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# NBER *Reporter*

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## Program Report

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### Health Care

Alan M. Garber

Notwithstanding the recent cessation of efforts toward comprehensive health care reform in Washington, improving the financing and delivery of health care remains a major issue for the public sector. Health care markets are undergoing dramatic change, as consolidation of health care organizations, the expansion of managed care, and increased price competition among health care providers have transformed the landscape of health care delivery. Members of the NBER's Program on Health Care have studied the phenomena now occurring in health care markets, worked to understand the factors leading to changes in health care markets, and analyzed the consequences of alternative policy options. This research program also has included efforts to forecast Medicare expenditures and to evaluate health care technologies. Members of the program include both young and well-established academic economists, as well as four physician-economists.

### Growth in Health Expenditures

In a recent paper,<sup>1</sup> David M. Cutler has compared the growth of health costs in the United States to that in the rest of the OECD. He finds that higher income is responsible for much of the higher cost of health care in the United States. Even after accounting for income effects, however, the growth of health costs in the United States in the 1980s outpaced the growth of health costs in other countries. This relative increase in spending was not associated with corresponding increases in longevity, though. Further, it is uncertain whether the lower cost growth in other countries, which was achieved largely by mandated reduction in prices for care, will continue in the future.

Medicare represents the largest public component of health care spending, and is responsible for a large fraction of the growth in the federal budget deficit. Thus, understanding why Medicare expenditures have grown is

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important for the development of health care cost containment strategies. For example, is expenditure growth concentrated among the groups of elderly Americans who have large claims? Or, has the expenditure growth been distributed equally across low- and high-cost users of services covered by Medicare, and across racial and gender categories?

To address such issues, Thomas E. MaCurdy and I<sup>2</sup> performed an analysis using data from a 5 percent file of Medicare hospital claims for 1986–90. We find that expenditure growth was not restricted to the highest-cost users, but rather occurred across the board. Expenditure growth for men, women, blacks, and whites, each viewed separately, also took place across the board. These findings suggest that cohort-targeted cost containment procedures are unlikely to curb overall Medicare expenditure growth. Identification of specific sources of growth, such as the procedures and diagnoses associated with rising expenditures, will be an important additional step in formulating cost containment policies.

## Health Care Technology: Costs, Use, and Effectiveness

The adoption and diffusion of new health care technologies is widely considered to be the most important controllable source of growth in health expenditures. Several NBER economists have explored how health care technology can explain cross-sectional variation in health expenditures. They also have developed and applied methods of evaluating health technologies.

Cutler and Mark McClellan<sup>3</sup> have investigated the causes of growth in hospital spending on heart attacks for the Medicare population. Between 1984 and 1991, that spend-

ing grew by 4 percent annually. Over the same time period, Medicare determined prices for heart attack care on an administered basis. The prices paid were essentially unchanged in real terms during that period. An increased use of intensive surgical procedures—cardiac catheterization, coronary artery bypass surgery, and angioplasty—accounted for the entire increase in spending on heart attacks.

The share of patients receiving one of these procedures rose from about 10 percent in 1984 to more than 40 percent in 1991. The procedures result in higher reimbursement levels than heart attacks treated with medication alone. McClellan<sup>4</sup> has found that virtually all growth in hospital expenditures under Medicare since implementation of the prospective payment system for inpatient care can be explained by favorable reimbursement for specific procedures. In particular, expenditure growth can be traced to the more frequent use of intensive technologies that receive supplemental Medicare payments. In contrast, expenditures for such traditional technologies as hospital and intensive-care stays for patients not receiving the intensive procedures have declined substantially.

Charles E. Phelps has examined causes of the significant variation (often five- to tenfold differences) in the per capita rates of use of various medical interventions across regions. He finds that incomplete diffusion of knowledge is the most plausible explanation for the range of treatment.<sup>5</sup> There is little market incentive for acquiring knowledge about the “right way to produce health.”<sup>6</sup>

McClellan also has found that observable patient characteristics account for only a small part of the variation across individuals in utilization.<sup>7</sup> Less than one-fourth of the va-

riation in Medicare hospital reimbursement is related to such factors as patient diagnoses and complicating conditions present on admission, and to characteristics of the admitting hospital. All of the remaining variation in expenditures is attributable to retrospective case-specific factors, such as whether or not the patient received a particular intensive procedure, and whether the admission involved unusually high costs.

Several NBER researchers have studied the application of cost-effectiveness analysis to medical interventions. Phelps and I have shown<sup>9</sup> how a cost-effectiveness criterion can be derived. We further show that while cost-effectiveness analysis can be a useful and powerful tool, in the presence of varied preferences and personal characteristics, it is unlikely to yield the optimal allocation of resources at the population level.<sup>9</sup>

McClellan has addressed the effectiveness of various health interventions in the treatment of heart attacks in the elderly.<sup>10</sup> Using data on all elderly Americans hospitalized for new heart attacks between 1984 and 1991, he and his colleagues found that patients who received intensive cardiac procedures appeared to have substantially better outcomes than those who did not. McClellan then developed an instrumental-variables approach, using measures of patients' differential access to hospitals capable of performing intensive cardiac procedures. Through detailed medical records, he confirms that the characteristics of patients “near” and “far” to hospitals performing intensive procedures are very similar; thus, this method of analysis appears to eliminate substantial problems of selection bias.<sup>11</sup> One of these studies<sup>12</sup> was named an outstanding contribution to health pol-

icy research in 1994 by the Association for Health Services Research. The instrumental-variables method appears to be generally applicable to the analysis of other medical technologies, and McClellan and I now use it to analyze the cost effectiveness of care for other severe illnesses.

In more recent work,<sup>13</sup> McClellan has extended this methodology to broader questions of the benefits of technological change in health care over the past decade. He finds in general that the returns to technological change are not declining, but they vary substantially across different kinds of medical treatments and hospitals.

## Provider Behavior and the Organization of Health Care

Laurence C. Baker has analyzed the effects of health maintenance organizations (HMOs) on health care markets, including how HMOs affect fee-for-service physicians and other non-HMO providers. He finds that fees for normal office visits do fall in response to increases in HMO market share, but that physicians' incomes are not affected.<sup>14</sup> In addition, there is no evidence that quantities of service fall in response to increases in HMO market share. Another paper<sup>15</sup> considers the relationship between HMO market share and premiums for traditional indemnity health insurance, finding that increases in HMO market share are associated with declines in premiums.

In the face of negative shocks to income, physicians may exploit their relationship with patients by providing excessive care. Jonathan Gruber and Maria Owings consider the financial environment facing obstetrician/gynecologists because

of declining fertility in the United States.<sup>16</sup> They claim that the 13.5 percent fall in fertility from 1970 to 1982 led ob/gyns to substitute for normal childbirth the more highly reimbursed alternative, cesarean delivery. Using national data for the period, they show that within-state declines in fertility are highly correlated with within-state increases in cesarean utilization.

Martin Gaynor and Paul J. Gertler have a long-standing interest in incentive effects of the organizational form of physician groups. In a recent study,<sup>17</sup> they show that physician attitudes toward risk have dramatic effects on the incentives chosen by medical group practices, and have important consequences for productivity. They estimate that the most risk-averse physicians sacrifice over 10 percent of their annual gross income by choosing incentive schemes that induce less productivity.

This work has strong implications for public policy toward physician payment and optimal contracting of private physicians. First, optimal payment schemes will allow for risk aversion among physicians and thus not base compensation solely on performance. Second, since physicians differ in their attitudes toward risk, there will be no single payment contract that is optimal, both in terms of physicians' welfare and in terms of eliciting the desired responses from them.

Gaynor and Gertler<sup>18</sup> examine how contracts with health plans affect physician practice. The majority of U.S. physicians now have some contractual relationship with a health plan. Using the Socioeconomic Monitoring Survey of the American Medical Association, Gaynor and Gertler find that physicians who derive a greater proportion of their revenues from HMO

or IPA contracts spend fewer hours in patient care, work fewer total hours, and have lower incomes. They also see fewer patients in the office, and make fewer referrals.

## Issues in Health Insurance

Economic theory generally has argued that rising insurance costs should not affect employment. Since the provision of health insurance is voluntary, firms will offer it only if employees are willing to "buy it" in the form of lower wages. Cutler and Brigitte C. Madrian claim that this argument is not complete.<sup>19</sup> Because health insurance is a fixed cost but wages are a marginal cost, increases in health insurance costs that are offset by wage reductions will raise the ratio of fixed to marginal costs in employment. As a result, employers will have incentives to reduce the number of workers but to increase the hours worked. Using data on hours of work and health insurance costs from 1980 through 1992, they find that the rising cost of health insurance has led to an increase of between one and two hours of work per week over the past decade.

Cutler also has investigated reasons for the low rate of employment-based health insurance. In one paper,<sup>20</sup> he finds that firms with low-wage employees or high turnover have much more variable health insurance premiums than firms with high wages and low turnover.

Low rates of health insurance coverage among the nonemployed have motivated consideration of policies to subsidize the purchase of insurance for those who are without a job. Gruber and Madrian analyze data on men aged 25 to 54 between 1983 and 1989.<sup>21</sup> They

find first that, even after taking into account differences in tastes for insurance, the likelihood of coverage drops by roughly 20 percentage points separation after separation from a job. Second, limited subsidization of the cost of insurance through state laws mandating continued access to employer-provided health insurance for the nonemployed increases by 6.7 percent the likelihood of having insurance although without a job. Third, these mandates increase the number of individuals with spells of nonemployment, and the total amount of time spent jobless. Still, at least some of this increased nonemployment appears to be spent in productive job search, since the availability of continuation coverage is related to significant wage gains among those who separate from their jobs.

A key question for health care reform in the United States is whether expanded eligibility for health insurance will lead to improvements in health outcomes. Gruber and Janet Currie address this question in the context of dramatic changes during 1979-92 in Medicaid eligibility for pregnant women.<sup>22</sup> They find first that while the changes dramatically increased the Medicaid eligibility of pregnant women, they did so at quite different rates across the states. Second, the changes lowered the incidence of infant mortality and low birthweight: the 30 percentage point increase in eligibility among 15-44-year-old women was associated with a decrease in infant mortality of 8.5 percent. Third, earlier targeted changes in Medicaid eligibility, which were restricted to specific low-income groups, had much larger effects on birth outcomes than broader expansions of eligibility to women with higher income levels. These targeted changes,

which raised Medicaid expenditures by \$840,000 per infant life saved, were fairly cost effective compared to conventional estimates of the value of a life. Gruber and Currie conclude that public policy on insurance can improve health, but that translating eligibility to coverage may be the key link in making public insurance effective.

Finally, Martin Feldstein and Gruber use data from the National Medical Expenditure Survey to study the effects of substituting a "major risk insurance" (MRI) policy for traditional health insurance.<sup>23</sup> MRI policies would reduce the distortion in the demand for care but would increase the net risk that households bear. On balance, the reduced distortion would have greater value to households than the increased risk bearing. In the aggregate, an MRI policy with a 50 percent coinsurance rate but a maximum out-of-pocket payment of 10 percent of income would create a positive gain of \$34 billion a year among households with members below age 65.

## Current Research Initiatives and Future Reports

Several members of the health care program (David A. Wise, McClellan, MaCurdy, Cutler, and I, among others) are analyzing large health insurance claims files to address a number of critical issues in health expenditure growth and the evaluation of medical technologies. Other areas of current focus include general strategies toward cost containment, and developing analyses to support projections of Medicare expenditures and to estimate the impact of alternative Medicare policies.

Since this program is so active, another report on its activities (many of which could not be de-

scribed here) will appear in the *NBER Reporter* within the next year.

<sup>1</sup>D. M. Cutler, "Does the United States Spend Too Much on Medical Care?" unpublished manuscript delivered at NBER-JCER conference on "The Economics of Health Care," Tokyo, December 1994.

<sup>2</sup>A. M. Garber and T. E. MaCurdy, "Nursing Home Discharges and Exhaustion of Medicare Benefits," in *Journal of the American Statistical Association* 88 (1993), pp. 727-736.

<sup>3</sup>D. M. Cutler and M. McClellan, "Determinants of Technology Change in Medical Practice," unpublished manuscript presented at NBER conference on "The Economics of Aging," Cambridge, May 1995.

<sup>4</sup>M. McClellan, "The Sources of Hospital Expenditure Growth in Medicare," unpublished manuscript.

<sup>5</sup>C. E. Phelps and C. Mooney, "Variations in Medical Practice Use: Causes and Consequences," in *Competitive Approaches to Health Care Reform*, R. J. Arnould, R. F. Rich, and W. D. White, eds. Washington, DC: The Urban Institute Press, 1993.

<sup>6</sup>C. E. Phelps, "Diffusion of Information in Medical Care," *Journal of Economic Perspectives* 6, 3 (Summer 1992), pp. 23-42.

<sup>7</sup>M. McClellan, "Medicare Reimbursement and Hospital Cost Growth," in *Topics in the Economics of Aging*, D. A. Wise, ed. Chicago: University of Chicago Press, forthcoming.

<sup>8</sup>A. M. Garber and C. E. Phelps, "Economic Foundations of Cost-Effectiveness Analysis," NBER Working Paper No. 4164, September 1992.

<sup>9</sup>See *Valuing Health Care: Costs, Benefits, and Effectiveness of Pharmaceuticals and Other Medical Technologies*, F. A. Sloan, ed. Cambridge, U.K.: Cambridge University Press, 1995.

<sup>10</sup>M. McClellan, B. McNeil, and J. Newhouse, "Does More Intensive Treatment of Acute Myocardial Infarction in the Elderly Reduce Mortality?" *Journal of the American Medical Association* 272, (1994), pp. 859-866; M. McClellan, "Uncertainty, Health Care Technologies, and Health Care Costs," *American Economic Review* 85, 2 (1995), pp. 38-44; M. McClellan and J. Newhouse, "The Marginal Benefits of Medical

Technology," unpublished manuscript, and "The Marginal Costs and Benefits of Medical Technology: A Panel Instrumental-Variables Approach," *Journal of Econometrics*, forthcoming.

<sup>11</sup>M. McClellan, E. Guadagnoli, and P. Cleary, "The Validity of Instrumental-Variables Estimation Methods," unpublished manuscript.

<sup>12</sup>See McClellan, McNeil, and Newhouse, *op. cit.*

<sup>13</sup>M. McClellan, "Costs and Survival Benefits of Technological Change: Acute Myocardial Infarction in the Elderly," *Proceedings of the National Academy of Sciences*, forthcoming; and "The Marginal Returns to Technological Change in Health Care," unpublished manuscript.

<sup>14</sup>L. C. Baker, "Does Competition from HMOs Affect Fee-For-Service Physicians?" NBER Working Paper No. 4920, November 1994.

