment of the motor carrier industry. High debt seems to affect survival by curtailing investments and reducing the price per-ton-mile that a carrier can afford to charge after deregulation.

Power in a Theory of the Firm

Raghuram G. Rajan and Luigi Zingales

NBER Working Paper No. 6274
November 1997

Transactions take place in the firm rather than in the market because the firm offers power to agents who make specific investments. The literature has emphasized the allocation of ownership as the primary mechanism by which the firm does this. Within the contractibility assumptions of this literature, we identify a potentially superior mechanism, the regulation of *access* to critical resources. Access can be better than ownership because: 1) the power agents get from access is more contingent on them making the right investment; and 2) ownership has adverse effects on the incentive to specialize. The theory explains the importance of internal organization and third party ownership.

Job Destruction and Propagation of Shocks

Wouter J. den Haan, Garey Ramey, and Joel Watson

NBER Working Paper No. 6275
November 1997
JEL Nos. E24, E32

We develop and quantitatively implement a dynamic general equilibrium model with labor market matching and endogenous job destruction. The model produces a close match with data on job creation and destruction. Cyclical fluctuations in the job destruction rate serve to magnify the effects of productivity shocks on output, as well as making those effects much more persistent. Interactions between decisions about household saving and decisions about separation in employment relationships play a key role in propagating shocks.

Graduation to Health Insurance Coverage: 1981–1996

Sherry Glied and Mark Stabile

NBER Working Paper No. 6276
November 1997

The health insurance experience of young men, who are new entrants to the labor market, provides an early indicator of the strengths and weaknesses of the employer-sponsored health insurance system. Insurance coverage for these men has fallen sharply over the past 15 years. We examine patterns of health insurance coverage for cohorts of young men using successive cross-sectional surveys and longitudinal data.

We find that coverage declines persist and are exacerbated as young men age. Not only did cohorts of men born during the 1950s fail to age into employer-sponsored coverage as they reached their 30s and 40s, but they actually lost such coverage as they grew older. Furthermore, young men who lacked coverage when they were in their mid-20s were not likely to gain such coverage later. Declines in coverage are sharpest among the least educated cohorts of young men. We show that most of the decline is attributable to the substantial increase in health insurance costs during the 1980s. By contrasting young men's experiences with pension receipt with their health insurance experiences, we show that structural changes in the labor market cannot explain any of the decline in coverage within cohorts.

Our results suggest that the existing system of employer-sponsored health insurance subsidies did not compensate for the declines in earnings and increases in health insurance costs faced by young men between 1981 and 1996.

Avoiding Health Insurance Crowd-Out: Evidence from the Medicare-as-Secondary-Payer Legislation

Sherry Glied and Mark Stabile

NBER Working Paper No. 6277
November 1997

The cost of efforts to expand health insurance coverage to the currently uninsured increases when people who would otherwise purchase private insurance obtain subsidized public coverage. Legislators increasingly are interested in mechanisms that target insurance benefits to those who need them most. This paper investigates the effects of one of the first such targeting efforts, the 1982 Medicare as Secondary Payer (MSP) provisions.

The MSP rules require employers who offer insurance coverage to their employees under 65 to offer coverage on the same terms to their Medicare-eligible employees. This coverage then becomes "primary" to Medicare. We examine the incidence of this implicit tax, the magnitude of tax avoidance efforts, and the extent of tax compliance.

We find little evidence that the MSP rules affected the wages or employment of covered workers. We find weak evidence suggesting that the MSP shifted the composition of employment of older workers toward MSP-exempt jobs. We find strong evidence of low compliance with the MSP rules.

Our results cast doubt on the efficacy of provisions designed to reduce crowd-out in new health insurance programs.

A New Bankruptcy Procedure that Uses Multiple Auctions

Oliver Hart, Rafael La Porta Drago, Florencio Lopez-de-Silanes, and John Moore

NBER Working Paper No. 6278
November 1997
JEL Nos. G33, K22

We develop a new bankruptcy procedure that makes use of multiple auctions. The procedure is designed to work even when capital markets do not function well (for example in developing economies, or in economies in transition), although it can be used in all economies.

Employer Learning and Statistical Discrimination

Joseph G. Altonji and Charles R. Pierret

NBER Working Paper No. 6279
November 1997
JEL Nos. D83, J31

We provide a test for statistical discrimination, or "rational" stereotyping, in environments in which agents learn over time, and apply it to the labor market. If profit maximizing firms have limited information about the general productivity of new workers, then they may choose to use easily observable characteristics, such as years of education, to "statistically discriminate" among workers. As firms acquire more information about a worker, pay will become more dependent on actual productivity and less dependent on easily observable characteristics or credentials that predict productivity.

Consider a wage equation that contains both the interaction between experience and a hard-to-observe variable that is positively related to productivity and the interaction between experience and a variable that firms can observe easily, such as years of education. We show that the wage coefficient on the unobservable productivity variable should rise with time in the labor market, and the wage coefficient on education should fall. We investigate this proposition using panel data on education, the AFQT test, father's education, and wages for young men and their siblings from NLSY. We also examine the empirical implications of statistical discrimination on the basis of race. Our results support the hypothesis of statistical discrimination, although they are inconsistent with the hypothesis that firms fully utilize the information on race. Our analysis has wide implications for the analysis of the determinants of wage growth and productivity, and for the analysis of statistical discrimination in the labor market and elsewhere.

Discreteness and the Welfare Cost of Labor Supply Distortions

Keshab Bhattarai and John Whalley

NBER Working Paper No. 6280
November 1997

We discuss the effect of discrete choice of labor supply (or, leisure consumption) on measures of the welfare cost of labor supply tax distortions. We construct comparable continuous- and discrete-choice models, each calibrated to have similar aggregate (uncompensated) labor supply elasticities. In the former, there is a single representative consumer; in the latter there is a distribution of individuals across preference parameters. In the discrete model, taxes induce a large response from a subset of the population, while the majority of the population shows unchanged behavior. Welfare costs of similar taxes in continuous models can substantially exceed those in discrete models or vice versa, depending upon the formulation used. We also report on experiments for a two-labor type household model with one continuous variable (secondary labor) and one discrete variable (primary labor), and do calculations using an empirically-based model specification calibrated to U.K. data. Our model clearly shows that discrete choice matters in the assessment of the cost of labor supply tax distortions.

The Redistributive Effects of Transfers

Keshab Bhattarai and John Whalley

NBER Working Paper No. 6281
November 1997

Existing literature assessing the impacts of transfers on low income households assumes that participants in transfer programs benefit by the full amount of cash transfers received. We argue here that because tax-back arrangements accompany such transfer programs, and endogenous participation decisions (that is, regime choices) are involved, a money-metric measure of the utility generated by transfers typically will be substantially less than the cash value of transfers received. We use a conditional choice general equilibrium model of the United Kingdom, calibrated to literature-based labor supply and labor demand elasticities, with a leisure-consumption choice for household and production involving heterogeneous labor inputs. In the model, households face nonconvex budgets that are set because of differences in tax rates and tax-back schemes in transfer programs. We evaluate household demands for leisure and consumption goods numerically, using optimization techniques within a larger equilibrium structure including the production side of the economy, since demands are nonanalytic. Our results suggest that a money-metric measure of the utility equivalent of transfers received by the bottom deciles of U.K. households in the early 1990s was only 32 percent of cash transfers received because of the conditionality in these programs.

Apocalypse Now? Fundamental Tax Reform and Residential Housing Values

Donald Bruce and Douglas Holtz-Eakin

NBER Working Paper No. 6282
November 1997
JEL No. H24

Using a simulation model crafted to integrate the short- and long-run effects of tax reform on the housing market, we find modest impacts from fundamental reform of the federal income tax. These results suggest that concerns about the impact of tax reform on housing values and household net worth are overstated. To the extent that reform is otherwise desirable, fears of drastic effects on the housing market should not stand as an impediment to reform.