<sup>15</sup>L. C. Baker and K. S. Corts, "The Effect of HMOs on Conventional Insurance Premiums: Theory and Evidence," NBER Working Paper No. 5356, November 1995.

<sup>16</sup>J. Gruber and M. Owings, "Physician Financial Incentives and the Cesarean Section Delivery," NBER Working Paper No. 4933, November 1994, and *RAND Journal of Economics*, forthcoming.

<sup>17</sup>M. Gaynor and P. J. Gertler, "Moral Hazard and Risk Spreading in Medical Partnerships," *RAND Journal of Economics*, forthcoming.

<sup>18</sup>M. Gaynor and P. J. Gertler, unpublished manuscript, 1995.

<sup>19</sup>D. M. Cutler and B. C. Madrian, "Labor Market Responses to Rising Health Insurance Costs," unpublished manuscript.

<sup>20</sup>D. M. Cutler, "Market Failure in Small Group Health Insurance," NBER Working Paper No. 4879, October 1994.

<sup>21</sup>J. Gruber and B. C. Madrian, "Non-employment and Health Insurance Coverage," NBER Working Paper No. 5228, August 1995.

<sup>22</sup>J. Currie and J. Gruber, "Saving Babies: The Efficacy and Cost of Recent Expansions of Medicaid Eligibility for Pregnant Women," NBER Working Paper No. 4644, February 1994.

<sup>23</sup>M. Feldstein and J. Gruber, "A Major Risk Approach to Health Insurance Reform," in *Tax Policy and the Economy*, Volume 9, J. M. Poterba, ed. Cambridge, MA: MIT Press, 1995.

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## Research Summaries

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### Modeling International Financial Markets

Bernard Dumas

A large number of issues in the field of international economics depend on one crucial question: Is the worldwide financial market integrated, or is it made up of a number of segments with imperfect capital mobility among them?

To try to decide this issue, some macroeconomists have derived clues from macroeconomic variables. Feldstein and Horioka,<sup>1</sup> for example, have examined the behavior of national savings and investment, testing for complete segmentation. But high correlations found between savings and investment could be compatible as easily with full integration of capital markets.

A second macroeconomic avenue is based on the correlation among consumption rates across countries. Under integration and certain other conditions, national consumption rates ought to be correlated perfectly. In fact, the correlations are very low (in many cases lower than for national production rates). But the correlations may be low because financial markets, although integrated, are incomplete.

Evidence from the composition of aggregate portfolios of national investors also indicates that portfolios are not diversified worldwide nearly as much as they should be in a fully integrated world. This fact is called the "home-equity bias."

In principle, the best way to decide the matter of integration versus segmentation is to look at prices in financial markets. If simi-

lar assets—or similar dimensions of risk—traded in different places do not receive the same price, then full integration does not exist. Furthermore, data on prices in the financial market are plentiful, more so than macroeconomic data.

However, the approach based on financial-market prices necessarily relies on some model of the relationship between expected return and risk. Deviations from the pricing model act as "noise" in the data, and prevent any clear empirical conclusion on the issue of segmentation. Therefore, it is important to have a model that provides a decent degree of explanation of the worldwide cross section of asset returns at any given time. Here I discuss two aspects of such a model on which some progress has been made recently.

#### The Pricing of Exchange Risk

Prima facie, it would seem that randomly fluctuating exchange rates could be a cause of market segmentation, since investing abroad brings returns that are subject to exchange risk, whereas investing at home does not. Exchange risk is important mainly because deviations from Purchasing Power Parity (PPP)—for example, movements in real exchange rates—cause investors who consume in different places to adopt different attitudes toward the same securities.

However, currency-based financial instruments provide a way of

hedging exchange risk, at a price. The hedge is considered perfect when nominal and real exchange rates are correlated perfectly.<sup>2</sup> It is imperfect, but empirically nearly perfect, when they are not.<sup>3</sup> As a result, equity portfolios should be well diversified in equilibrium despite the presence of exchange risk. Since it is believed that in fact they are not, the model is rejected in principle.

It is not inconceivable that the model nonetheless would provide some indication of the pricing of exchange risk. In view of our goal of determining whether "similar" assets are priced similarly, controlling for the price of exchange risk is certainly important.

In a recently published paper,<sup>4</sup> Solnik and I show empirically that exchange risk receives a statistically significant price, and therefore constitutes a dimension of risk for each security (measured by the covariance of each security with exchange rates) that must be taken into account. The degree of fit of the model is not yet sufficient, however, to provide evidence of segmentation.

#### The Time-Varying Nature of Risk and Returns

The insufficient degree of fit of a pricing model conceivably could be caused by the fact that the first and second moments, corresponding to expected return and risk, move over time. Any empirical test

that does not capture these movements properly from period to period, could fail to detect the pricing relationship. Therefore, it is important to identify variables—called “state variables,” or “information variables,” or “instrumental variables”—that properly track the movements of *ex ante* risk and return over time. For instance, one weakness of the Dumas–Solnik test is that the variables used as instruments presumably do a decent job at tracking expected returns but do a poor one at tracking the degree of risk of each security. As a result, the market price of risk in that empirical implementation is bound to move excessively. Also, being a security-independent variable, the market price of risk is not capable of compensating for the improperly modeled movement of risk, which is a security-specific variable. The inadequate fit conceivably could be ascribed to that.

Empirical research on international asset price data, following Harvey,<sup>5</sup> has relied on instrumental variables, most of which are “internal” to the financial market: lagged rates of return; dividend yields; short-term rates; term and default spreads derived from bond-market data; January dummies; and so on. Solnik and I have followed Harvey’s lead in this respect.

The theoretical reason why these “internal” variables would track *ex ante* risk and return reliably over time has not been clarified. I recently tried to use instrumental variables that are “external” to the financial markets and that relate the market to the economy. At an NBER conference,<sup>6</sup> I presented an article showing empirically that Stock and Watson’s<sup>7</sup> new leading indicators of the U.S. business cycle, which do not include financial indicators, do a reasonable job

of tracking expected stock returns in the United States and abroad, but do a poor job at tracking expected returns on currencies.

I have a program of research underway now with Campbell R. Harvey to investigate the tracking ability of non-U.S. leading indicators. Another program of research, with Bertrand Jacquillat, aims to determine whether firm-specific variables (such as price–earnings ratios, price-to-book ratios, and analysts’ forecasts of earnings) help in tracking the risk and returns of a large panel of European corporations.

## General Equilibrium Models

The search for instrumental variables by empirical means may be a wild goose chase. If a reasonable general equilibrium model of international market equilibrium were available, the model would dictate the list of variables that represent the “state of the economy.” These may not be observable, or may not be observable with sufficient frequency, in which case a search for proxy variables would be needed. The empirical task of finding proxies for state variables would be defined more precisely than that of finding state variables themselves, without any guidance from theory.

I<sup>8</sup> set out to build a stochastic model that: 1) endogenizes deviations from the Law-of-One-Price (LOP) in commodities; 2) prices exchange risk in equilibrium; and 3) provides state variables that track expected risk and return over time. The device that I use to produce deviations from parity in commodity prices is a “shipping cost.” The world economy is made up of two countries, each with its own capital stock. The current levels of those stocks are the state variables. Ship-

ping physical resources from one country to the other is costly. The cost is assumed to be proportional to the physical amount transferred. In this model, the single good is sometimes traded, sometimes not.

In each country, the physical resources may be consumed at will, invested in the local production process, or transferred abroad. The local production process is risky, with constant risk and constant returns to scale. There is no correlation between the output shocks in the two countries. Households consume only the physical resources currently available in their country. The shipping cost is the only friction present in the model. Financial markets are fully integrated and frictionless. Perfect competition is assumed in all markets. Equilibrium is calculated as a central planning problem.

The price variable of interest in the model is the price of physical resources currently located in one country relative to physical resources currently located in the other; this price is the deviation from the LOP and is called “the real exchange rate.” It is at once the relative price of goods and the relative price of the equities of the firms operating in the two countries. The exchange rate fluctuates around one (or, parity); it stays within a band, the width of which is determined by the transportation loss factor.

My main purpose in building the model is to derive endogenously the stochastic process for LOP deviations within the band that are compatible with financial market equilibrium. The process I obtain shows reversion in the mean. It also displays a strong degree of heteroskedasticity;<sup>9</sup> the conditional variance is equal to zero at the edges of the band and is largest at

the central point. The variance behavior causes the real exchange rate process to be "centrifugal," despite reversion in the mean: the chance of a move away from parity is greater than that of a move toward parity.

The important consequence of this centrifugal behavior is persistence. The transfers of physical resources that occur between the two countries keep the same sign for "very long" periods of time. The variance of the exchange rate is also persistent. These features accord well with the facts. In particular, they imply positive serial correlation in observations of the real exchange rate over the shorter run. Over the longer run, shipments "push back" the real exchange rate to the inside of the band, and the serial correlation becomes negative.

In other respects, the model is unsatisfactory. Lumping together consumption and capital goods in each country causes the price of capital in each country to be fixed. The correlation between consumption across countries is conditionally equal to one and unconditionally close to one; this does not accord well with the facts.

An area of great potential for immediate research is based on ex-

tant models of international business cycles that are derived from the "Real Business Cycle" approach. Since these models feature intertemporally optimizing agents, they provide an opportunity to endogenize asset prices.

General-equilibrium models that feature a financial market all run into major difficulties. The most troublesome one is the "equity premium puzzle" that has been identified in the domestic context by Mehra and Prescott.<sup>10</sup> consumption and marginal utility, as a basis for pricing, follow a path that is excessively smooth and cannot account for the comparatively large variability of asset returns. Another stumbling block arises from the solution technique used so far for general equilibrium models: equilibriums can be calculated conveniently when they are also Pareto optimal. In the international context, commodity price rigidities eventually will be needed to introduce PPP deviations into the model, but these will preclude a solution technique based on Pareto optimums. These and related issues are discussed further in my recent survey.<sup>11</sup>

<sup>1</sup>M. Feldstein and C. Horioka, "Domestic Savings and International Capital Flows," *Economic Journal* 90 (1980), pp. 314-329.

<sup>2</sup>B. Solnik, "An Equilibrium Model of the International Capital Market," *Journal of Economic Theory* 8 (1974), pp. 500-524; and Sercu, "A Generalization of the International Asset Pricing Model," *Revue de l'Association Française de Finance* 1 (1980), pp. 91-135.

<sup>3</sup>M. Adler and B. Dumas, "International Portfolio Choice and Corporation Finance: A Synthesis," *Journal of Finance* 38 (1983), pp. 925-984.

<sup>4</sup>B. Dumas and B. Solnik, "The World Price of Foreign Exchange Risk," *Journal of Finance* 50 (1995), pp. 445-479.

<sup>5</sup>C. R. Harvey, "The World Price of Covariance Risk," *Journal of Finance* 46 (1991), pp. 111-158.

<sup>6</sup>See The Internationalization of Equity Markets, J. A. Frankel, ed. Chicago: University of Chicago Press, 1994.

<sup>7</sup>Business Cycles, Indicators, and Forecasting, J. H. Stock and M. W. Watson, eds. Chicago: University of Chicago Press, 1993.

<sup>8</sup>B. Dumas, "Dynamic Equilibrium and the Real Exchange Rate in a Spatially Separated World," *Review of Financial Studies* 5 (1992), pp. 153-180.

<sup>9</sup>Note that the heteroskedasticity in the exchange rate is endogenous. Output shocks in each country are assumed homoskedastic.

<sup>10</sup>R. Mehra and E. C. Prescott, "The Equity Premium: A Puzzle," *Journal of Monetary Economics* 15, (1985), pp. 145-161.

<sup>11</sup>B. Dumas, "Partial-Equilibrium Versus General-Equilibrium Models of the International Capital Market," in *The Handbook of International Macroeconomics*, F. van der Ploeg, ed. Cambridge, U.K.: Blackwell Publishers, 1994.

## Generational Accounting

Laurence J. Kotlikoff

Generational accounting is a method of long-term fiscal analysis and planning that I developed with Alan J. Auerbach and Jagadeesh Gokhale.<sup>1</sup> It is used to assess the sustainability of fiscal policy and to measure the fiscal burdens facing current and future generations. Al-

though the concept is only five years old, it already has been applied to the United States, Germany, Italy, Norway, Sweden, Canada, New Zealand, Australia, and Thailand.<sup>2</sup> In addition, generational accounting projects are underway for Japan, Portugal, and Argentina. The U.S. government has included generational accounts in past edi-

tions of its *Federal Budget*,<sup>3</sup> and it is being implemented by New Zealand's Treasury and the Bank of Japan, as well. This article first briefly describes generational accounting, then compares it to deficit accounting, applies it to U.S. fiscal policy, considers its shortcomings, and finally suggests areas for future research.

## How It Works and What It Does

Generational accounting is based on the government's intertemporal budget constraint that requires that either current or future generations pay the government's bills (which are the present value of the government's projected future purchases of goods and services, plus its official net financial liabilities). Subtracting from these bills the present value of projected future net tax payments of current generations yields the present value net tax burden facing future generations that is implicit in current policy. (Net tax payments are taxes paid minus Social Security, Medicare, and other transfer payments received.)<sup>4</sup>

The net tax burden facing future generations divided by the present value of their projected labor earnings will produce a lifetime net tax rate. By comparing the lifetime net tax rates facing future generations with those facing current newborns (who are assumed to pay, over their lifetimes, only the net taxes implied by current policy), one can assess the sustainability of current fiscal policies. For example, if the lifetime net tax rate facing future generations is higher than the rate facing newborns, then maintaining current policy through time—which means taxing successive new generations at the same rate as current generations—is not sustainable, because it won't pay all of the government's bills.

Generational accounting also calculates the (present value) changes in net taxes of generations, both living and future, that result from changes in fiscal policies. For example, an expansion of pay-as-you-go-financed Social Security retirement benefits will help current older and harm current younger and future generations, according

to generational accounting. Specifically, this method records the reduction in the present value net tax payments of older generations arising under the policy as well as the increase in the present value net tax payments of young and future generations (whose increased payroll taxes have a larger present value than do their increased Social Security retirement benefits).<sup>5</sup>

Finally, generational accounting can identify the set of sustainable policies available to the government. For example, it can be used to calculate the immediate and permanent annual percentage increase in income tax revenues (relative to the baseline projected time path of these revenues) needed to achieve intertemporal budget balance. This calculation takes the government's projected expenditures and non-income tax receipts as given and asks: "By what percentage would one need to immediately and permanently raise income taxes so as to be able (in conjunction with other tax receipts) to pay for the government's projected future expenditures and its current net financial liabilities, and never have to raise taxes again?"