Costly Capital Reallocation and the Effects of Government Spending

Valerie A. Ramey and Matthew D. Shapiro

NBER Working Paper No. 6283
November 1997
JEL Nos. E62, E13, E22

Changes in government spending often lead to significant shifts in demand across sectors. We analyze the effects of sector-specific changes in government spending in a two-sector dynamic general equilibrium model in which the reallocation of capital across sectors is costly. The two-sector model leads to a richer array of possible responses of aggregate variables than the one-sector model. The empirical part of the paper estimates the effects of military buildups on a variety of macroeconomic variables using a new measure of military shocks. The behavior of macroeconomic aggregates is consistent with the predictions of a multisector neoclassical model. In particular, consumption, real product wages, and manufacturing productivity fall in response to exogenous military buildups in the post-World War II United States.

The Upcoming Slowdown in U.S. Economic Growth

Charles I. Jones

NBER Working Paper No. 6284
November 1997
JEL Nos. O40, O30

At least since 1950, the United States has been stimulated by increases in educational attainment, increases in research intensity, and the increased openness and development of the world economy. Contrary to the conventional view, such changes suggest that the U.S. economy is far from its steady state balanced growth path. The theoretical framework analyzed here provides a coherent interpretation of this evidence, and indicates that when these increases cease and the U.S. economy reaches its steady state, then U.S. per capita growth can be expected to fall to a rate of approximately one quarter its post-war average.

Population and Ideas: A Theory of Endogenous Growth

Charles I. Jones

NBER Working Paper No. 6285
November 1997
JEL Nos. O41, O30

Why do economies exhibit sustained growth in per capita income? I argue that endogenous fertility and increasing returns to scale are the fundamental ingredients in understanding endogenous growth. Endogenous fertility leads the scale of the economy to grow over time. Increasing returns translate this increase in scale into rising per capita income. According to this view, a justification for increasing returns rather than linearity in the equation for technological progress is the fundamental insight of the idea-based growth literature. Endogenous fertility together with the increasing returns associated with the nonrivalry of ideas generates endogenous growth.

Debts and Deficits with Fragmented Fiscal Policymaking

Andrés Velasco

NBER Working Paper No. 6286
November 1997
JEL Nos. H3, H6, E6

I develop a political-economic model of fiscal policy in which government resources are a "common property" out of which interest groups can finance expenditures on their preferred items. This setup has striking macroeconomic implications. Transfers are higher than a benevolent planner would choose; fiscal deficits emerge even when there are no reasons for intertemporal smoothing and, in the long run, government debt tends to be excessively high; peculiar time profiles for transfers can emerge, with high positive net transfers early on giving way to high taxes later on; and multiple dynamic equilibrium paths can occur starting at the same initial level of government debt.

The Market and the Estimators: Forecasting the Cost of Medicare Catastrophic Coverage

Sherry Glied and Tama Brooks

NBER Working Paper No. 6287
November 1997

As part of the process of enacting the Medicare Catastrophic Coverage Act (MCCA) in 1988, both the Congressional Budget Office (CBO) and the Department of Health and Human Services (HHS) developed estimates of the cost of the pharmaceutical component of the proposal. These estimates varied substantially. For some benefit years, cost estimates differed by a factor of more than two.

This paper uses data from the stock market to measure how market participants gauged the likely consequences of the MCCA, and to compare the market estimate with those of the CBO and HHS estimators. We examine the market response to key events linked to passage and repeal of the MCCA for brand name and generic pharmaceutical producers. We find that on event days associated with passage of the MCCA, generic pharmaceutical firms had positive and significant excess stock market returns. On early event days associated with passage, brand name producers had smaller positive returns and on later days, brand name producers had small negative returns. On event days associated with repeal of the MCCA, brand name producers had small positive excess returns and generic producers had zero or small negative returns.

The effect of the MCCA on the stock price of pharmaceutical firms would depend on the elasticity of demand for pharmaceuticals. Differences in assumptions about this elasticity were a key component of the differences between CBO and HHS estimates. Using the market returns to evaluate these elasticities, we find that market participants shared the CBO's view that demand responses to the legislation would be small. We also find that the market anticipated that the MCCA would strongly favor generic manufacturers.

The Sources of Regional Variation in the Severity of the Great Depression: Evidence from U.S. Manufacturing, 1919–37

Joshua L. Rosenbloom and William A. Sundstrom

NBER Working Paper No. 6288
November 1997
JEL Nos. N12, N62, E32

The severity of the Great Depression in the United States varied by region. Most notably, compared with the rest of the country, the South Atlantic states experienced a milder contraction, while the Mountain states suffered more severely. The impact of the contraction was more uniform across other regions of the country—surprisingly so, considering the large regional differences in industrial structure. We use data from the biennial Census of Manufactures on 20 individual manufacturing industries disaggregated by state to analyze the relative contributions of industry mix and location to regional variations in economic performance during the period 1919–37. Industrial composition had a significant impact on regional employment growth, with regions that concentrated on the production of durable goods or inputs to the construction sector tending to fare worse than other regions. Long-run regional trends also played an important role in regional variation, and explain much of the South Atlantic region's more favorable performance over the cycle.

"Make Us a King": Anarchy, Predation, and the State

Herschel I. Grossman

NBER Working Paper No. 6289
November 1997
JEL Nos. D60, D70, H40

In order to enforce a collective choice to allocate resources to guarding against predators, producers must subject themselves to the state's sovereign power to tax and spend. But, with these sovereign powers in hand, the state can exploit the producers by taxing and spending for its own purposes. Using a general equilibrium model in which people can choose to be producers or predators, this paper rationalizes the biblical request, "Make us a king." The analysis shows that, if the technology of predation is good enough, then having a "king" is better than not having a king for everyone—including both producers and potential predators—even though the king maximizes the consumption of a ruling elite.

The Past, Present, and Future of Macroeconomic Forecasting

Francis X. Diebold

NBER Working Paper No. 6290
November 1997

Broadly defined, macroeconomic forecasting is alive and well. Nonstructural forecasting, which is based largely on reduced-form correlations, always has been well and continues to improve. Structural forecasting, which aligns itself with economic theory, and hence rises and falls with theory, receded following the decline of Keynesian theory. In recent years, however, powerful new dynamic stochastic general equilibrium theory has been developed, and structural macroeconomic forecasting is poised for resurgence.

The Alleged Instability of Nominal Income Targeting

Bennett T. McCallum

NBER Working Paper No. 6291
November 1997
JEL Nos. E52, E32

It has been argued recently that a monetary policy of nominal income targeting would result in dynamically unstable processes for output and inflation. That result holds in a theoretical model that includes backward-looking IS and Phillips-curve relations, but these are rather special and theoretically unattractive. I demonstrate that replacement of the special Phillips curve with one of several more plausible specifications overturns the instability result, whether or not the IS equation is replaced with a forward-looking version. Thus, the instability result is quite fragile and provides almost no basis for a negative judgment on nominal income targeting.

Transition Issues for the European Monetary Union

Willem H. Buiter and Anne C. Sibert

NBER Working Paper No. 6292
November 1997
JEL Nos. F31, F33, F36, E58, E63

If Stage Three of EMU starts on January 1, 1999, then transition issues will remain on two time scales. Until July 1, 2002, national currencies and the euro will co-exist as legal tender. We argue that in principle intra-EMU currency risk exists during that period, but that no EMU member can be forced out through speculative attacks.

Cohabitation of "Ins" and "Outs" has an open-ended time scale. We discuss the effect of EMU on incentives for both Ins and Outs to undertake structural reform, and the coordination problems associated with the distribution of seigniorage revenue and the Stability and Growth Pact.

The Competitive Effects of Transmission Capacity in a Deregulated Electricity Industry

Severin Borenstein, James Bushnell, and Steven Stoft

NBER Working Paper No. 6293
November 1997

In an unregulated electricity generation market, the degree to which generators in different locations compete with one another depends on the capacity to transmit electricity between locations. We study the impact of transmission capacity on competition among generators. We show that there may be no relationship between the effect of a transmission line in spurring competition and the actual electricity that flows on the line. We then investigate the equilibriums that are likely to result as transmission lines between previously unconnected locations are built and expanded. We demonstrate that limited transmission capacity can give a firm the incentive to restrict its output in order to congest transmission into its area of dominance. We apply this analysis to a model of California's forthcoming deregulated electricity market. Our results indicate that at least one firm could have an incentive to strategically induce transmission congestion, and that relatively small investments in transmission may yield surprisingly large payoffs in terms of increased competition.

Welfare and Market Access Effects of Piecemeal Tariff Reform

Jiandong Ju and Kala Krishna

NBER Working Paper No. 6294
November 1997
JEL Nos. F1, F13

In a situation where tariff reforms are being negotiated between two parties, one of which aims to raise its exports and the other to raise its welfare, tariff cuts must be in the interest of at least one party. It is possible for the interests of the two sides to conflict. Conflict is certain if the excess demand for exported goods does not respond to changes in the prices of imported goods. In this case, any policy that raises imports must also reduce welfare.

Implications of Rising Personal Retirement Saving

James M. Poterba, Steven F. Venti, and David A. Wise

NBER Working Paper No. 6295
November 1997
JEL Nos. J14, J26

Retirement savings accounts, particularly employer-provided 401(k) plans, have expanded rapidly in the last decade. More than 40 percent of workers are currently eligible for these plans, and over 70 percent of eligibles participate in these plans. The substantial and ongoing accumulation of assets in these plans has the potential to significantly alter the financial preparations for retirement by future retirees. We use data on current age-specific patterns of 401(k) participation, in conjunction with Social Security earnings records which provide detailed information on age-earnings profiles over the lifetime, to project the 401(k) balances of future retirees. The results, which are illustrated by reference to individuals who were 27 and 37 in 1996, demonstrate the growing importance of 401(k) saving. The projected mean 401(k) balance at retirement for a current 37 year old is $91,600, assuming that the 401(k) plan assets are invested half in stocks and half in bonds. For a current 27 year old, the projected balance is $125,500. These results support the growing importance of personal saving through retirement saving accounts in contributing to financial well-being in old age.

The Enforcement of Intellectual Property Rights: A Survey of the Empirical Literature

Jean O. Lanjouw and Josh Lerner

NBER Working Paper No. 6296
December 1997
JEL Nos. K41, O32, O34

We examine several recent avenues of empirical research into the enforcement of intellectual property rights. To frame these issues, we start with a stylized model of the patent litigation process. The bulk of the paper is devoted to linking the empirical literature on patent litigation to the parameters of this model. The four major areas we consider are: 1) how the propensity to litigate patents varies with the expected benefits of litigation; 2) the ways in which the cost of litigation affects the willingness to enforce patents; 3) how the cost of enforcing patents changes the private value of patent rights; and 4) the impact of intellectual property litigation on the innovation process itself.

Stylized Facts of Patent Litigation: Value, Scope, and Ownership

Jean O. Lanjouw and Mark Schankerman

NBER Working Paper No. 6297
December 1997
JEL Nos. O34, K41

We investigate the characteristics of litigated patents by combining for the first time information about patent case filings from the U.S. district courts and detailed data from the U.S. Patent and Trademark Office. We construct a series of indicators for the factors which the theoretical literature suggests contribute to litigation: the frequency of disputes; the size and asymmetry of stakes; the structure of information; and costs. Compared to a random sample of U.S. patents from the same cohorts and technology areas, we find, more valuable patents and those with domestic owners are considerably more likely to be involved in litigation. Patents owned by individuals are at least as likely to be the subject of a case as corporate patents, and litigation is particularly frequent in new technology areas. We interpret the results with reference to theoretical models of litigation and settlement, and discuss what they suggest about the effect of patent litigation on the incentives to invest in R and D.

Death to the Log-Linearized Consumption Euler Equation! (And Very Poor Health to the Second-Order Approximation)

Christopher D. Carroll
NBER Working Paper No. 6298
December 1997
JEL Nos. C6, D91, E21

This paper shows that standard empirical methods for estimating log-linearized consumption Euler equations cannot successfully uncover structural parameters, like the coefficient of relative risk aversion, from the dataset of simulated consumers behaving exactly according to the standard model. Furthermore, consumption growth for the simulated consumers is very highly statistically related to predictable income growth. Thus standard "excess sensitivity" tests would reject the hypothesis that consumers are behaving according to the standard model. Results are not much better for the second-order approximation to the Euler equation. I conclude that empirical estimation of consumption Euler equations should be abandoned, and discuss some alternative empirical strategies that are not subject to the problems of Euler equation estimation.

Environmental Regulation and Labor Demand: Evidence from the South Coast Air Basin

Eli Berman and Linda T. Bui
NBER Working Paper No. 6299
December 1997
JEL Nos. C2, C8, H2, J23, L5, Q2

The nature of environmental regulation, by generating rich variation across regions and over time, provides an excellent opportunity for estimating the effects of regulation on employment. We use direct measures of regulation and plant data to estimate the employment effects of an unprecedented increase in air quality regulation in the Los Angeles region, using for comparison unregulated plants in other regions, industries, and years. While environmental regulation generally is thought to reduce employment, economic theory is ambiguous on this point, since pollution abatement technologies may use labor. We find that air quality regulation induced very expensive investments in abatement capital for individual plants, especially for oil refineries. Despite these high costs, *we find no evidence that environmental regulation decreased labor demand, even when we allow for induced plant exit and dissuaded plant entry.* If anything, air quality regulation probably increased employment slightly.

A Model of Crises in Emerging Markets

Michael P. Dooley
NBER Working Paper No. 6300
December 1997
JEL Nos. F32, F34

First-generation models show that apparently random speculative attacks on policy regimes can be fully consistent with rational and well-informed speculative behavior. Unfortunately, models driven by a conflict between exchange rate policy and other macroeconomic objectives do not seem consistent with important empirical regularities surrounding recent crises in emerging markets. This has generated considerable interest in models that associate crises with self-fulfilling shifts in private expectations.

In this paper, I develop a first generation model based on an alternative policy conflict. Credit constrained governments accumulate reserve assets in order to self-insure against shocks to national consumption. Governments also insure domestic financial markets that are poorly regulated. Given this policy regime, a variety of internal and external shocks generate capital inflows to emerging markets, followed by successful and anticipated speculative attacks.

I argue that a common external shock generated capital inflows to emerging markets in Asia and Latin America after 1989. Country-specific factors determined the timing of speculative attacks. Lending policies of industrial country governments and international organizations explain contagion—that is, a bunching of attacks over time.

Predation, Efficiency, and Inequality

Herschel I. Grossman and Minseong Kim
NBER Working Paper No. 6301
December 1997
JEL Nos. D60, D74, D31, D50

We show how predation breaks the links between an economy's aggregate resource endowment and consumption and between the interpersonal distribution of endowments and consumption. We construct a general-equilibrium model in which some people (the privileged) are well endowed with resources and other people (the unprivileged) are poorly endowed with resources. Each person can choose to be a producer or a predator. In this model, the choice to be a predator decreases aggregate consumption, because predators' resources are wasted by not being used productively, and because producers sacrifice production by allocating resources to guarding against predators.