This sustainability calculation is, by the way, essentially identical to that undertaken annually by the Social Security trustees when they calculate the immediate and permanent percentage increase in payroll taxes needed to equate the present value of projected future Social Security expenditures to the present value of projected future taxes plus the current Social Security trust fund. Indeed, if one were to include only Social Security benefits and taxes in the construction of generational accounts, one would end up with, essentially, the *Trustee's Report of the Social Security Administration*.

## Scope and Construction of Generational Accounts

Like the *Trustee's Report*, generational accounting incorporates fiscal, demographic, and growth projections. But unlike the *Trustee's Report*—which considers only Social Security taxes, transfers, and assets—generational accounting provides a comprehensive analysis of the United States' and other countries' fiscal situations. It does so by considering all taxes, transfers, net financial liabilities, and government spending at all levels of government (federal, state, and local).

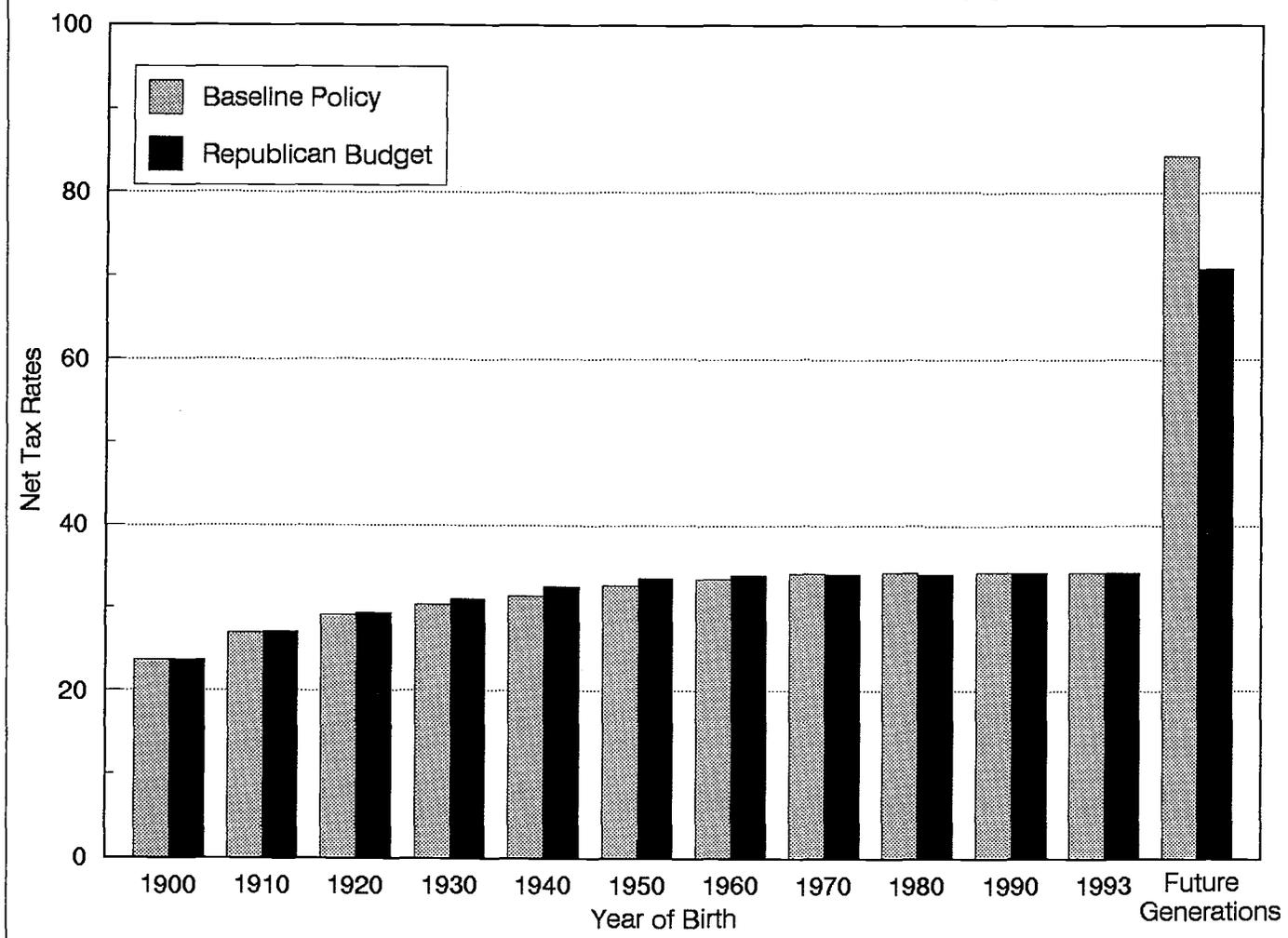
The projections used in U.S. generational accounting are provided by the government, including the Office of Management and Budget, the Social Security Administration, and the Health Care Financing Administration. Projected totals of taxes and transfers (on a national income account basis) are distributed by age and sex to existing generations based on age-sex profiles derived from cross-section surveys and other information. Generational accounting simply applies arithmetic to these data.

## U.S. Generational Accounts

Chart 1 presents lifetime net tax rates of generations born in this century as well as rates of future generations.<sup>6</sup> The dark bars show the net tax rates under baseline policy: U.S. fiscal policy as of 1995. The light bars show net tax rates under the Republican budget passed by Congress and rejected by the president in the late fall of 1995, a budget that promised to reduce the deficit to zero by 2002.

Under baseline policy, lifetime net tax rates increase from 24 per-

Chart 1  
U.S. Lifetime Net Tax Rates Under Alternative Policies



cent for the generation born at the turn of the century to 34 percent for children who have just been born. In other words, over the course of this century the net tax rate of successive living generations rises by over 40 percent. This growth in net taxation notwithstanding, future generations face a dramatically higher lifetime net tax rate, equal to 84 percent!<sup>7</sup> Since future generations would receive positive transfer payments, their gross tax rate in fact would exceed 84 percent.

The Republican budget plan raises the net tax rates of current generations primarily by slowing the growth of Medicare and Medicaid transfers. The higher net taxation of current generations, coupled with reduced levels of future government purchases, lowers the net tax rate facing future generations, but not by much. The rate declines from 84 percent to 71 percent, whereas the 34 percent net tax rate facing newborns increases marginally.<sup>8</sup>

The plan to balance the budget

by 2002 doesn't come close to achieving generational balance, defined as equal lifetime net tax rates facing newborn and future generations. That's because the plan doesn't reduce government debt but lets it grow by hundreds of billions of dollars for seven more years and then permits it to continue to grow after 2002. The plan doesn't stabilize the growth of Medicare and Medicaid benefits: these benefits continue to grow year after year at roughly twice the rate of the economy. Nor would

balancing the budget in 2002 change America's demographic/fiscal dilemma: the fact that the enormous cohort of baby boomers starts collecting Social Security benefits in just 12 years and Medicare benefits in just 15 years.

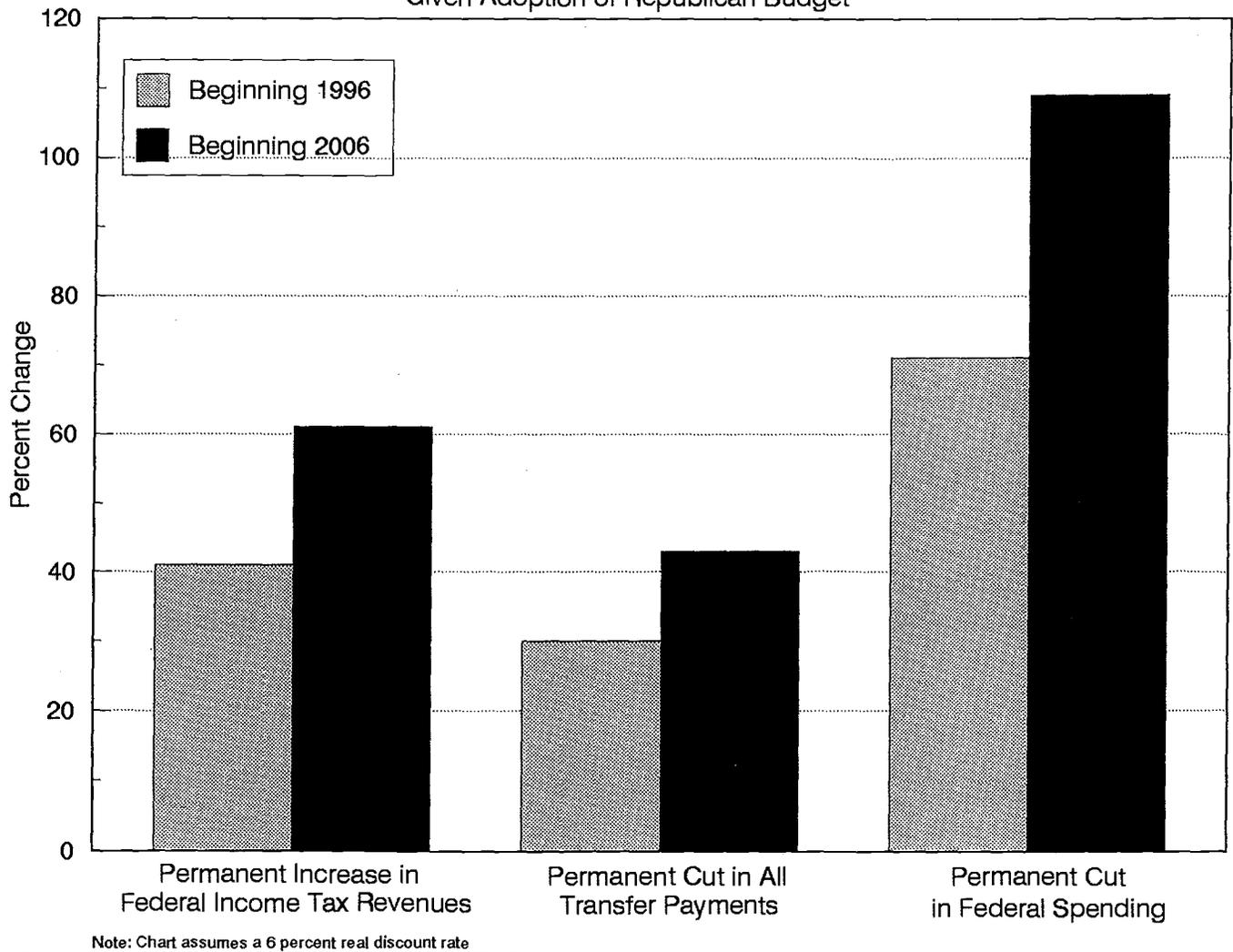
### Generational Accounting Versus Deficit Accounting

As just illustrated, budget balance and generational balance bear

no necessary relationship. Nor should they. Notwithstanding its ubiquitous use in the analysis of fiscal affairs, the deficit does not provide the answer to a well-posed economic question.<sup>9</sup> Rather it is a reflection of economically arbitrary decisions by the government with respect to the labeling of government receipts and payments.<sup>10</sup> This is not true with generational accounting, since the answers to the key economic questions it addresses do not vary with the choice of fiscal labels.<sup>11</sup>

Take, for example, the question of whether "the" federal deficit should be defined to exclude Social Security's surplus. Under such a definition, the administration's 1995 plan to balance the budget in 2005 produces a \$135 billion deficit in that year rather than a zero deficit.<sup>12</sup> If the deficit is defined to exclude all Social Security contributions (not simply those in excess of outlays), on the grounds that each dollar contributed purchases an implicit I.O.U. for future benefits from the

Chart 2  
Alternative Policy Changes Needed To Achieve Generational Balance Given Adoption of Republican Budget



government, then the 2005 deficit under the administration's policy is over \$1 trillion rather than zero.

## Achieving Generational Balance in the United States

Assuming the adoption of a budget that eliminates the fiscal deficit in 2002, what additional policies can achieve generational balance? Chart 2 provides some answers. It shows alternative policies, beginning either in 1996 or 2006, which would equalize the lifetime net tax rates facing newborns and future generations, albeit at different levels. The three types of policies considered are permanent percentage increases in federal income tax revenues, permanent percentage reductions in all federal transfer payments, and permanent percentage cuts in federal government purchases. Each of these policies is sustainable in that, once undertaken, no additional adjustments are projected to be needed to satisfy the government's intertemporal budget constraint.

Achieving generational balance by raising federal income taxes requires a 41 percent increase in revenues if the increases begin in 1996, and a 61 percent increase if they begin in 2006.<sup>13</sup> The equalized lifetime net tax rates facing current and future newborns are, in these two cases, 41 and 44 percent, respectively. If cuts in Social Security, Medicare, and other federal transfer payments are used instead to achieve generational balance, then a 30 percent cut is needed beginning in 1996 and a 43 percent cut is needed beginning in 2006.<sup>14</sup> For these two policies, the equalized lifetime net tax rates are 30 and 40 percent, respectively. Finally, generational balance could

be achieved by cutting federal purchases by 71 percent starting in 1996, or by an infeasible 109 percent starting in 2006. In both of these cases, the equalized lifetime net tax rate is 34 percent.<sup>15</sup>

Chart 2 tells us three things: First, balancing the budget in 2002 by itself falls very far short of the kinds of fiscal adjustment needed to produce generational balance and achieve a sustainable policy. Second, the longer the government waits to achieve generational balance, the more painful the fiscal adjustment will be. Third, achieving generational balance will require policy initiatives beyond those currently being discussed.

## Shortcomings of Generational Accounting

As indicated, generational accounting doesn't rely on a fully articulated, stochastic, general equilibrium simulation model. Instead, it combines governments' own forecasts of receipts and payments with other information. Its simplicity is both a strength and a weakness. Because generational accounting does not consider general equilibrium feedbacks, it provides only an approximation to the true generational welfare effects (incidence) of changes in fiscal policy.<sup>16</sup> The quality of this approximation depends on the extent to which the actual incidence of fiscal changes is distributed across generations in accordance with generational accounting procedures for allocating aggregate changes in taxes and transfers to specific generations.

Hans Fehr and I studied the size of the approximation error in using generational accounting to assess generational incidence.<sup>17</sup> We simulated a variety of fiscal policies in

closed- and open-economy versions of the Auerbach-Kotlikoff Dynamic Life-Cycle Simulation Model, and compared the dollar value of the actual change in utility of particular generations with the change in their generational accounts. We found that changes in generational accounts generally provide fairly good approximations to generations' actual utility changes. The approximations are better for living generations. They are worse for policies that involve significant changes in fiscal distortions, and they are worse in economies with sizable capital-adjustment costs.