Analyzing this model, we find that the minimum equilibrium ratio of predators to producers depends only on the technology of predation. In addition, the equilibrium ratio of predators to producers equals its minimum value if and only if the ratio of unprivileged to privileged people is not larger than this minimum value. These properties imply that, in contrast to a model that abstracts from predation, the fully egalitarian distribution of resources does not satisfy the Rawlsian criterion of maximizing the consumption of the person with the lowest consumption. (In fact, the fully egalitarian distribution is not even Pareto efficient). Instead, the Rawlsian criterion selects an unequal distribution of resources in which the ratio of unprivileged to privileged people equals the minimum ratio of predators to producers, and in which unprivileged people have only the minimum possible endowment of resources. In the resulting Rawlsian equilibrium, only unprivileged people choose to be predators rather than producers; because both the ratio of predators to producers and the amount of resources that predators waste are minimized, aggregate consumption is maximized. In addition in the Rawlsian equilibrium, predation equalizes the consumption of the privileged and the unprivileged.

Argentina and the World Capital Market: Saving, Investment, and International Capital Mobility in the Twentieth Century

Alan M. Taylor

NBER Working Paper No. 6302
December 1997
JEL Nos. F41, F43, N16, N26, O11, O54

This paper is concerned with integration between the economies of the core and periphery in the twentieth century world capital market. It proceeds with some general observations and a special focus on the case of Argentina. I argue that understanding the changing relations in international capital markets offers important insights into the growth and development process, especially for the countries of the periphery. Moreover, studying the extent of market integration in history informs current conditions in the relationship between capital-scarce economies, like Argentina, and the global capital market as a whole. Looking to the future, the repercussions of economic reform and demographic change suggest likely implications for future saving, investment, and international capital flows.

The Effect of Means-Tested Income Support for the Elderly on Pre-Retirement Saving: Evidence from the SSI Program in the U.S.

David Neumark and Elizabeth Powers

NBER Working Paper No. 6303
December 1997
JEL Nos. I38, J14, J26

We attempt to draw inferences about potential behavioral responses to means-tested income support for the elderly by examining the effects on saving of the Supplemental Security Income (SSI) program for the aged in the United States. Part of the SSI program provides payments to the poor elderly, thus operating as a means-tested public retirement program. The federal government sets eligibility criteria and benefit levels for the federal component of the program, but many states supplement federal SSI benefits substantially. We exploit the state-level variation in SSI benefits to estimate the effects of SSI on saving. We use data from selected waves of the 1984 Survey of Income Program Participation (SIPP), and find that high SSI benefits reduce saving among households with heads who are approaching the SSI eligibility age and are likely to participate in the program.

Patent Buy-Outs: A Mechanism for Encouraging Innovation

Michael Kremer

NBER Working Paper No. 6304
December 1997
JEL Nos. O31, O30, N40

In 1839, the French government purchased the patent on the Daguerreotype process and placed it in the public domain. This paper examines one mechanism under which governments would use an auction to estimate the private value of patents, and then offer to buy out patents at this private value times a fixed markup. The markup would correspond to the typical estimated ratio of the social and private values of inventions: for example, two. Most patents purchased would be placed in the public domain. But in order to induce bidders to reveal their valuations, a few patents would be sold to the highest bidder. These patent buyouts could eliminate monopoly price distortions and incentives for wasteful reverse engineering, while raising private incentives for original research. However, patent buyouts are potentially vulnerable to collusion. Patent buyouts may be particularly appropriate for pharmaceuticals.

Are Public Housing Projects Good for Kids?

Janet Currie and Aaron Yelowitz

NBER Working Paper No. 6305
December 1997
JEL Nos. H5, I3, J0, R0

One of the goals of federal housing policy is to improve the prospects of children in poor families. But little research has been conducted into the effects on children of housing programs, perhaps because it is difficult to find datasets with both information about participation and interesting measures of outcome. This paper combines data from several sources in order to provide a first look at the effect of participation in public housing projects on housing quality and on the educational attainment of children.

We use administrative data from the Department of Housing and Urban Development to impute the probability that a Census household lives in a public housing project. We find that a higher probability of living in a project is associated with poorer outcomes. We then use two-sample instrumental variables (TSIV) techniques to combine information on the probability of living in a project, based on the 1990 to 1995 Current Population Surveys, with information on outcomes that we obtained from the 1990 Census. The common instrument in both samples is an indicator that is set equal to one if the household is entitled to a larger housing project unit because of the sex composition of the children in the household. Those families entitled to a larger unit are 24 percent more likely to live in projects. After controlling for omitted variables bias using TSIV, we find that project households are less likely to suffer from overcrowding and less likely to live in high-density complexes. Project children are also 12 to 17 percentage points less likely to have been held back in school one or more grades, although this effect is confined to boys. Thus, most families do not face a tradeoff between housing quality and child outcomes: the average project improves both.

Central Bank Policy Rules: Conceptual Issues and Practical Considerations

Stephen G. Cecchetti

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JEL Nos. E52, E58

The design of rules for central bank policy has been a subject of increasing interest to many monetary economists. This essay first presents an analytical structure in which a policymaker is presumed to formulate a rule based on the solution to an optimal control problem, and then to examine a number of issues that are germane to the current debate on the nature of such rules. These issues include the implication for policymaking of the slope of the output-inflation variability frontier, the importance of various types of uncertainty, the consequences of a zero nominal interest rate floor, and the possible reasons for interest rate smoothing.

Although this essay is intended to raise, rather than resolve, key questions concerning policy rules, it does offer fairly compelling evidence on one point: the potential consequences of the move by many central banks toward some form of price-level or inflation targeting. In adopting such an approach, central banks implicitly are changing the relative importance of output and inflation variability in their objective function. The robustness of the policy rule, however, may depend on the shape of the output-inflation variability tradeoff. The data indicate that this tradeoff is extremely steep: small decreases in inflation variability are associated with very large increases in output variability. This finding suggests that pure inflation targeting may have very undesirable side effects.

Welfare and Macroeconomic Interdependence

Giancarlo Corsetti and Paolo Pesenti

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We develop a simple choice-theoretic model for carrying out welfare analyses of the international transmission of monetary and fiscal policies. The model can be solved in closed form and illustrated in terms of the simplest graphical apparatus, so as to provide the analysis of macroeconomic interdependence, structural spillovers, policy links, and strategic complementarities with rigorous but intuitive micro-foundations. In contrast with the traditional literature, our findings emphasize the positive externalities of foreign monetary expansions and foreign fiscal contractions on domestic welfare, while highlighting the ambiguous effects on welfare of domestic policy shocks.

Social Security and Retirement in Canada

Jonathan Gruber

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In Canada, government transfers to older persons are one of the largest and fastest growing components of the government budget. I provide an overview of the interaction between these transfer programs and retirement behavior. I begin by documenting historical trends in labor force participation and program receipt, and contemporaneous patterns of work and income receipt for the current cohort of older persons. I then describe the structure of this system of Canadian transfer programs. Finally, I present the results of a simulation model which measures the implicit tax/subsidy rate on work after age 55 within this system. I find that, for married male workers, there are modest taxes on work through age 64 which rise to fairly high levels thereafter. But these taxes are substantially lower for single workers, since they do not have wives who are eligible for means-tested transfers, and for workers with other substantial sources of income, since the family is not at all eligible for means-tested transfers.

Corporate Governance
Luigi Zingales
NBER Working Paper No. 6309
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JEL No. G3

This essay summarizes my own personal view of what corporate governance is about. I argue that it makes sense to discuss corporate governance only in an incomplete-contract world. In this world, the notion of corporate governance is intrinsically related to the definition of the firm. In this respect, I review the shortcomings of the existing definitions of the firm and the possible applications of the idea that the firm is a "nexus of specific investments" introduced by Rajan and Zingales [1997]. I conclude by discussing the limitations of the incomplete contracts approach to corporate governance.

Sharp Reductions in Current Account Deficits: An Empirical Analysis
Gian Maria Milesi-Ferretti and Assaf Razin
NBER Working Paper No. 6310
December 1997
JEL Nos. F32, F34

We study the determinants and consequences of sharp reductions in current account imbalances (reversals) in low- and middle-income countries. We try to answer two questions: First, what triggers reversals? Second, what factors explain the costliness of reversals? We find that both domestic variables, such as the current account balance, openness, and the level of reserves, and external variables, such as the terms of trade shocks, U.S. real interest rates, and growth in industrial countries, play an important role in explaining reversals in current account imbalances. We also find that countries with a less appreciated real exchange rate, higher investment, and openness prior to the reversal tend to grow faster after a reversal occurs.

Managing the Public Debt in Fiscal Stabilizations: The Evidence
Alessandro Missale, Francesco Giavazzi, and Pierpaolo Benigno
NBER Working Paper No. 6311
December 1997
JEL Nos. E31, E41, E43, G12

This paper provides evidence on the behavior of public debt managers during fiscal stabilizations in OECD countries over the last two decades. We find that debt maturity tends to lengthen: the more credible the program; the lower the long-term interest rate; and the higher the volatility of short-term interest rates. We show that this debt issuing strategy is consistent with optimal debt management if information between the government and private investors is asymmetric, as is usually the case at the outset of a stabilization attempt, when private investors may lack full confidence in the announced budget cuts.

Foreign Speculators and Emerging Equity Markets
Geert Bekaert and Campbell R. Harvey
NBER Working Paper No. 6312
December 1997
JEL Nos. F3, G0, G1

A number of countries have delayed the opening of their capital markets to international investment because of reservations about the impact of foreign speculators on expected returns and market volatility. We propose a cross-sectional time-series model that attempts to assess the impact of market liberalizations —in the form of offering depositary receipts, country funds, and other financial instruments, in an extranational market—on the cost of capital and market volatility in emerging equity markets. We also examine the impact of capital market liberalizations on the correlation between emerging equity market returns and the world market return. Our empirical approach is designed to control for other economic events which might confound the impact of foreign speculators on local equity markets. Whatever the empirical specification, the cost of capital always decreases after capital market liberalization, but the effect is economically and statistically weak. The effects on volatility and correlation are less robust.

Unequal at Birth: A Long-Term Comparison of Income and Birth Weight
Dora L. Costa
NBER Working Paper No. 6313
December 1997
JEL Nos. I12, N30

I demonstrate that although socioeconomic differences in birth weight have always been fairly small in the United States, they have narrowed since the beginning of this century. I argue that maternal height, and therefore the mother's nutritional status during her growing years, accounted for most of the socioeconomic differences in birth weight in the past, but not today. This implies that in the past health inequality was transmitted across generations. I also show that children born at the beginning of this century compared favorably to modern populations in terms of birth weights, but suffered higher fetal and neonatal death rates because obstetrical and medical knowledge was poorer. In addition, by day ten of life, children of the past were at a disadvantage relative to children today because "best practice" resulted in insufficient feeding. The poor average health of past populations therefore originated in part in the first days of life.

NIMBY Taxes Matter: State Taxes and Interstate Hazardous Waste Shipments

Arik Levinson

NBER Working Paper No. 6314
December 1997
JEL Nos. H73, H23

This paper examines the extent to which state taxes have inhibited interstate transport of hazardous waste for disposal in the United States. I use panel data from the Toxics Release Inventory (TRI) and the Resource Conservation and Recovery Act (RCRA) on interstate shipments of waste, and analyze them in conjunction with a set of state characteristics, including hazardous waste disposal taxes and disposal capacity. I use four approaches to deal with the potential endogeneity of taxes and unobserved heterogeneity among states: a "natural experiment" based on the retaliatory nature of some state tax laws; a fixed-effects model; a two-stage least squares estimator; and a reinterpretation of the coefficient on the distance among states. I conclude that hazardous waste taxes are a statistically and economically significant deterrent to interstate waste transport, that taxes are being imposed by large-capacity and large-import states, and that these taxes therefore have had a decentralizing effect on the national pattern of hazardous waste transport and disposal.

Inventories

Valerie A. Ramey and Kenneth D. West

NBER Working Paper No. 6315
December 1997
JEL Nos. E22, E32

We review and interpret recent work on inventories, emphasizing empirical and business cycle aspects. We begin by documenting two empirical regularities about inventories: that inventories move procyclically; and that inventory movements are quite persistent, even conditional on sales.

To explain the two facts, we present a linear-quadratic model. The model can rationalize the facts in a number of ways, but two stylized explanations have the virtue of relative simplicity and support from a number of papers. Both assume that there are persistent shocks to demand for the good in question, and that the marginal production cost curve slopes up. The first explanation also assumes that there are highly persistent shocks to the cost of production. The second assumes that there are strong costs of adjusting production and a strong accelerator motive.

However, research to date has not reached a consensus on whether one of these two, or some third alternative, provides a satisfactory explanation of inventory behavior. We suggest several directions for future research that promise to improve our understanding of inventory behavior and thus of business cycles.

After Chile, What? Second-Round Pension Reforms in Latin America

Olivia S. Mitchell and Flávio Ataliba Barreto

NBER Working Paper No. 6316
December 1997
JEL Nos. J26, J14, H55, G23

The apparent success of Chile's pension reform catalyzed a number of subsequent reforms in sister Latin American nations. The "Chilean model" now has captured the attention of policymakers and researchers in the OECD as well. In this paper, we identify six critical elements of old-age pension reform, and examine how these elements differ across the Chilean reform, and in several other Latin nations that followed in Chile's footsteps. We emphasize how these other Latin American nations adopted different mechanisms to restructure their old-age pension systems, and we highlight available evidence on the performance of the system in each case.

Myopia and Inconsistency in the Neoclassical Growth Model

Robert J. Barro

NBER Working Paper No. 6317
December 1997
JEL Nos. O40, E21

I modify the neoclassical growth model to allow for a varying rate of time preference. If the household cannot commit on future choices of consumption, and if utility is logarithmic, then the equilibrium will resemble the standard results of the neoclassical model. In this solution, the effective rate of time preference is high, but constant. Although this model has potentially important implications for institutional design and other policies—because households would benefit from an ability to commit future consumption—there is a sense in which the results are observationally equivalent to those of the conventional model. When I extend the framework to allow for partial ability to commit, some testable hypotheses emerge concerning the link between this ability and the rates of saving and growth. I obtain steady-state results for general concave utility functions, and work out some properties of the dynamic paths for the case of isoelastic utility.

Unions and Managerial Pay

John DiNardo, Kevin Hallock, and Jörn-Steffen Pischke

NBER Working Paper No. 6318
December 1997
JEL Nos. J31, J44, J51

Unions compress the wage distribution among workers covered by union contracts. We ask whether unions also have an effect on the managers of unionized firms. To this end, we collect and assemble data on unionization and managerial pay within firms and industries in the United States and across countries. Generally, we find a negative correlation between executive compensation and unionization in our cross-section data, but no relationship between changes in unionization and the growth of compensation of executives over time. Using data on NLRB elections, we find that a loss of union members attributable to decertification elections is associated with higher CEO pay, although our estimates are imprecise. With CPS data, we consistently find that where unions are stronger, fewer managers are employed.