Using a life-cycle model automatically rules out the possibility, raised by Robert J. Barro and Gary S. Becker, that private intergenerational transfers offset government intergenerational redistribution. Were this the case, there would be much less need for generational accounting. However, recent coauthored studies of mine sharply reject such models. At the cohort level, postwar U.S. intergenerational redistribution from young and future generations to older generations has been associated with dramatic increases in the relative consumption of older Americans.<sup>18</sup> The data speak quite clearly: older generations are spending the transfers they receive; they aren't giving them to their children via larger inter vivos transfers, or leaving them to their children via larger bequests. Indeed, the U.S. government's past and ongoing policy of transferring from young savers to old spenders appears to be the major cause for the greater-than-two-thirds decline in the U.S. national saving rate since 1950.<sup>19</sup> This cohort-level rejection of intergenerational altruism is very strongly confirmed by studies of the consump-

tion and inter vivos transfers of individual extended American families.<sup>20</sup>

Perhaps the most important concern about generational accounting is the choice of the proper discount rate to use in an uncertain world featuring multiple assets and incomplete markets. The key question is how to properly discount future tax payments and receipts of transfers in light of the riskiness of these payments and receipts. This is an important area for future research on generational accounting.

## Conclusion

Notwithstanding all the attention they receive, fiscal deficits are largely beside the point when it comes to considering either the sustainability of fiscal policy or the fiscal burdens being placed on young and future generations. In contrast to deficit accounting, generational accounting represents a direct attempt to assess the sustainability of fiscal policy and to determine which generations will pay for the government's bill. Application of general accounting to the United States shows that current U.S. fiscal policy is unsustainable and that recent budget proposals fall far short of what is needed to prevent placing enormous fiscal burdens on the children of today and tomorrow.

<sup>1</sup>See A. J. Auerbach, J. Gokhale, and L. J. Kotlikoff, "Generational Accounts: A Meaningful Alternative to Deficit Accounting," in *Tax Policy and the Economy*, Volume 5, D. F. Bradford, ed. Cambridge, MA: MIT Press, 1991, pp. 55-110; and L. J. Kotlikoff, *Generational Accounting*, New York: The Free Press, 1992.

<sup>2</sup>See A. J. Auerbach, J. Gokhale, L. J. Kotlikoff, and E. Steigum, Jr., "Generational Accounting in Norway: Is Norway Overconsuming Its Petroleum Wealth?" *The Ruth Pollak Working Pa-*

*per Series on Economics No. 24*; Boston University Department of Economics, October 1993; D. Franco, J. Gokhale, L. Guiso, L. J. Kotlikoff, and N. Sartor, "Generational Accounting—The Case of Italy," in *Saving and the Accumulation of Wealth*, A. Ando, L. Guiso, and I. Visco, eds. Cambridge, UK: Cambridge University Press, 1993, pp. 128-162; J. Gokhale, B. Raffelbueschen, and J. Walliser, "The Burden of German Unification: A Generational Accounting Approach," mimeo, Federal Reserve Bank of Cleveland, September 1994, and in *Finanzarchiv*, forthcoming; P. Oreopoulos, "A Generational Accounting Perspective on Canadian Public Policy," mimeo, University of British Columbia, July 1995; J. Ablett, "Generational Accounting—An Australian Perspective," mimeo, School of Economics, University of New South Wales, 1995; N. Kakwani, M. Kongkaew, L. J. Kotlikoff, S. Shatty, and J. Walliser, "Generational Accounting in Thailand," mimeo, Boston University, November 1995; and W. Leibfritz, "Generational Accounting: An International Comparison," OECD, mimeo, 1995.

<sup>3</sup>See, for example, Budget of the United States Government Fiscal Year 1995, Analytical Perspectives, Washington, DC: U.S. Government Printing Office, February 1994, pp. 21-31.

<sup>4</sup>The fact that the government's bills left unpaid by current generations must be paid by future generations does not mean that future generations must pay off (retire) official government debt at some finite future date. They do, however, have to service the debt.

<sup>5</sup>This statement assumes that the return to capital exceeds the growth rate of the economy.

<sup>6</sup>A generation's lifetime net rate is defined as the ratio of its lifetime net tax payment to its lifetime labor earnings, both of which are measured as present values discounted to the year the generation is born.

<sup>7</sup>Again, this figure is high, in part because it is based on a counterfactual experiment in which currently living generations are assumed to pay, over the remainder of their lives, only the net taxes implied by current policy.

<sup>8</sup>The net tax rate facing current newborns is increased because of the reduced growth in Medicare and Medicaid, but reduced because of the Republicans' plan to cut income taxes. These

calculations incorporate a 6 percent real discount rate. The corresponding net tax rates for current newborns and future generations based on a 3 percent real discount rate are 23 and 51 percent under baseline policy, and 27 and 45 percent under the Republican budget plan. Note that the generational imbalance in baseline policy, defined as the ratio of the net tax rate facing future generations to that facing newborns, is quite similar whether one uses a 6 or 3 percent discount rate. With a 6 percent discount rate, the ratio is 2.5; with a 3 percent rate, the ratio is 2.2. Under the Republican plan, generational imbalance is 2.1 with a 6 percent discount rate and 1.7 percent with a 3 percent discount rate.

<sup>9</sup>See L. J. Kotlikoff, "Deficit Delusion," *The Public Interest*, 1986; A. J. Auerbach and L. J. Kotlikoff, *Dynamic Fiscal Policy*, New York: Cambridge University Press, 1987; and L. J. Kotlikoff, "From Deficit Delusion to the Fiscal Balance Rule—Looking for a Meaningful Way to Describe Fiscal Policy," *The Economic Journal*, Seventh Supplement (1993).

<sup>10</sup>Martin Feldstein's study, "Social Security, Induced Retirement, and Aggregate Capital Accumulation," *Journal of Political Economy* 82 (1974), made a seminal contribution in pointing out not only that pay-as-you-go Social Security programs could reduce national saving, but also that the government's measure of debt excludes unfunded Social Security liabilities. In so doing, Feldstein implicitly raised the question of whether the debt and its changes over time were well-defined concepts.

<sup>11</sup>These questions are: 1) how the fiscal burden facing newborns compares with that facing future generations; and 2) how changes in policy alter the fiscal burdens of living and future generations.

<sup>12</sup>Under intermediate assumptions, the Social Security Trustees project a surplus of \$134.9 billion in 2005 (see 1995 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors' Insurance and Disability Insurance Trust Funds, p. 181).

<sup>13</sup>These tax increases are calculated assuming a 6 percent real discount rate. If one uses a 3 percent real discount rate, the requisite federal income tax increases are 54 percent starting in 1996 and 62 percent starting in 2006.

<sup>14</sup>These transfer cuts are calculated assuming a 6 percent real discount rate.

If one uses a 3 percent real discount rate, the requisite cut in transfer payments is 35 percent starting in 1996 and 74 percent starting in 2006.

<sup>15</sup>This cut in federal spending is calculated assuming a 6 percent real discount rate. If one uses a 3 percent real discount rate, the requisite spending cut is 95 percent starting in 1996 and above 100 percent starting in 2006.

<sup>16</sup>For a critique of generational accounting and a reply, see R. Haveman, "Should Generational Accounts Replace Public Budgets and Deficits?" and A. J. Auerbach, J. Gokhale, and L. J. Kotlikoff, "Generational Accounting: A Meaningful Way to Evaluate Fiscal Policy." Both articles appear in *Journal of Economic Perspectives* 8, 1 (Winter 1994).

<sup>17</sup>See H. Febr and L. J. Kotlikoff, "Generational Accounting in General Equilibrium," NBER Working Paper No. 5090, April 1995.

<sup>18</sup>See A. B. Abel and L. J. Kotlikoff, "Intergenerational Altruism and the Effectiveness of Fiscal Policy—New Tests Based on Cohort Data," NBER Reprint No. 1928, December 1994.

<sup>19</sup>J. Gokhale, L. J. Kotlikoff, and J. Sabelhaus, "Understanding the Postwar Decline in U.S. Saving: A Cohort Analysis," in *Brookings Papers on Economic Activity*, forthcoming, shows that the government's intergenerational redistribution to the elderly is responsible for the postwar decline in U.S. saving. In addition, A. J. Auerbach, J. Gokhale, L. J. Kotlikoff, J. Sabelhaus, and D. N. Weil, "The

*Annuityization of Americans' Resources: A Cohort Analysis*," NBER Working Paper No. 5089, April 1995, shows that, as a share of their resources, older Americans have reduced their life insurance holdings, not increased them, in response to an increase in the annuityization of their resources.

<sup>20</sup>See J. G. Altonji, F. Hayashi, and L. J. Kotlikoff, "Is the Extended Family Altruistically Linked? New Tests Based on Microdata," NBER Reprint No. 1811, September 1993; F. Hayashi, J. G. Altonji, and L. J. Kotlikoff, "Risk Sharing Between and Within Families," NBER Working Paper No. 3834, September 1991, and *Econometrica*, forthcoming; and "Parental Altruism and Inter Vivos Transfers: Theory and Evidence," NBER Working Paper, forthcoming.

## The Economic Effects of Unemployment Insurance

Bruce D. Meyer

Unemployment Insurance (UI) programs in the United States provide payments to 2 million unemployed workers in an average week at an annual cost of about \$25 billion. These programs smooth the income of laid-off workers, but have many other effects as well. For example, they induce the unemployed to spend more time out of work, they encourage firms to lay off their workers temporarily in slack times, and they subsidize industries with frequent layoffs. In a series of papers, many of them jointly with Patricia M. Anderson, Lawrence F. Katz, or Dan T. Rosenbaum, I have examined these and other issues. This research quantifies many of the concepts that bear on the design of UI programs and tests some of the basic predictions of economic theory.

We use the detailed records on firms and workers that state agencies employ to administer their UI programs, including the earnings measures that determine a person's

eligibility and level of benefits, and the amount and dates of UI benefit receipt. In many cases, these records also contain key firm characteristics, including the firm's tax rate. Unlike survey data, these administrative records accurately identify the incentives that a program provides to a given individual or firm.

This research on UI also makes use of the large differences across state programs and the frequent changes in these programs. A common methodological problem in analyses of social insurance programs such as UI is that an individual's eligibility and benefits usually are determined by the individual's work history and state of residence. Unfortunately, both of these determinants are likely to have their own influence on unemployment or wages, for example. Convincing estimates of the effects of UI require variation in program incentives that is not attributable to causes that might influence the outcomes under study. In these papers, I control carefully for a work-

er's earnings history. Several papers use a "natural experiment" approach, examining outcomes such as an individual's length of unemployment before and after changes in state UI laws.<sup>1</sup>

UI has effects on both workers and firms. The theoretical frameworks that have been used most often to analyze worker actions are search and labor supply models. In search models, an unemployed individual seeks out job offers and considers whether or not they meet his requirements. The existence of UI reduces the incentives for an individual to search hard and to take the first job offered. This reduced search effort implies that the length of unemployment is prolonged. However, the prolonged search may lead to a better new job than the worker would find otherwise. These models also suggest that unemployed individuals will intensify their search and become less choosy around the time that unemployment benefits run out. The other main theoretical approach, labor supply theory, assumes that

workers select their length of time out of work to balance the income they receive from work and the alternative uses of their time. Similarly, this approach predicts a longer time out of work if UI is more generous, and an increased rate of job finding around the time that benefits run out.

In three papers, I focus on the effects of UI program characteristics on the time recipients spend out of work and on their job-finding efforts. In some cases, I focus especially on behavior around the time that UI benefits run out. The key characteristics of a UI program that I examine are the weekly benefit amount and the number of weeks that benefits are available (the potential duration of benefits). In one paper, I use a large sample of administrative records from 12 states over several years.<sup>2</sup> I compare the job-finding rates of people with similar past earnings but different UI weekly benefits and different potential durations. I find that when unemployment benefits rise, the rate of job finding falls dramatically. I also find that the probability of leaving unemployment rises dramatically just prior to when benefits lapse.

A second paper with Katz uses these data and methods to simulate the effects of changing the weekly benefit or the potential duration of benefits.<sup>3</sup> The estimates indicate that a one-week increase in potential benefit duration increases the average duration of the unemployment spell by 0.16 to 0.2 weeks. The estimates also imply that extending the potential duration of benefits increases unemployment substantially more than do equally costly policies that raise the level of benefits. In the same paper, we study a large sample of unemployed household heads, some of whom are UI recipients and others

who are not. Sharp increases in the rate of job finding, both through recalls and through acceptances of new jobs, are apparent for UI recipients around the time that benefits are likely to lapse. The absence of such increases for nonrecipients strongly suggests that the potential duration of UI benefits affects both the recall policies of firms and workers' willingness to start new jobs.

A third paper uses a "natural-experiment approach to assess the effect of increases in the weekly benefit on the number of weeks of receipt.<sup>4</sup> This paper examines the number of weeks of UI receipt among those eligible for a state's maximum benefit before and after the state raises the maximum. In all, I examine 17 benefit increases from six states during 1979-84. I find increases in weeks of receipt for those individuals who have their benefits raised, while individuals who are never subject to the maximum, and thus have no change in their incentives, have little change in their weeks of receipt.

The tendency of UI to prolong unemployment also has prompted a recent group of social experiments. Through random assignment, these experiments tested two reforms of the UI system: reemployment bonuses and job search programs.<sup>5</sup> The bonus experiments offered UI recipients a lump-sum payment if they found a job quickly. The shorter durations of UI receipt for those offered the bonus show that economic incentives do affect the length of UI receipt.

The experiments also provide some evidence that being induced to find a job more quickly does not lead to a decline in earnings. While the estimates are imprecise, these results suggest that the job matches are not of poorer quality because they are made more quickly. The

experimental evidence does not show that a permanent bonus program would be a wise policy, since it does not measure such a program's effect on the number of claimants. A permanent program would increase the compensation for short UI spells sharply, and would be likely to increase the claims rate, and possibly unemployment.

The job search experiments test several more promising reforms. These experiments tried various combinations of closer monitoring of compliance with UI job search requirements and increased assistance in finding a job. The closer monitoring included more frequent checks of eligibility and additional required visits to the UI office. The increased help included job-finding workshops and more job referrals. Nearly all of the combinations of enforcement and assistance reduced UI receipt and had favorable cost/benefit analyses. Earnings often increased, although the estimates were imprecise.

In addition to affecting workers' incentives to remain on the UI program, the generosity of the program affects whether workers file for benefits in the first place. Administrative data allow researchers to assign the potential level and duration of benefits accurately for a sample of workers separating from their employers, whether or not UI ever actually was received. Anderson and I use these UI characteristics along with marginal tax rates to explain the probability that a separating employee receives UI.<sup>6</sup> We find that the benefit level has a strong positive effect on takeup, but that the potential duration of benefits has little effect. The estimates imply that a 10 percent increase in benefits would raise the takeup rate by about 4.6 to 7.8 percent.

The estimates also show that

potential claimants respond to the tax treatment of benefits. Simulations of the effects of taxing UI benefits indicate that recent tax changes can account for most of the decline in UI receipt in the 1980s. A second paper that examines the UI claims rate before and after a 36 percent increase in New York state's maximum benefit amount finds a sharp increase in claims.<sup>7</sup> These findings of a strong effect of the generosity of unemployment benefits on the probability of filing for benefits underscore the arguments stated above that a reemployment bonus would increase the UI filing rate.

Most research focuses on how UI affects workers, but UI also has important effects on firms. Unemployment insurance in the United States is financed through a payroll tax that is not perfectly experience rated, and thus only partially reflects a firm's use of the system. Since firms pay only part of the UI costs, layoffs are subsidized partially by the UI system. Anderson and I examine the effects of UI experience rating on layoffs using a large panel of workers and firms and actual firm tax rates.<sup>8</sup> Our estimates imply that incomplete experience rating is responsible for over 20 percent of temporary layoffs.

Further, incomplete experience rating causes certain firms and industries to receive many more dollars in unemployment benefits than they pay in taxes. We document that the same patterns of large interindustry subsidies have persisted for over 30 years; we find that these subsidies are caused mostly by differences in layoff rates across industries.<sup>9</sup> Agriculture, mining, manufacturing, and particularly construction receive subsidies, while trade, finance, insurance and real estate, and services consistently

pay more in taxes than they receive. Additionally, using previously unexamined firm level data, we document a persistent pattern of interfirm subsidies across several years. Together, these results indicate that UI benefit payments are predictable; this weakens arguments for incomplete experience rating that focus on its insurance value to firms faced with unexpectedly large layoff costs. We also find that the efficiency costs of the cross-subsidies to industries with fluctuating employment may be large, but such calculations depend on differences between marginal and average subsidies that are difficult to estimate.

Closely related to the work showing persistent use of UI by certain industries and firms, a paper by Katz and me shows that nearly two-thirds of UI recipients expect to be recalled, and nearly half do in fact return to their last employer.<sup>10</sup> In new work with Rosenbaum, I show that a large fraction of UI benefits go to workers who receive them in most years and consistently return to their former employer.<sup>11</sup> This work suggests that for a significant fraction of firms and recipients, UI is not true insurance, but rather a subsidy to regular, often seasonal unemployment.

The combined actions of workers and firms also lead UI to have direct effects on wages and employment. One important question about most social insurance programs, as well as about government mandates (for example, safety legislation or parental leave laws), is: what is their effect on wages and employment? What if a firm-varying tax is used to finance a fringe benefit? To answer these questions, Anderson and I use data from the experience-rated UI system. But it is important to realize

that differential treatment of firms (including special considerations for small business) under mandated benefits laws leads to costs that vary across firms and are analogous to experience-rated taxes. Theory implies that differences in taxes among firms that compete in the same labor and product markets will not be passed on to workers or consumers. Our results suggest that most of the industry-level tax is borne by the worker through lower wages.<sup>12</sup> However, this does not imply that there are no employment effects of the tax. Rather, individual firms appear to pass on a small share of the within-industry differences in the tax they face, leading to substantial reallocation of employment across firms.

Work in progress with Anderson uses the recent experience of the state of Washington to examine tax incidence and the effects of experience rating. During the 13-year period from 1972 through 1984, all employers in Washington paid a single tax rate, implying that a firm's tax rate did not vary with its UI use. Federal legislation then forced Washington to adopt an experience-rated system in 1985. Comparisons of firm behavior before and after the tax change have the potential to provide good evidence on the effects of UI taxes on wages, employment, and layoffs.

The effect of UI on earnings on the next job also is a current area of research for Anderson, Jonathan Gruber, and me. While some of the papers mentioned earlier examine the effect of UI on reemployment earnings, their results are not conclusive because of large standard errors. After carefully controlling for past earnings, we currently are examining whether people who are eligible for higher benefits do better on their new job.

<sup>1</sup>I review these methods and related work in B. D. Meyer, "Natural and Quasi-Experiments in Economics," NBER Technical Paper No. 170, December 1994, and *Journal of Business and Economic Statistics* 13 (April 1995), pp. 151-162.

<sup>2</sup>B. D. Meyer, "Unemployment Insurance and Unemployment Spells," *Econometrica* 58 (July 1990), pp. 757-782.

<sup>3</sup>L. F. Katz and B. D. Meyer, "The Impact of the Potential Duration of Unemployment Benefits on the Duration of Unemployment," *Journal of Public Economics* 41 (February 1990), pp. 45-72.

<sup>4</sup>B. D. Meyer, "Using Natural Experiments to Measure the Effects of Unemployment Insurance," Working Paper, Northwestern University, May 1992. An earlier version of this paper was "A Quasi-Experimental Approach to the Effects of Unemployment Insurance," NBER Working Paper No. 3159, November 1989.

<sup>5</sup>See B. D. Meyer, "Policy Lessons from

the U.S. Unemployment Insurance Experiments," NBER Working Paper No. 4197, October 1992, and the revised version "Lessons from the U.S. Unemployment Insurance Experiments," *Journal of Economic Literature* 33 (March 1995), pp. 91-131, and "Implications of the Illinois Reemployment Bonus Experiments for Theories of Unemployment and Policy Design," NBER Working Paper No. 2783, December 1988, and the revised version "What Have We Learned from the Illinois Reemployment Bonus Experiment?" *Journal of Labor Economics*, forthcoming.

<sup>6</sup>P. M. Anderson and B. D. Meyer, "Unemployment Insurance Benefits and Takeup Rates," NBER Working Paper No. 4787, June 1994.

<sup>7</sup>B. D. Meyer, "Quasi-Experimental Evidence on the Effects of Unemployment Insurance from New York State," NBER Working Paper, forthcoming.

<sup>8</sup>P. M. Anderson and B. D. Meyer, "The Effects of Unemployment Insurance Taxes and Benefits on Layoffs Using

Firm and Individual Data," NBER Working Paper No. 4960, December 1994.

<sup>9</sup>P. M. Anderson and B. D. Meyer, "The Unemployment Insurance Payroll Tax and Interindustry and Interfirm Subsidies," in *Tax Policy and the Economy*, Volume 7, J. M. Poterba, ed., Cambridge, MA: MIT Press, 1993, pp. 111-144.

<sup>10</sup>L. F. Katz and B. D. Meyer, "Unemployment Insurance, Recall Expectations, and Unemployment Outcomes," NBER Reprint No. 1501, February 1991, and *Quarterly Journal of Economics* 105 (November 1990), pp. 973-1002.

<sup>11</sup>B. D. Meyer and D. T. Rosenbaum, "Repeat Use of Unemployment Insurance," NBER Working Paper, forthcoming.

<sup>12</sup>P. M. Anderson and B. D. Meyer, "The Incidence of a Firm-Varying Payroll Tax: The Case of Unemployment Insurance," NBER Working Paper No. 5201, July 1995

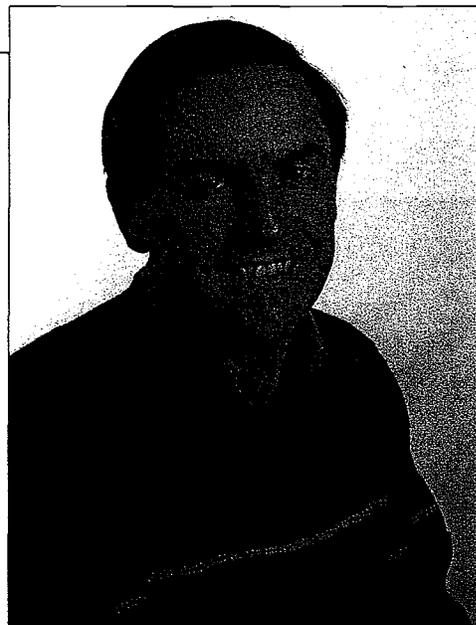
## NBER Profile: Bernard Dumas

Bernard Dumas is a research associate in the NBER Programs in International Finance and Macroeconomics and Asset Pricing, and a professor of finance at the HEC School of Management in France. He is also a research professor at Duke University's Fuqua School of Business, and a director of the financial economics program at the Centre for Economic Policy Research in London. A French citizen, Dumas received his training in engineering at the Ecole Centrale de Paris, and his Ph.D. in Business from Columbia University.

He also has taught at Columbia, ESSEC, and the Wharton School of the University of Pennsylvania, and has been a visiting professor at Berkeley's Haas School of Business. Dumas has published both theoretical and empirical papers on international financial market equilibrium, financial market segmenta-

tion, international corporate finance, equilibrium real exchange rates, exchange rate target zones, portfolio choice with frictions, and option pricing. He currently serves on the board of editors of the *Review of Financial Studies* and several other journals.

Dumas's wife, Anne, studied Russian. After receiving a master's degree in communications at the Annenberg School of the University of Pennsylvania, she turned to a new career: teaching primary school in France. The Dumas's have three children: Marion (10), who has started her education in the bilingual section of the junior high school at Sèvres near Paris; Juliette (8), who is in primary school; and Louis (5), who is in kindergarten. Anne and Bernard enjoy reading novels by North American writers, skiing in the French Alps, and vacationing in Corsica.



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## NBER Profile: *Alan M. Garber*

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Alan M. Garber is an NBER research associate and the director of the Bureau's Program in Health Care. He is also an associate professor of medicine, economics, and health research and policy at Stanford University, and a senior research associate of the Department of Veterans Affairs.

Garber received his A.B., A.M., and Ph.D. degrees in economics from Harvard University, and his M.D. from Stanford University School of Medicine. He did his internship and residency in medicine at Brigham and Women's Hospital in Boston.

Garber's research spans a wide area of issues in health economics and health policy. Currently he is investigating the causes of Medi-

care expenditure growth and the relationship among the intensity of treatment, costs, and outcomes of care. Much of his effort is devoted to understanding the costs and benefits of specific medical technologies. He teaches in the Medical School and the Graduate School of Business at Stanford, serves on the Medical Advisory Panel of the Blue Cross-Blue Shield Association, is associate editor of the *Journal of Investigative Medicine*, and participates in several government and academic panels and committees. He also sees patients and teaches clinical medicine.

Garber's wife, Anne Yahanda, is a cancer specialist and assistant professor of medicine at Stanford. They have two sons, Daniel (4)



and Benjamin (2). Time, children, and injuries permitting, Garber is an active runner and bicyclist.



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## NBER Profile: *Bruce D. Meyer*

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Bruce D. Meyer is a research associate (RA) in the NBER's Programs in Labor Studies and Public Economics, and a tenured associate professor of economics at Northwestern University. He received his B.A. and M.A. from Northwestern, and his Ph.D. in economics from MIT.

Meyer joined the Northwestern faculty as an assistant professor in 1987 and became an NBER faculty research fellow in the same year. In 1993, he was promoted to associate professor, and also was named an NBER RA. Meyer was a visiting professor at Princeton University in 1988-9, and since 1987

has been a faculty fellow of Northwestern's Center for Urban Affairs and Policy Research.

His work in labor economics has been published in many journals, as well as in the NBER Working Paper series. He is also the associate editor of the *Journal of Public Economics* and the *Journal of Business and Economic Statistics*.

Meyer is married to Paula R. Worthington, an economist at the Federal Reserve Bank of Chicago. They live in Evanston with their two sons, Robert and Benjamin. Meyer likes to hike and play tennis, and his family indulges his interest in natural history.

## NBER Profile: *George A. Akerlof*

George A. Akerlof recently was elected to the Board of Directors of the NBER as a representative of the University of California, Berkeley. Akerlof is a professor of economics at Berkeley, where he has taught since 1966. He is also a senior fellow at the Brookings Institution. He received his B.A. from Yale University and his Ph.D. in economics from MIT.

In addition to his positions at Berkeley, Akerlof has served as a senior staff economist at the President's Council of Economic Advis-

ers in 1973-4, a visiting research economist at the Federal Reserve Board of Governors in 1977-8, and the Cassel Professor with respect to Money and Banking at the London School of Economics in 1978-80. He is also a past vice president of the American Economic Association, a fellow of the Econometric Society, and a former NBER research associate.

Akerlof is married to Janet L. Yellen, currently a member of the Federal Reserve System's Board of Governors. They have one son.



## Conferences

### Taxes and Financial Behavior

Nearly 70 representatives of U.S. and Canadian universities and government agencies attended the NBER-Universities Research Conference on "Taxes and Financial Behavior" in Cambridge on November 10 and 11. This conference was organized by David F. Bradford, also of Princeton University, and William M. Gentry, also of Columbia University. The program was:

**Eric Engen**, Federal Reserve Board, and

**William G. Gale**, Brookings Institution, "Debt, Taxes, and the Effects of 401(k) Plans on Household Wealth Accumulation"

Discussant:

Leslie E. Papke, NBER and Michigan State University

**Gary Engelhardt**, Dartmouth College, "Tax Subsidies and Household Saving: Evidence from Canada"

Discussant:

James Davies, University of Western Ontario

**John Chalmers**, Virginia Polytechnic Institute, "The Relative Yields of Tax-Exempt and Taxable Bonds: Evidence from Municipal Bonds Secured by U.S. Treasury Obligations"

Discussant:

James M. Poterba, NBER and MIT

**Robert Trezevant**, University of Southern California, and **Dan Dhaliwal** and

**Merle Erickson**, University of Arizona, "Ownership Changes After a Firm Initiates a Cash Dividend: New Evidence That Tax Clienteles Matter"

Discussant:

Roni Michaely, Cornell University

**Michael Barclay**, University of Rochester;

**Neil Pearson**, University of Illinois; and

**Michael Weisbach**, University of Arizona, "Open-End Mutual Funds and Capital Gains Taxes"

*Continued on page 20*

Discussant:

Joel Dickson, Federal Reserve Board

**Robert Dammon** and **Chester Spatt**, Carnegie-Mellon University, "Do Heterogeneous Basis Values Affect Equilibrium Asset Prices?"

Discussant:

Peter Klein, University of Toronto

**David F. Bradford**, and **Kyle D. Logue**, University of

Michigan, "The Effects of Tax Law Changes on Prices in the Property-Casualty Insurance Industry"

Discussant:

Douglas Shackelford, University of North Carolina

**Deen Kemsley**, Columbia University, "The Effects of Taxes on the Choice Between Exports and Foreign Production"

Discussant:

Deborah L. Swenson, NBER and University of California, Davis

**Mark Vaughan**, Federal Reserve Bank of St. Louis, and **Michael Williams**, The Milken Institute, "Dividends, Stock Repurchases, and Signaling: Empirical Evidence"

Discussant:

Stewart C. Myers, NBER and MIT

**Engen** and **Gale** examine the interaction between household indebtedness and tax-based savings incentives, each of which has grown dramatically since the early 1980s. They show that 401(k) eligibility can raise households' financial assets, but does not raise broader wealth measures, including housing equity. Moreover, the rise in financial assets is restricted to homeowners: 401(k) eligibility does not raise the financial assets of renters. The results suggest that debt and saving patterns can interact in important ways, and that 401(k) plans have not raised private wealth.