Open-Economy Macroeconomics: Developments in Theory and Policy

Maurice Obstfeld
NBER Working Paper No. 6319
December 1997
JEL No. F41

This paper surveys recent research in open-economy macroeconomics, using questions raised by European economic and monetary unification to guide the topics discussed. A striking empirical regularity is the tendency for changes in the nominal exchange rate regime to systematically affect the variability of nominal and real exchange rates. This regularity (which disappears in high-inflation conditions) can be explained by sticky-price theories or by models of asset-market liquidity effects. But plausible liquidity models have difficulty generating enough persistence (in output and real exchange rates, in particular) to match the data. Thus the macroeconomic costs of giving up the exchange-rate realignment option, emphasized in Mundell's optimum currency area concept, seem empirically relevant. I discuss other possible costs of currency unification that are associated with a reduced number of asset markets. On the benefit side, my theories of the efficiencies attributable to a common currency remain unsatisfactory, despite recent advances. A key motivation for the choice of a common currency rather than a fixed exchange rate among national currencies is the fear of speculative attack. I conclude by showing how self-fulfilling currency crises can occur, and describe recent progress in narrowing the range of multiple equilibriums in adjustable-peg regimes.

Volatility and Financial Intermediation

Joshua Aizenman and Andrew Powell
NBER Working Paper No. 6320
December 1997
JEL Nos. F32, F34, E44

Following the Tequila period, its after effects in Latin America, and recent events in South East Asia, the effect of volatility on emerging market economies has become an important topic of research. The domestic financial intermediation process is being advanced as one of the most important transmission mechanisms. At the same time, there has been continued interest in the issues of imperfect information and rationing in credit markets. In this paper, we consider an economy where risk neutral banks provide intermediation services and risk neutral producers demand credit to finance their working capital needs. Our model blends costly state verification with imperfect enforcement power. In this context of costly financial intermediation, we show that a weak legal system combined with high costs of information verification leads to large, first-order effects of volatility on production, employment, and welfare. A calibration illustrates that the semi-elasticity of welfare with respect to volatility is less than –1 for reasonable parameter values (that is, a 1 percent increase in the coefficient of variation of productivity shocks would reduce welfare by more than 1 percent). We suggest that legal and information problems in the credit market may then underlie why volatility has profound effects on emerging market economies.

Market Forces and Sex Discrimination

Judith K. Hellerstein, David Neumark, and Kenneth R. Troske
NBER Working Paper No. 6321
December 1997
JEL Nos. J71, J16, J24

We report new evidence on the existence of sex discrimination in wages and whether competitive market forces act to reduce or eliminate discrimination. Specifically, we use plant- and firm-level data to examine the relationships among profitability, changes in growth and ownership, product market power, and the sex composition of a plant or firm's workforce. Our strongest finding is that, among plants with high levels of product market power, those that employ relatively more women are more profitable. No such relationship exists for plants with apparently low levels of market power. This is consistent with sex discrimination in wages in the short run in markets where plants have product market power. We also examine evidence on the longer-run effects of market forces on discrimination, asking whether discriminatory employers with market power are punished over time through lower growth than non-discriminatory employers, or whether discriminatory employers are bought out by non-discriminators. We find little evidence that this occurs over a five-year period, as growth and ownership changes for plants with market power are generally not significantly related to the sex composition of a plant's workforce.

Regions, Resources, and Economic Geography: Sources of U.S. Regional Comparative Advantage, 1880–1987

Sukkoo Kim

NBER Working Paper No. 6322
December 1997
JEL Nos. R12, F1

This paper estimates the Rybczynski equation matrix for the 20 two-digit U.S. manufacturing industries for various years between 1880 and 1987. As predicted by the standard general equilibrium theory of interregional trade, the regression estimates show that a consistent set of factor endowments explains a significant amount of the geographic distribution of manufacturing activities over time. Although these results do not rule out the importance of increasing returns, they do suggest certain limits on how increasing returns affect U.S. economic geography.

How the Changing Market Structure of U.S. Higher Education Explains College Tuition

Caroline M. Hoxby

NBER Working Paper No. 6323
December 1997

This paper presents theoretical and empirical evidence demonstrating how the changing market structure of American higher education from 1940 to the present affected college prices and quality. Over this period, the market for baccalaureate education became significantly more competitive, as it was transformed from a collection of local autarkies to a nationally integrated market. I demonstrate that the results of increased competition were what industrial organization models (with product differentiation and students being both consumers of, and inputs into, higher education) would predict: higher average college quality and tuitions; greater between-college variation in tuition and student quality; less within-college variation in student quality; higher average subsidies to students; and greater between-college variation in subsidies. Changing market structure can explain real tuition increases of approximately 50 percent for selective private colleges. I use panel data from 1940 to 1991 on 1121 baccalaureate-granting colleges, including data on students' home residences, for this study.

A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets

Harrison Hong and Jeremy C. Stein

NBER Working Paper No. 6324
December 1997

We model an asset market populated by two groups of boundedly rational agents—"newswatchers" and "momentum traders"—each of whom can process only a subset of all available information. The bounded rationality of the newswatchers creates a tendency for prices to underreact to private information in the short run. This underreaction in turn means that the momentum traders can make money by chasing trends. However, if they are restricted to following simple (that is, univariate) strategies, their best attempts at arbitrage, although profitable, inevitably must lead to overreaction at long horizons. In addition to providing a unified account of asset market under- and overreactions, the model generates a number of distinctive testable implications.

The Central Tendency: A Second Factor in Bond Yields

Pierluigi Balduzzi, Sanjiv Ranjan Das, and Silverio Foresi

NBER Working Paper No. 6325
December 1997
JEL No. G12

We assume that the instantaneous riskless rate reverts towards a central tendency which, in turn, is changing randomly over time. As a result, current short-term rates are not sufficient to predict future short-term rate movements, as would be the case if the central tendency were constant. However, since longer-maturity bond prices incorporate information about the central tendency, longer-maturity bond yields can be used to predict future short-term rate movements. We develop a two-factor model of the term structure which implies that a linear combination of any two rates can be used as a proxy for the central tendency. Based on this central tendency proxy, we estimate a model of the one-month rate that performs better than models which assume the central tendency to be constant.

Pecuniary Incentives to Work in the U.S. During World War II

Casey B. Mulligan

NBER Working Paper No. 6326
December 1997

I argue that changes in workers' budget sets cannot explain the dramatic increases in civilian work in the United States during World War II. Although money wages grew during the period, wartime aftertax real wages were lower than either before or after the war. Evidence from the 1940s also appears to be inconsistent with other pecuniary explanations, such as wealth effects of government policies, intertemporal substitution induced by asset prices, unfulfilled expectations, and changes in the nonmarket price of time. Although untested and relatively undeveloped, nonpecuniary models of behavior are tempting explanations for wartime work.

Whither the World Bank and the IMF?

Anne O. Krueger

NBER Working Paper No. 6327
December 1997
JEL No. F33

On their fiftieth anniversary, the International Monetary Fund and the World Bank were reviewed extensively, both to mark the occasion and to consider, often critically, their current roles and performance. This paper reviews the functions of the two institutions, in light of their evolution over the past 50 years and of changes in the international economic system. It then evaluates and assesses some of the criticisms and proposals for reform of the two institutions.

The Determinants of Child Care Workers' Wages and Compensation: Sectoral Difference, Human Capital, Race, Insiders and Outsiders

H. Naci Mocan and Deborah Viola

NBER Working Paper No. 6328
December 1997
JEL Nos. J13, J31, J41, J44, J51, L3, J24

This paper investigates the determinants of wages and compensation for teachers and aides in child care centers. Nonprofit status has no across-the-board impact on wages. The extent of the wage premium enjoyed by some nonprofit workers depends on the category of the nonprofit center, the occupation of the workers, and their race. The rate of return to an additional year of tenure is 2 percent for both teachers and aides; for prior experience, it is 1 percent for teachers and zero for aides. An additional year of general education results in a 5 percent increase in teacher wages, and a 2.5 percent increase in aide wages. Specialized training influences teacher wages, but has less impact on aide wages. Unionization has a large impact on both wages and compensation of teachers and aides. Alternative wages of the workers are related positively to teacher and aide wages. An increase in local unemployment decreases aides' wages, but has a positive impact on the teachers' wages. There is evidence of profit sharing in the case of aides, but not teachers. An increase in center size raises teacher wages.