**Engelhardt** studies a Canadian saving program—the Registered Home Ownership Savings Plan—and uses household data from the 1978, 1982, 1984, and 1986 Canadian Family Expenditure Surveys to estimate how such a tax subsidy will affect household saving. He finds that each dollar contributed to the program represented between 60 cents and one dollar of new saving. This suggests that recently proposed federal tax subsidies to saving for homeownership in the United States would generate a significant amount of new saving among young households.

**Chalmers** uses a sample of municipal bonds secured by irrevocable escrows of U.S. Treasury securities to examine the relationship between taxable and tax-exempt yields. He shows that default-free tax-exempt yields display the same tendency to be too high (relative to the Fama and Miller prediction). This implies that differential default risk does not explain relatively high yields on long-term tax-exempt bonds. He also documents a curious fact: U.S. government-secured municipal bonds have higher yields than comparable-maturity AAA-rated municipal bonds that are not secured by U.S. Treasury bonds.

For a sample of firms that initiated a cash dividend from 1982 to 1990, **Trezevant**, **Dhaliwal**, and **Erickson** observe a dramatic increase in institutional ownership in the months following the dividend initiation. This increase is significant in a statistical as well as an economic sense; it is not explained well by post-initiation changes in risk; and no similar increase is observed for dividend initiators in the year preceding the dividend initiation, or for a matched control sample of firms not paying dividends. Since the institutions increasing their ownership of dividend-initiators are often less heavily taxed on

dividends than they are on capital gains, these results provide new evidence that the effects of tax clienteles for dividend policies are strong enough to influence the decisions of investors.

**Barclay**, **Pearson**, and **Weisbach** ask why mutual funds realize such a large fraction of their capital gains each year. Unrealized capital gains in the fund's portfolio increase the likely magnitude of future taxable distributions, and therefore increase the expected present value of a new investor's tax liability. Thus, even though existing shareholders would prefer that gains be deferred as long as possible, potential new investors will be attracted to funds with a smaller overhang of unrealized capital gains. Consequently, managers have incentives to reduce the overhang in order to attract new investors. This paper shows that overhangs are correlated negatively with the fund's growth-rate volatility and the fund's cash balances.

**Dammon** and **Spatt** examine the effect of heterogeneous basis values across investors and securities on the equilibrium prices of financial assets. They show that investors' basis values in an individual asset have no effect on its equilibrium price, but may affect its

equilibrium quantity of trade. However, the distribution of basis values across *all* investors can affect the *aggregate* level of security prices through its effect on aggregate consumption. The more investors are "locked in" to capital gains, the lower is the equilibrium quantity of trade and the aggregate level of security prices.

During the 1980s, the federal income tax treatment of property-casualty insurers and their policyholders underwent several important changes, the most significant of which came in 1986. **Bradford and Logue** theorize how these changes should have affected the equilibrium prices of property-casualty insurance policies, and explore the extent to which their theoretical predictions are reflected in actual industry experience. The paper is devoted mainly to a careful specification of the income tax

rules, and to deriving the connection between predictions about simple forms of insurance policy and industry data on "premiums earned." Although the predicted impact of the changes in the tax rules enacted in 1986 translates into a tax on premiums (net of the cost of acquisition) of up to 13 percent (on medical malpractice, the longest-tail line of insurance), it is small relative to the variability of the actual loss experience.

**Kemsley** investigates the relationship between binding foreign tax credit (FTC) positions and the choice of exports versus foreign production. Specifically, is there a positive cross-sectional relationship between the magnitude of the FTC incentive for exports and the proportion of exports versus foreign production that multinational corporations use to serve their foreign

markets? He finds that the export tax incentive is associated with additional exports of approximately \$70 million on average per firm facing a binding FTC position.

**Vaughan and Williams** use yearly accounting data from COMPUSTAT to test both for evidence of the signaling explanation for dividends and for the relative signaling power of dividends versus repurchases. They find that current dividends help to predict income one year and five years into the future. In contrast, stock repurchases bear no compelling relationship to future earnings. The evidence suggests that firms use dividends rather than stock repurchases as the distribution vehicle for signaling future earnings. These results support the notion that firms deliberately pay excessive taxes to signal favorable prospects.

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## Bureau News

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### Moore Honored by AEA

Geoffrey H. Moore, an NBER Director Emeritus, was named a Distinguished Fellow of the American Economic Association at its recent annual meeting in San Francisco. His citation read:

"Geoffrey Moore's work has been deeply influenced by the principles and practices of the National Bureau of Economic Research where he spent most of his working life. Moore's association with the National Bureau, marked by close work with Wesley C. Mitchell and Arthur F. Burns in particular, began in 1939. He became Di-

rector of Research in 1965, but left the Bureau in 1969 to serve as U.S. Commissioner of Labor Statistics. Moore returned to the NBER in 1973. In 1979, he established the Center for International Business Cycle Research (CIBCR), which is currently at Columbia University.

"At the NBER, Moore was prominently involved in the study of business cycles and cyclical indicators. In the 1950s, in collaboration with Julius Shiskin, he developed a methodology for constructing leading, coinciding, and lagging composite indexes which have become important forecasting tools. A large part of Moore's work in the late 1960s and early 1970s was in directing the research efforts of oth-

ers. Since the mid-1970s, he has been immersed in a major effort to develop cyclical indicators and indexes for the main industrial countries in North America, Europe, and Asia. The construction and continuing improvement of this global battery of cyclical indicators and indexes is an achievement of the highest order. Another important subject of Moore's research was inflation: the analysis of its cyclical behavior, indicators, and prediction.

"The kind of research that preoccupied Moore centers on important empirical findings. Many of the results of his studies were eventually incorporated in the regular statistical work of U.S. and international agencies. Only research

commanding a very high degree of confidence can have this result. The scientific integrity of the individual who is responsible for the research is one basic element on

which this confidence rests. Geoffrey Moore held fast to the principles and standards on which the National Bureau's reputation rests—a reputation for objective sci-

entific research on significant economic problems that serves to strengthen the basis for sound economic policy."

## Economic Fluctuations Research Meeting

The NBER's Program on Economic Fluctuations met in Cambridge on October 27. Martin S. Eichenbaum, NBER and Northwestern University, and Peter Kleinow, University of Chicago, organized this program:

**Michele Boldrin**, Università de Carlos III;

**Lawrence J. Christiano**, NBER and Northwestern University; and

**Jonas Fisher**, University of Western Ontario, "Asset Pricing Lessons for Modeling Business Cycles" (NBER Working Paper No. 5262)

Discussant:

John Y. Campbell, NBER and Harvard University

**Alwyn Young**, NBER and Boston University, "Growth

Without Scale Effects"

Discussant:

Robert E. Lucas, NBER and University of Chicago

**V. V. Chari**, Northwestern University;

**Patrick J. Kehoe**, NBER and University of Minnesota; and

**Ellen R. McGrattan**, NBER and Federal Reserve Bank of Minneapolis, "The Poverty of Nations: A Quantitative Exploration"

Discussant:

Xavier Sala-i-Martin, NBER and Universitat Pompeu Fabra

**Ana Aizcorbe**, Federal Reserve Board; and

**Sharon Kozicki**, Federal Reserve Bank of Kansas City, "The Comovement of Output and Labor Productivity in Aggregate

Data for Auto Assembly Plants"

Discussant:

Susanto Basu, NBER and University of Michigan

**Paul Beaudry**, NBER and Boston University; and

**Michael Devereux**, University of British Columbia, "An Endogenous Propagation Theory of Business Cycles"

Discussant:

Robert E. Hall, NBER and Stanford University

**Matthew D. Shapiro**, NBER and University of Michigan, "Capital Utilization and the Marginal Premium for Work at Night"

Discussant:

Mark Bills, NBER and University of Rochester

**Boldrin, Christiano, and Fisher** develop a model that accounts for the observed equity premium and the average risk-free rate, without implying counterfactually high risk aversion. Their model also does well in explaining business cycle phenomena. On two dimensions the business cycle implications of their model are better than those of standard models. Because it has enhanced internal propagation, their model can explain the positive persistence in output growth. It also resolves the "excess sensitivity puzzle" for consumption and income. Two of the model's key features are habit per-

sistence preferences, and a multi-sector technology with limited mobility of factors of production among sectors.

Increases in the size of an economy should raise the rewards to innovators, fostering more innovation and growth. But whereas the growth of the market in industrialized nations indeed has led to more research effort, the postwar experience has been one of stagnant or declining growth. Drawing upon the insights of museum curator S. C. Gilfillan, **Young** theorizes that bigger markets may give rise to an increased variety of differentiated solutions to similar prob-

lems. So, rather than more economic growth, the benefits of bigger markets may take the form of greater variety and more customized goods.

**Chari, Kehoe, and McGrattan** take as their starting point several patterns in the distribution of per capita income across countries from 1960 to 1985. For example, the distribution exhibits a great deal of mobility, especially among middle-income countries. They develop a quantitative version of the neoclassical growth model with barriers to investment in physical and human capital (such as taxes). These barriers change over time

and differ across countries, but not permanently. The model successfully mimics the data in several respects, such as displaying growth miracles and growth disasters with realistic differences in investment rates.

Some workers typically remain at auto assembly plants even when the assembly line is idle. Looking at 22 such plants over an eight-year period, **Aizcorbe** and **Kozicki** find that the number of production worker hours reported from shutdown establishments is not trivial and is highly cyclical. Virtually all of the comovement between output and labor productivity in this industry is associated with labor hours reported at shutdown plants, they conclude.

**Beaudry** and **Devereux** argue that recurrent elements in business

cycles may reflect a common endogenous propagation mechanism initiated by potentially disparate exogenous disturbances to the economy. They present a dynamic general equilibrium model that incorporates two elements often considered relevant in macroeconomics: variable factor utilization and efficiency wages. In their model, these elements interact so that very temporary disturbances to the economy can lead to persistent fluctuations in output, employment, and consumption that look strikingly similar to business cycle phenomena. They remain agnostic about the source of shocks that initiate business cycles, in order to emphasize endogenous propagation as potentially the central element in a theory of business cycles.

The typical U.S. manufacturing

plant uses its capital (for example, factories and equipment) less than 40 percent of the time. **Shapiro** investigates the extent to which this is because firms must pay workers more for working at night. Although firms pay a 5 percent explicit premium for night work, Shapiro argues that this understates the true premium if night workers are less educated and experienced, or must be paid more when they rotate onto the day shift. Using data on manufacturing establishments and employees to gauge these effects, Shapiro estimates that the true premium for work at night is at least 25 percent. He concludes that the cost of working labor at night accounts for much, but not all, of the low level of capital utilization at night.

## Public Economics Program Meeting

Nearly 40 members and guests of the NBER's public economics program met in Cambridge on November 9. Program Director James M. Poterba, also of MIT, organized this agenda:

**David N. Cutler**, NBER and Harvard University, and  
**Jonathan Gruber**, NBER and MIT, "Does Public Insurance Crowd Out Private Insurance?" (NBER Working Paper No. 5082)

Discussant:  
Robert A. Moffitt, NBER and Johns Hopkins University  
**Richard Blundell** and

**Costas Meghir**, University College, London, and  
**Alan Duncan**, University of York, "Estimating Labor Supply Responses Using Tax Reforms"  
Discussant:

James J. Heckman, NBER and University of Chicago  
**B. Douglas Bernheim**, NBER and Stanford University, and  
**Daniel M. Garrett**, Stanford University, "The Determinants and Consequences of Financial Education in the Workplace: Evidence from a Survey of Households"

Discussant:  
Laurence J. Kotlikoff, NBER and Boston University  
**James M. Poterba**, and  
**Kim Rueben**, MIT, "Fiscal Institutions and Public Sector Labor Markets"

Discussant:  
Douglas Holtz-Eakin, NBER and Syracuse University  
**Robert J. Barro**, NBER and Harvard University, "Optimal Debt Management" (NBER Working Paper No. 5327)  
Discussant:  
Kenneth L. Judd, NBER and Stanford University

**Cutler** and **Gruber** discuss the dramatic expansion of the Medicaid program between 1987 and 1992. During that time, eligibility

for children increased by 50 percent and eligibility for pregnant women doubled. Cutler and Gruber find that 50 to 75 percent of

the associated increase in Medicaid coverage was accompanied by a reduction in private insurance coverage. This occurred mainly be-

cause employees took up insurance offered by their employers less frequently, although the employers themselves may have encouraged this by contributing less toward premiums. Also, since children would be covered by Medicaid, some workers may have dropped coverage for their family and switched into individual policies.

During the 1980s, a sequence of important tax policy reforms in Great Britain along with a rapid change in the pretax wage structure induced much variation in aftertax wages. At the same time, there were large fluctuations in female participation, hours of work, and the proportion of taxpayers in the labor force. **Blundell, Duncan, and Meghir** estimate that labor supply responses to increases in aftertax wages are small but positive. Their results depend crucially on whether they control for self-selection and aggregate shifts in labor supply.

**Bernheim and Garrett** use a novel household survey to develop evidence on the efficacy of em-

ployer-based financial education. While their primary focus is the effect of these programs on saving (both in general and for the purposes of retirement), they also examine a number of collateral issues. These include the circumstances under which employers offer, and employees participate in, financial education programs, and the effects of these programs on sources of information and advice concerning retirement planning. They find that employer-based retirement education strongly influences household financial behavior.

**Poterba and Rueben** describe the pattern of relative wages between state and local government employees and their private sector counterparts, and the effect of fiscal institutions on these wage patterns, during 1979-92. They begin by summarizing data on the public sector wage premium. While the relative wages of women employed in the public and private sectors changed very little during this period, the relative wages of men employed in the state and local sector

rose nearly 8 percent. For highly educated workers, private sector wages rose significantly faster than public sector wages. After documenting these broad patterns, **Poterba and Rueben** consider the effect of fiscal and labor market institutions on wage patterns. They find that states with either limitations on local property taxes or statewide tax and expenditure caps display slower relative wage growth in the public sector than other states during the 1980s.

**Barro** studies dynamic optimal taxation in an equilibrium model that yields a form of tax smoothing as a basis for debt management. The type of taxation that yields the clearest results on tax smoothing is a proportional levy on consumption. In a simple benchmark case, optimal debt management entails the issue of indexed consols. More generally, payouts on debt also would be contingent on aggregate consumption and the level of government spending.

## Monetary Economists Meet

Members and guests of the NBER's Program in Monetary Economics met in Cambridge on November 17. They discussed the following papers, chosen by Program Director N. Gregory Mankiw, of NBER and Harvard University:

**Christina D. Romer** and **David H. Romer**, NBER and University of California, Berkeley, "Federal Reserve Private Information and the Behavior of Interest Rates"

Discussant:

Jeff Fuhrer, Federal Reserve Bank of Boston

**James D. Hamilton**, University of California, San Diego, "The

Daily Market for Federal Funds"  
Discussant:

Glenn Rudebusch, Federal Reserve Bank of San Francisco

**John H. Cochrane**, NBER and University of Chicago, "Identifying the Output Effects of Monetary Policy" (NBER Working Paper No. 5154)

Discussant:

Michael Woodford, NBER and Princeton University

**Benjamin M. Friedman**, NBER and Harvard University, "The Rise and Fall of Money Growth Targets as Guidelines for U.S. Monetary Policy"

Discussant:

William Poole, Brown University

**Stephen G. Cecchetti**, NBER and Ohio State University, and **Anil K Kashyap**, NBER and University of Chicago, "International Cycles" (NBER Working Paper No. 5310)

Discussant:

Jeffrey A. Miron, NBER and Boston University

**Robert J. Barro**, NBER and Harvard University, "Optimal Debt Management" (NBER Working Paper No. 5327) (See "Public Economics Program Meeting" earlier in this section.)

Discussant:

Henning Bohn, University of California, Santa Barbara

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

**Hamilton** establishes that there are important predictable patterns in the federal funds rate over the course of a typical maintenance period. He presents a theoretical model of the banking system in which these patterns could emerge as a consequence of line limits and transaction costs in the federal funds market. He concludes that such frictions cause banks to re-

gard reserves held on different days of the week to be imperfect substitutes, and thus they explain the existence of a downward-sloped daily demand-for-liquidity function. The immediate effect of an open market operation on the federal funds rate is the result of moving along this daily demand schedule.

**Cochrane** asks what the relative effects of anticipated versus unanticipated monetary policy are. He examines the effect of this identifying assumption on estimates of the output response to money, assuming that anticipated monetary policy can have some effect on output results.

**Friedman** briefly reviews what it means to make monetary policy with a money growth target, and under what conditions doing so is useful. He then presents evidence, based on U.S. time-series data, bearing on what Federal Reserve policymakers should have known about the relationship of money to income and prices, and when they should have known it. Next he shows how the Federal Reserve changed its actual reliance on money growth targets over time. He asks whether the Federal Reserve

acted sensibly in this regard, by evaluating its changes in policy-making in light of changes in economic behavior. Friedman concludes that whatever economic conditions might have warranted reliance on money growth targets in the 1970s and early 1980s had long disappeared by the 1990s, so that the Federal Reserve's "downgrading" of these targets was indeed an appropriate response to changing circumstances. Whether adopting money growth targets in the first place was likewise appropriate is less clear.

**Cecchetti** and **Kashyap** study 20 years of monthly production data for 11 manufacturing industries in nine countries. Using the fact that in some countries production virtually shuts down for one summer month, together with the differences in the timing of aggregate cyclical fluctuations, they are able to learn about the cost structure of different industries. Their primary finding is that during a boom year, summer shutdowns are shorter. Rather than increasing production further during the rest of the year, producers reallocate activity from high-output months to low-output months.

## Meeting on Behavioral Macroeconomics

Robert J. Shiller, NBER and Yale University, and George A. Akerlof, University of California, Berkeley, organized a meeting on behavioral macroeconomics held in Cambridge on November 18. The program was:

**David I. Laibson**, NBER and Harvard University, "Hyperbolic Discount Functions, Undersaving, and Saving Policy"

Discussant:  
John Shea, NBER and University of Wisconsin

**Shulamit Kahn**, Boston University, "Evidence of Nominal Wage Stickiness from Microdata"

Discussant:  
Truman Bewley, Yale University

**Robert J. Shiller**, "Why Do People Dislike Inflation?"

Discussant:

Anil K Kashyap, NBER and University of Chicago

**Edward L. Glaeser**, NBER and Harvard University;

**Bruce Sacerdote**, Harvard University; and

**José A. Scheinkman**, University of Chicago, "Crime and Social Interactions" (NBER Working Paper No. 5026)

*Continued on page 26*

Discussant:

Michael Kremer, NBER and MIT

**Andrei Shleifer**, NBER and Harvard University, and

**Robert W. Vishny**, NBER and University of Chicago, "The Limits of Arbitrage" (NBER Working Paper No. 5167)

Discussant:

Franco Modigliani, MIT

**Robert B. Barsky**,

**Miles S. Kimball**, and

**Matthew D. Shapiro**, NBER and University of Michigan, and

**F. Thomas Juster**, University of Michigan, "Preference Perimeter

and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Survey" (NBER Working Paper No. 5213)

Discussant:

Richard H. Thaler, NBER and University of Chicago

**Laibson** derives an equation that implies that an economist with data about the consumption path cannot determine whether those data were generated by a hyperbolic or an exponential economy. He then proposes two ways to make that determination using additional data. First, hyperbolic discounting implies a breakdown in the standard inverse relationship between risk aversion and the elasticity of intertemporal substitution. Second, hyperbolic discounting implies that the economy will be characterized by undersaving. Laibson confirms the existence of hyperbolic discounting with survey data on undersaving. His analysis concludes that consumers are willing to sacrifice a year's worth of income to induce the government to implement revenue-neutral policies designed to encourage saving.

**Kahn** finds that nominal wages for people who stay with a single employer are "sticky," that is, not likely to decrease in dollar terms. She also finds an important distinction between wage earners and salary earners: wage earners exhibit the strongest stickiness in nominal wages. For salary earners in the 1980s, there does not seem to be any nominal stickiness, although this could be the result of large measurement errors in salary figures. Finally, Kahn's analysis suggests that changing rates of pay in-

curs costs that lead employers to delay small changes.

**Shiller** conducted a questionnaire survey in the United States, Germany, and Brazil to explore how people think about inflation, and the problems it may cause. Among noneconomists surveyed in all three countries, the largest concern is that inflation lowers people's standard of living; they seem to believe that wages do not respond to inflationary shocks that are caused by people or institutions acting badly. This standard-of-living effect is not the only perceived cost of inflation among noneconomists; other concerns involve the ill effects of inflation on fairness, morale, and national prestige. Shiller uncovers important differences in the understanding of the mechanics of inflation both across countries and between economists and noneconomists.

**Glaeser, Sacerdote, and Scheinkman** present a model in which social interaction explains the high variance of crime rates across cities. This model allows them to compare the degree of social interaction across crimes, across geographic units, and across time. Their index suggests that the amount of social interaction is highest in petty crimes (such as larceny and auto theft), moderate in more serious crimes (assault, burglary, and robbery), and almost negligible in mur-

der and rape.

Arbitrage in a given security is conducted by a relatively small number of highly specialized investors who take large positions using other people's money. Such professional arbitrage has a number of interesting implications for securities pricing, including the possibility that it becomes ineffective in extreme circumstances, when prices diverge far from fundamental values. In this paper, **Shleifer** and **Vishny** suggest where anomalies in financial markets are likely to appear, and why arbitrage fails to eliminate them.

Individuals' preferences that underlie most economic behavior may display substantial heterogeneity. **Barsky, Kimball, Juster, and Shapiro** report on direct measures of preferences relating to risk tolerance, time preference, and intertemporal substitution. The majority of their survey respondents fall into the least risk-tolerant group, but a substantial minority displays higher tolerance of risk. Individual measures of intertemporal substitution and time preference also display substantial heterogeneity. Measured risk tolerance is related positively to a number of risky behaviors, including smoking, drinking, failing to have insurance, and holding stocks rather than Treasury bills.

## Corporate Finance

More than 30 members and guests of the NBER's Program in Corporate Finance met in Cambridge on December 1. Program Director Robert W. Vishny, NBER and University of Chicago, organized this agenda.

**Bengt Holmström**, MIT, and **Jean Tirole**, Université des Sciences Sociales, "Private and Public Supply of Liquidity"

Discussant:  
Oliver D. Hart, NBER and

Harvard University

**Douglas W. Diamond**, University of Chicago, "Bank Liquidity Creation When Markets Are Illiquid"

Discussant:  
Gary B. Gorton, NBER and University of Pennsylvania  
**Zsuzsanna Fluck**, New York University, "The Optimality of Debt Versus Outside Equity"

Discussant:  
Luigi Zingales, NBER and

University of Chicago

**Stewart C. Myers**, NBER and MIT, "Inside and Outside Equity Financing"

Discussant:  
Andrei Shleifer, NBER and Harvard University

**Jeremy C. Stein**, NBER and MIT, "Rational Capital Budgeting in an Irrational World"

Discussant:  
Michael J. Barclay, NBER and University of Pennsylvania

**Holmström** and **Tirole** ask whether claims on private assets provide sufficient liquidity for the efficient functioning of the productive sector. In their model, firms can meet future liquidity needs in three ways: by issuing senior claims; by obtaining a credit line from a financial intermediary; or by holding claims on other firms. When there is no aggregate uncertainty, these instruments are sufficient for attaining the socially optimal (second-best) contract between investors and firms. However, when there is only aggregate uncertainty, the private sector is no longer self-sufficient in terms of liquidity. The government can improve liquidity by issuing bonds that commit future consumer income. In order to minimize the tax burden, the government should manage the supply of liquidity by boosting the value of its securities when the aggregate liquidity shock is high and tightening liquidity when the shock is low.

**Diamond** examines the roles of markets and banks when both are active. The amount of liquidity that banks offer is influenced by the liquidity (degree of direct participa-

tion) in the financial market. Conversely, the amount of liquidity that markets offer is influenced by banks. As direct participation in markets increases, and markets provide more liquidity, the banking sector shrinks, and banks' holdings of long-term assets fall more rapidly. In addition, the ability of the banking sector to subsidize those with immediate liquidity needs is reduced. More liquid markets also lead to longer maturity physical investment, a longer average maturity of financial assets, and a smaller gap between the maturity of financial assets and physical investments. Financial assets have a shorter maturity than real investments do, but this gap approaches zero as the market approaches full liquidity.

**Fluck** presents a theory of outside equity based on control rights and maturity design. She shows that outside equity is a tacit agreement between investors and management supported by equityholders' right to dismiss management regardless of performance, and by the lack of a prespecified expiration date on equity. Furthermore, outside equity is sustainable de-

spite management's potential for manipulating or diverting the cash flows, and regardless of how costly it is for equityholders to establish a case against managerial wrongdoing. The only outside equity that investors are willing to hold in equilibrium has unlimited life, and is issued by corporations. **Fluck** theorizes that investors match the maturity of the optimal debt contract with the life of the physical assets, and the maturity of the equity contract with the life of the company's real options.

**Myers** explores the necessary conditions for outside equity financing when insiders (that is, managers or entrepreneurs) are self-interested and cash flows are not verifiable. He contrasts two control mechanisms: a "partnership," in which outside investors can commit assets for a specified period, and a "corporation," in which assets are committed for an indefinite period but insiders can be ejected at any time. In the final section of the paper, **Myers** illustrates how "going public" and reducing outsiders' power can be efficient if it preserves appropriate incentives for insiders.

**Stein** asks the following basic question about capital budgeting: If cross-sectional differences in stock returns can be predicted based on variables other than beta (such as book-to-market), and this pre-

dictability reflects market irrationality rather than compensation for fundamental risk, then how should companies determine hurdle rates? He shows how such factors as managerial time horizons and financial

constraints affect the optimal hurdle rate. Under some circumstances, beta can be useful as a capital budgeting tool, even if it is of no use in predicting stock returns.

## Health Care Program Meeting

Members and guests of the NBER's Program on Health Care met in Cambridge on December 1. The program, organized by Jonathan Gruber, NBER and MIT, was:

**David E. Bloom**, NBER and Harvard Institute for International Development, and

**Ajay S. Mahal**, Barnard College, "Does the AIDS Epidemic Really Threaten Economic Growth?"

**Donna B. Gilleskie**, NBER and University of North Carolina, and **Thomas A. Mroz**, University of North Carolina, "A Dynamic Model of Medical Care Consumption During the Health Insurance Year"

**Aaron Yelowitz**, University of California, Los Angeles, "Using the Medicare Buy-In Program to Estimate the Effect of Medicaid on SSI Participation"

**Laurence C. Baker**, NBER and Stanford University, "HMOs and Fee-for-Service Health Care Expenditures: Evidence from Medicare"

**David M. Cutler**, NBER and Harvard University, and **Mark B. McClellan**, NBER and Stanford University, discussion on "Medicare Reform: Policy and Research Issues"

By examining the association between changes in the prevalence of AIDS and the rate of growth of GDP per capita across 51 developing and industrial countries, **Bloom** and **Mahal** find that the AIDS epidemic has not had a significant effect on income growth. The insignificant effect of AIDS on per capita income is qualitatively similar to the insignificant effect on wages of the Black Death in England and France during the Middle Ages, and the insignificant effect on per capita output of influenza in India during 1918-9, they estimate.

**Gilleskie** and **Mroz** model individual consumption of medical care over an insurance year, explicitly accounting for variations in the effective price of medical care that are attributable to the health insurance contract. Their model generates probabilities of: curative

and preventive treatment; illness; charges for medical care; and choice of health insurance plan. It also allows them to predict behavior under alternative cost-sharing provisions of endogenous health insurance contrasts.

**Yelowitz** asks how receiving public health insurance through Medicaid affects participation among elderly households in Supplemental Security Income (SSI). The implementation of the Qualified Medicare Beneficiary (QMB) program offered a substitute for Medicaid coverage, while expanding eligibility for Medicaid to households with higher incomes than were needed for SSI. Yelowitz finds that increasing the income limit for Medicaid eligibility sharply reduced participation in SSI. The effects were particularly strong for African-Americans and for those

with less than a high school diploma. His results also suggest that the QMB program was not as expensive as it might first have appeared because of the concurrent reductions in SSI expenditures.

Medicare provides fee-for-service (FFS) coverage to the majority of its beneficiaries, and thus may provide a way of examining the spillover effects of increased HMO activity. **Baker** examines both 1986-90 Medicare FFS expenditures and measures of HMO market share during that period at the county and Metropolitan Statistical Area levels. He finds that increases in HMO market share from 20 percent to 30 percent are associated with expenditure reductions of at least 3 percent to 6 percent in Medicare Part A FFS expenditures and a reduction of 3 percent to 5 percent in Medicare Part B FFS expenditures.