This body of evidence indicates that both teacher and aide remuneration have non-competitive flavors, where the case is more compelling for aides.

Political Economics and Macroeconomic Policy

Torsten Persson and Guido Tabellini

NBER Working Paper No. 6329
December 1997
JEL Nos. E5, E6, H2, H3, O1

This paper surveys the recent literature on the theory of macroeconomic policy. We study the effect of various incentive constraints, such as lack of credibility, political opportunism, political ideology, and divided government, on the policymaking process. The survey is organized in three parts. Part I deals with monetary policy in a simple Phillips curve model: it covers credibility issues, political business cycles, and optimal design of monetary institutions. Part II deals with fiscal policy in a dynamic general equilibrium set up: the main topics are credibility of tax policy and political determinants of budget deficits. Part III studies economic growth in models with endogenous fiscal policy.

Has Job Stability Declined Yet? New Evidence for the 1990s

David Neumark, Daniel Polsky, and Daniel Hansen

NBER Working Paper No. 6330
December 1997
JEL Nos. C80, J21, J63

In earlier work, we examined the evolution through the 1980s of job stability in U.S. labor markets, using data assembled from a sequence of Current Population Survey tenure supplements. We found little or no change in aggregate job stability in the U.S. economy. In addition, older and more-tenured workers experienced increases in job stability in the latter part of the 1980s.

In this paper, we update the evidence on changes in job stability through the mid-1990s, using recently-released CPS data for 1995 that parallel the earlier job tenure supplements. Updating the evidence from systematic random samples of the population and workforce through this period is especially important, because the media have painted a particularly stark picture of declining job stability in the 1990s.

In the aggregate, there is some evidence that job stability declined modestly in the first half of the 1990s. Moreover, the relatively small aggregate changes mask rather sharp declines in stability for workers with more than a few years of tenure. Nonetheless, the data available up to this point do not support the conclusion that the downward shift in job stability for more-tenured workers, and the more modest decline in aggregate job stability, reflect long-term trends.

The Careers of Modern Artists: Evidence from Auctions of Contemporary Paintings

David W. Galenson
NBER Working Paper No. 6331
December 1997
JEL No. J24

Using transactions from fine art auctions for 42 leading American contemporary artists, I estimate the relationship between the value of a painting and the artist's age at the date of its creation. I show that artists born before 1920 were likely to have done their most valuable work late in their careers, while artists born in the 1920s and 1930s were more likely to have done their most valuable work at an early age. Comparing these results with evidence drawn from art history textbooks and museum exhibitions indicates that these artists' most valuable work also has been the most highly regarded by scholars. I argue that the shift across generations in the shape of these artists' age-price profiles was a result of both the evolution of modern painting and a growth in the demand for contemporary American art during the 1950s and 1960s.

Hong Kong's Business Regulation in Transition

Changqi Wu and Leonard K. Cheng
NBER Working Paper No. 6332
December 1997
JEL Nos. L43, L51, L94, L96

The transition of Hong Kong's main economic activities from manufacturing to services is accompanied by gradual changes in the regulatory regimes for monopolies. The local telecommunication services industry has been liberalized; deregulation of public transport is taking shape; and the schemes of control for electricity suppliers are candidates for reform. In this paper, we review the evolution of business regulation in Hong Kong, analyze the salient features of its scheme of control regulation, and evaluate the impact of transition from regulation to competition. To sharply contrast the difficulties of the traditional approach to regulation with the benefits of introducing competition, we focus on the cases of electricity and telecommunications. We also discuss the direction for future changes.

What Happens When You Tax the Rich? Evidence from Executive Compensation

Austan Goolsbee
NBER Working Paper No. 6333
December 1997
JEL No. H24

This paper reexamines the responsiveness of taxable income to changes in marginal tax rates, using detailed compensation data on several thousand corporate executives from 1991 to 1995. The data confirm that the higher marginal rates of 1993 led to a significant decline in taxable income. Indeed, this small group of executives can account for as much as 20 percent of the aggregate change in wage and salary income for the million richest taxpayers, and one person alone can account for more than 2 percent. The decline, however, is almost entirely a short-run shift in the timing of compensation, rather than a permanent reduction in taxable income. The short-run elasticity of taxable income with respect to the net-of-tax share exceeds one, but the elasticity after one year is at most 0.4 and probably close to zero. The response comes almost entirely from a large increase in the exercise of stock options in the year before the tax change, followed by a decline in the year of the tax change, and the change is concentrated among executives at the top of the income distribution. Executives without stock options show six times less responsiveness to taxation. Other types of compensation, such as salary and bonus or nontaxed income, are either not responsive to tax rates or not large enough to make a difference. The estimated elasticities indicate that the dead weight loss of recent tax increases was around 15 to 25 percent of the revenue generated.

The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?

Sebastian Edwards
NBER Working Paper No. 6334
December 1997
JEL Nos. F3, F4, O54, O23

The Mexican crisis of 1994 raised a number of questions, throughout the world, regarding the sustainability—and even the merits—of the market oriented reform process in Latin America and other regions. Understanding the way events unfolded in Mexico during the early 1990s continues to be fundamentally important for assessing the mechanics of currency crises. More importantly, perhaps, the eruption of the East Asian currency crises in the summer and fall of 1997 has raised the question of whether the lessons from Mexico indeed have been learned by policymakers, private sector analysts, and international civil servants. More specifically, as a result of the recent events in South East Asia, many observers have argued that the international financial organizations—the IMF and the World Bank—and the governments of the advanced countries have failed to revamp the early warning system that was supposed to prevent a repetition of a Mexico-style crisis. This paper analyzes the causes behind the Mexican crisis, emphasizing the role of capital inflows, inflationary inertia, and real exchange rate overvaluation. I also ask a number of questions regarding the predictability of the crisis: Should Wall

Street analysts have known that things were getting out of hand? And if they did, why didn't they alert their clients? And, how much did officials at the U.S. Treasury know about the depth of the Mexican problems? What was the role of the media? I conclude that although the U.S. Treasury was fully aware of what was going on, most private sector analysts were unaware of the seriousness of the situation.

Economic Integration and Convergence: U.S. Regions, 1840–1987

Sukkoo Kim

NBER Working Paper No. 6335
December 1997
JEL Nos. N31, N32, O40, R12, F1

Despite the recent inroads made by models of interregional trade based on external economies, the analysis of the long-run trends in U.S. regional specialization in agriculture, manufacturing, wholesale trade, retail trade, services, and all economic activities indicate that these trends are more consistent with explanations based on the neoclassical Heckscher-Ohlin model. Furthermore, while the long-run trends in U.S. regional industrial structures do not explain all the variations in regional income per capita, they play an important role in causing U.S. regional incomes to diverge and then converge between the nineteenth and the twentieth centuries.

A Model of Endogenous Fiscal Deficits and Delayed Fiscal Reforms

Andrés Velasco

NBER Working Paper No. 6336
December 1997
JEL Nos. E6, H3, H4, H6, H7

This paper develops a political-economic model of fiscal policy, in which government resources are a "common property" out of which interest groups can finance expenditures on their preferred items. This setup has striking macroeconomic implications. First, fiscal deficits and debt accumulation occur even when there are no reasons for intertemporal smoothing. Second, those deficits can be eliminated through fiscal reform, but such a reform may only take place after a delay, during which government debt is built up.

The Estate Tax and After-Tax Investment Returns

James Poterba

NBER Working Paper No. 6337
December 1997
JEL Nos. H24, J14

This paper explores the effect of estate and gift taxes on the aftertax rate of return earned by savers. The estate tax affects only a small fraction of households—taxable decedents represented only 1.4 percent of all deaths in 1995—but the affected households account for a substantial fraction of household net worth. The estate tax can be viewed as a tax on capital income, with the effective rate depending on the statutory tax rate as well as the potential taxpayer's mortality risk. Because mortality rates rise with age, the effective estate tax burden is greater for older than for younger individuals. The estate tax adds approximately 0.3 percentage points to the average tax burden on capital income for households headed by individuals between the ages of 50 and 59. For households headed by individuals between the ages of 70 and 79, however, the estate tax increases the tax burden on capital income by approximately 3 percentage points. The effects are even larger for older households.

The paper also explores the fraction of the net worth held by households that are subject to the estate tax that could be transferred to the next generation with a program of "planned giving": using the $10,000 per donor per donee exemption from the gift tax. While roughly one quarter of potentially taxable assets could be transferred in this way, the actual levels of *inter vivos* giving are much lower than the levels that one would expect if households were taking full advantage of this tax avoidance strategy.

Channeling Domestic Savings into Productive Investment under Asymmetric Information: The Essential Role of Foreign Direct Investment

Assaf Razin, Efraim Sadka, and Chi-Wa Yuen

NBER Working Paper No. 6338
December 1997
JEL Nos. F21, F35, H25, H30

Foreign direct investment (FDI) is a predominant form of capital flow to low- and middle-income countries with insufficiently developed capital markets. This paper analyzes the problem of channeling domestic savings into productive investment in the presence of asymmetric information between the managing owners of firms and other portfolio stakeholders. We emphasize the crucial role played by FDI in sustaining equity-financed capital investment for economies plagued by such information problems. Similar problems also exist for foreign portfolio debt flows. We identify how, in the presence of information asymmetry, different capital market structures may lead to foreign over- or underinvestment and to domestic under- or oversaving, and thus to inefficient equilibriums. We show how corrective tax-subsidy policies, consisting of taxes on corporate income and on the capital incomes of both residents and nonresidents, can restore efficiency.

Quantitative Implications of the Home Bias: Foreign Underinvestment, Domestic Oversaving, and Corrective Taxation

Assaf Razin, Efraim Sadka, and Chi-Wa Yuen

NBER Working Paper No. 6339
December 1997
JEL Nos. F21, F25, H25, H30

There is strong evidence about a home-court advantage in international portfolio investment. One explanation for the bias is an information asymmetry between domestic and foreign investors about the economic performance of domestic firms. This asymmetry causes two types of distortions: an aggregate production inefficiency, and a production-consumption inefficiency, leading to foreign underinvestment and domestic oversaving respectively. Such market failures are quite severe, slightly more so with equity flows than with debt flows. These inefficiencies nonetheless can be corrected by a mix of tax-subsidy instruments, consisting of taxes on corporate income and on the capital incomes of both residents and nonresidents. When only a partial set of instruments is available, however, the prescription for each tax instrument can change radically, and even may be reversed, although the welfare gains can be fairly substantial and sometimes close to the first best optimum. This partial set of instruments appears to be more effective in handling the market failure in the case of equity flows than in the case of debt flows.

NBER Historical Papers

The American Business Elite in Historical Perspective

Peter Temin

NBER Historical Paper No. 104
October 1997
Development of the American Economy

This paper replicates a classic study of the American business elite. The older study, done a half century ago, reported the composition of business leaders one hundred years ago. I have drawn a sample of business leaders today to discover how much the composition of the American business elite has changed. As in the earlier study, the business elite is compared to a sample of political leaders. I find that democratization of the business elite has progressed only slightly in the past century, nowhere near as much as democratization of the political elite. Despite the myriad things that have changed in America in the last century, the composition of the business elite appears recognizably the same.

Operations of "Unfettered" Labor Markets: Exit and Voice in American Labor Markets at the Turn of the Century

Price V. Fishback

NBER Historical Paper No. 105
November 1997
JEL Nos. N3, J3, K2

The American economy at the turn of the century offers an excellent opportunity for studying relatively unregulated labor markets. In this essay I discuss the operation of labor markets in the early 1900s. After examining the mobility of workers, the integration of geographically dispersed labor markets, and a case study of the extent of employer monopsony, I examine the extent to which workers received compensating differentials for workplace disamenities, and the extent to which competition among employers reduced discrimination. During this period, institutions including the company town, company union, and share cropping developed. I reexamine these institutions to determine whether they were exploitative or instead helped to resolve problems with transactions costs. Finally, reformers pressed for workers' compensation and laws regulating women's hours, child labor, and workplace safety. I examine the impact of progressive legislation and discuss the political economy of its passage.

Historical Perspectives on the Economic Consequences of Immigration into the United States

Susan B. Carter and Richard Sutch

NBER Historical Paper No. 106
December 1997
JEL Nos. J61, N11, N12, N31, N32

This paper highlights the distinctive features of the theoretical approach of scholars who analyzed the impacts of mass migration into the United States in the two decades preceding World War I. Broadly speaking, this literature was couched in terms of the "aggregate production function," and emphasized advancing technology, and changes in productivity and factor proportions. There was also a focus on the close interrelatedness among the many diverse elements in the economy.

One notable difference between these historical studies and the recent literature on the impacts of immigration is that the current literature tends to concentrate only on the first-round consequences. It is easy to show that these will be harmful to resident workers who face direct competition. Economic historians writing about the earlier period of high immigration went beyond the first-round effects. Taking a long-run perspective, they identified many aspects of the mass immigration that were beneficial from the point of view of the resident population.

NBER Technical Papers

Horizon Length and Portfolio Risk

Christian Gollier and Richard J. Zeckhauser

NBER Technical Working Paper No. 216
October 1997
JEL Nos. G11, G10, D81
Asset Pricing

We compare the attitude towards current risk of two expected-utility-maximizing investors who are identical except that the first investor will live longer than the second. In one of the models we consider, there are two assets at every period. The first asset has a zero sure return, whereas the second asset is risky without serial correlation of yields. It is often suggested that the young investor should purchase more of the risky asset than the old investor under such circumstances. We show that a necessary and sufficient condition to get this property is that the Arrow-Pratt index of absolute tolerance (T_u) be convex. If we allow for a positive risk-free rate, the necessary and sufficient condition is T_u convex, plus T_u (0) = 0. It extends the well-known result that investors are myopic in this model if and only if the utility function exhibits constant relative risk aversion.

Cointegration and Long-Horizon Forecasting

Peter F. Christoffersen and Francis X. Diebold

NBER Technical Working Paper No. 217
October 1997
JEL No. C5
Economic Fluctuations and Growth

We consider the forecasting of cointegrated variables and show that, at long horizons, nothing is lost by ignoring cointegration when forecasts are evaluated using standard multivariate measures of forecast accuracy. In fact, simple univariate Box-Jenkins forecasts are just as accurate. Our results highlight a potentially important deficiency of standard forecast accuracy measures—they fail to value the maintenance of cointegrating relationships among variables—and we suggest alternatives that explicitly do so.

Algorithms for Solving Dynamic Models with Occasionally Binding Constraints

Lawrence J. Christiano and Jonas D. M. Fisher

NBER Technical Working Paper No. 218
October 1997
JEL Nos. C6, C63, C68
Economic Fluctuations and Growth

We describe and compare several algorithms for approximating the solution to a model in which inequality constraints occasionally bind. We then evaluate and compare their performance using various parameterizations of the single sector growth model with irreversible investment. We develop parameterized expectation algorithms which, on the basis of speed, accuracy, and convenience of implementation, appear to dominate the other algorithms.

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