## Productivity Group Meets

Around 30 members and guests of the NBER's Program in Productivity met in Cambridge on December 4. This meeting was devoted to progress reports of research projects underway in connection with the NBER Project on Industrial Technology and Productivity, supported by the Alfred P. Sloan Foundation. The agenda, organized by Adam B. Jaffe, NBER and Brandeis University, was:

**James D. Adams**, NBER and University of Florida,  
**Michael S. Fogarty**, Case

Western Reserve University, and  
**Adam B. Jaffe**, "Spillovers from NASA Technology"

**Wayne Gray**, NBER and Clark University, "Environmental Regulation and Productivity Impacts in the Paper Industry"

**Joshua Lerner**, Harvard University, "Governance Structure and Control Rights in Strategic Alliances: An Empirical Analysis of Biotechnology-Pharmaceutical Contracts"

**Ann P. Bartel**, NBER and Columbia University,

"Productivity and Technological Change in Canadian Banking"

**Timothy F. Bresnahan**, NBER and Stanford University, and  
**Shane Greenstein**, NBER and University of Illinois, "The Information Technology Investment Decision"

**Severin Borenstein**, NBER and University of California Energy Institute, and

**Joseph Farrell**, University of California, Berkeley, "Why Do Oil Refining Firms Cut Cost?"

**Adams, Fogarty, and Jaffe** use data on patents granted to federal labs (both intramural and contractor-operated), and the citations to those patents, to measure the extent, timing, and geographic location of the technological impact of government research. To illustrate and validate this use of patent citation information, they are undertaking a detailed case study of a NASA lab in Cleveland that has a number of key inventions related to the creation of new materials and modifications of the surface of those materials with ion beam techniques. Based on discussions with key NASA scientists, and scientists at firms that have used these technologies and/or cited the NASA patents in their own patents, Adams and his coauthors will document the pathways by which federally developed technology gets into the private sector, and the extent to which patent citations can be used to measure this diffusion process.

**Gray** is measuring the impact of environmental regulation on productivity, focusing on the paper in-

dustry. Simultaneously he is analyzing the entire industry statistically, using data on productivity and regulatory compliance costs from the U.S. Bureau of the Census, and looking at detailed case studies of particular papermaking plants in New England. His statistical analysis indicates large negative impacts on productivity relative to actual compliance expenditures. He visits the plants in order to understand the relationship between the compliance cost information reported to the government and the actual costs of control technologies and process changes, as well as to study the overall interactions between compliance efforts and plant performance.

Since the early 1960s, economists have found the structure of intellectual property licenses to be interesting and puzzling. Because obtaining access to and analyzing these contracts is difficult, however, technology licensing has attracted relatively little empirical attention. This neglect is particularly striking because of the growing economic

importance of technology licensing and alliances, which is clearest in the biotechnology industry, where strategic alliances with pharmaceutical firms have become the single largest source of financing, accounting for several billion dollars of funds annually. In his project, **Lerner** exploits a unique database of approximately 500 agreements between biotechnology firms and pharmaceutical companies assembled by a San Francisco-based consulting firm.

**Bartel** has been examining the sources of productivity improvement in the retail sector, focusing on banking. She has an arrangement with a large Canadian bank under which she receives data on the performance and efficiency of all of the bank's branches. She plans to explore how market and management factors determine performance. Her analysis will be based on insights from a series of site visits in which she interviews managers and employees at "turn-around" branches, that is, branches identified as having gone from underperforming to overperforming.

**Bresnahan and Greenstein** are investigating the process by which large, data-intensive corporate users of computers have migrated from mainframes to client/server technologies. In particular, the economists are trying to understand the extent to which users seem to base their investment decisions on forward-looking evaluations of technologies' potential, and the extent to which transitions are slowed by users being "locked in" to existing hardware or software. This research combines statistical analysis of a large dataset describing the computer hardware in place over time at central corporate computer facilities with detailed interviews of information systems managers at companies in the retail, health care, accounting, and manufacturing sectors.

**Borenstein and Farrell** analyze the extent to which manufacturing companies carry significant "fat," or inefficiency, during prosperous times, which is then "lost" via explicit cost-cutting drives during hard times. Using a formal model of how equity markets value companies that are not operating efficiently, the economists are able to infer statistically the extent to which specific oil-refining companies carried "fat" at different times during the 1980s. They are testing these implications through discussions with specific managers involved in refining operations, in order to understand how it is decided that costs need to be reduced, and what the consequences of these decisions are for the organizations.



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2015. "Rules, Discretion, and Central Bank Independence: The German Experience, 1880–1989," by **Michael D. Bordo** and **Bernhard Eschweiler** (NBER Working Paper No. 4547)

2016. "Uncertain Demand, the Structure of Hospital Costs, and the Cost of Empty Hospital Beds," by **Martin Gaynor** and **Gerard F. Anderson** (NBER Working Paper No. 4460)

2017. "Internal Finance and Investment: Evidence from the Undistributed Profits Tax of 1936–7," by **Charles W. Calomiris** and **R. Glenn Hubbard** (NBER Working Paper No. 4288)

2018. "International R and D Spillovers," by **David T. Coe** and **Elhanan Helpman** (NBER Working Paper No. 4444)

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"Trade Reform and Labor Market Adjustment in Morocco," by **Janet Currie** and **Ann Harrison**.

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### Financial Deregulation and Integration in East Asia

*Financial Deregulation and Integration in East Asia*, edited by Takatoshi Ito and Anne O. Krueger, is now available from the University of Chicago Press for \$75. The product of the fifth NBER-East Asia Seminar on Economics, held in Singapore in June 1994, it focuses on financial markets in this important and volatile region.

This volume explores how financial deregulation and integration are affecting East Asian markets. The topics covered include the determinants of capital flows between countries, exchange rate behavior under various regimes, responses of capital flows to deregulation and integration, and the effects of foreign direct investment. As a group, the papers in this volume provide an excellent picture of the overall status of financial markets in East Asia, and demonstrate the complexity of the process of fi-

ancial deregulation and its challenges for policymakers.

Ito is an NBER research associate in international finance and macroeconomics, and is currently on leave and at the Research Department of the International Monetary Fund. Krueger is an NBER research associate in international trade and investment and a professor of economics at Stanford University.

### Trade Protection Volumes

*The Political Economy of Trade Protection*, edited by Anne O. Krueger, is available from the University of Chicago Press for \$24.95. This NBER conference report explores the political and economic factors that determine which industries receive trade protection, and the structure of protection across industries. Several key industries are discussed, including steel, autos, lumber, wheat, and textiles and apparel.

This volume, the result of a conference held in Washington in September 1994, offers nonspecialists a concise but thorough overview by leading scholars and experts. A second, more technical volume titled *The Political Economy of American Trade Policy*, aimed at economists and specialists and offering in-depth studies and discussants' comments, is also available from UC Press for \$70.00.

The authors and discussants represented in these volumes are: Douglas Nelson, NBER and Tulane University; Anne Brunsdale, U.S.

International Trade Commission; Richard Cooper and Joseph Kalt, Harvard University; Bruce Gardner, University of Maryland; David Orden, Virginia Polytechnic Institute; William Frenzel, Brookings Institution; Robert Paarlberg, Wellesley College; Edward Schuh, University of Minnesota; Douglas Irwin, NBER and University of Chicago; Andrew Dick, University of California, Los Angeles; Lionel Olmer, Paul, Weiss, Rifkind, Wharton & Garrison; Michael Finger and Ann Harrison, World Bank; Robert E. Baldwin, NBER and University of Wisconsin, Madison; NBER Directors Jagdish W. Bhagwati, Columbia University, and Michael H. Moskow, Federal Reserve Bank of Chicago; Mac Dester, University of Maryland; Michael Moore, George Washington University; William Lane, Caterpillar, Inc.; James R. Markusen, NBER and University of Colorado; Geoffrey Carliner, Institute for International Economics; Alan Rugman, University of Toronto; Robert W. Staiger, NBER and University of Wisconsin, Madison; Frank A. Wolak, NBER and Stanford University; and Kala Krishna, NBER and Pennsylvania State University. Also participating in these conferences were staff members of the U.S. International Trade Commission, the Council of Economic Advisers, the U.S. General Accounting Office, and the Office of Management and Budget.

Krueger is a research associate in the NBER's Program in International Trade and Investment and a professor of economics at Stanford University.



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### NBER Working Papers

#### Non-Walrasian Unemployment Fluctuations

Jordi Gali

NBER Working Paper No. 5337

November 1995

JEL Nos. E32, J64

Economic Fluctuations

I modify the standard real business cycle model by assuming that wages are set by a monopoly union at the firm level. In the context of that model, I introduce a measure of unemployment and analyze its equilibrium behavior. A calibrated version of the model is capable of generating both a procyclical labor supply and a countercyclical unem-

ployment rate, in a way that is qualitatively consistent with the evidence. The model stresses the role of countercyclical markups in the goods market as a key mechanism underlying the countercyclical behavior of unemployment.

#### The Impact of Inflation on Budgetary Discipline

Joshua Aizenman and  
Ricardo Hausmann

NBER Working Paper No. 5338

November 1995

JEL Nos. E3, E6

Monetary Economics

This paper investigates budgetary rules for an economy characterized by inflation and volatile relative prices. We view the budgetary process as a limited-contingencies contract between the treasury and the ministers. The budgetary process allows a minister, whose realized real budget falls short of a threshold, to ask for a budget revision. Upon cost verification by the treasury, the minister obtains the extra funds needed to meet the expenditure threshold level. The contract sets both the projected budget and the threshold real expenditure that justifies budget revisions.

We identify the efficient contract, and show that for significant state verification costs and low volatility, the contract is noncontingent (that is, a nominal contract). For significant enough volatility, the contract becomes state contingent: it reduces the initial allocation (that is, the projected budget), and reduces the threshold associated with budgetary revisions. Both adjustments imply that in volatile economies, the projected revenue *understates* the realized budget, and the average budget error is *positive*. As the volatility increases, the contract converges to full ex-

post indexation. Hence, one of the costs of inflation is that nominal contracts lose their disciplining role in determining real allocation. Instead, the economy shifts toward more costly arrangements, such as ex post indexation, in which the discipline is accomplished by constant monitoring.

The last part of the paper uses data from 12 Latin American countries to test the model's predictions. Our tests confirm that in an inflationary environment the planned budget underpredicts the realized one: higher inflation increases the budget error and the average budget error is *positive*.

### **Trade Strategy, Investment, and Exports: Another Look at East Asia**

**Dani Rodrik**

NBER Working Paper No. 5339

November 1995

JEL Nos. F14, F43, O53

Growth, International Trade and Investment

The export booms in South Korea and Taiwan that started in the early 1960s are anomalous when compared with later export booms in other non-East Asian countries such as Chile and Turkey. First, these booms have taken place in the context of comparatively small changes in relative prices in favor of exportables. Second, they have been associated from the start with booms in investment. This paper suggests that exports in East Asia may have been driven by an increase in the profitability of investment, with outward orientation a consequence of the investment boom rather than its instigator. In such economies as South Korea and Taiwan, an increase in investment required an increase in imports of capital goods. Since savings rose alongside the desired in-

vestment, the investment boom was accompanied by a boom in both exports and imports. Moreover, this could happen with a relatively small change in the relative price of exportables.

### **The Gold Standard as a "Good Housekeeping Seal of Approval"**

**Michael D. Bordo and Hugh Rockoff**

NBER Working Paper No. 5340

November 1995

JEL Nos. F21, F33, N10, E61

Development of the American Economy

We argue that adherence to the gold standard rule of convertibility of national currencies into a fixed weight of gold served as a "good housekeeping seal of approval" that facilitated access by peripheral countries to foreign capital from the core countries of western Europe. We survey the historical background of gold standard adherence by nine important peripheral countries during 1870–1914. Our sample includes the full range of commitment to the gold standard from continuous adherence through intermittent adherence to nonadherence. Evidence on the pattern of long-term government bond yields suggests that long-term commitment to the gold standard mattered even when bonds were denominated in gold; countries that remained on gold throughout the classical era were charged lower rates than countries that had a mixed record of adherence. Estimation of a model analogous to the capital asset pricing model—using the differential between peripheral country rates and U.K. rates augmented by a list of "fundamentals" and a dummy variable to capture gold standard adherence—reveals that capital markets attached significant weight to adherence to the

gold standard. Countries with poor records of adherence were charged considerably more than those with good records, enough to explain the determined effort to stay on gold made by a number of capital importing countries.

### **Economics and Politics of Rice Policy in Japan: A Perspective on the Uruguay Round**

**Yujiro Havami and Yoshihisa Godo**

NBER Working Paper No. 5341

November 1995

JEL Nos. F14, Q18

International Trade and Investment

This paper reviews the recent problems of the opening of Japan's rice market and evaluates the Japanese government's rice policy from both an economic and a political standpoint. The Japanese government strenuously resisted the opening of Japan's rice market during the negotiations on agricultural trade at the GATT's Uruguay Round. Eventually Japan's rice was made exempt from "tariffication" by compensating in the form of increased "minimum access" import quotas. However, the tariffication rule in the final agreement guarantees that importing countries can impose quite high tariffs. Thus, the volume of Japan's rice imports could be decreased if the Japanese government accepted the tariffication agreement. In retrospect the decisions made by the Japanese government have protected the vested interests of the domestic rice distribution system effectively, while hindering the structural improvement of the Japanese rice industry.

## **Virtuous Circles of Productivity: Star Bioscientists and the Institutional Transformation of Industry**

**Lynne G. Zucker and Michael R. Darby**

NBER Working Paper No. 5342

November 1995

JEL No. O31

Productivity

The most productive ("star") bioscientists possessed intellectual human capital of extraordinary scientific and pecuniary value for some 10–15 years after Cohen and Boyer's 1973 founding discovery for biotechnology. This extraordinary value was attributable to the union of their still scarce knowledge of the new research techniques and the genius and vision to apply these techniques in novel, valuable ways. As in other sciences, star bioscientists were particularly protective of their techniques, ideas, and discoveries in the early years of the revolution, tending to collaborate more within their own institution, which slowed the diffusion of ideas to other scientists. Therefore, close and bench-level working ties between stars and firm scientists were needed to commercialize the breakthroughs. Where and when star scientists actively were producing academic publications is a key determinant of where and when commercial firms began to use biotechnology. The extent of collaboration with stars by a firm's scientists is a powerful predictor of the firm's success: for each nine articles coauthored by both an academic star and firm scientists, an estimated three more products are in development, one more is on the market, and there are 1550 more employees. Such collaboration with firms, or increased employment,

also results in significantly higher rates of citation of articles written with the firm. The U.S. scientific and economic infrastructure has been particularly effective in fostering and commercializing the bioscientific revolution. To provide an initial indication of international competitiveness, we estimate stars' distribution, their commercial involvement, and their migration across the top ten countries in bioscience. Our results let us inside the black box to see how scientific breakthroughs become economic growth, and enable us to consider the implications for policy.

## **Long-Term Effects of Job Displacement: Evidence from the Panel Study of Income Dynamics**

**Ann Huff Stevens**

NBER Working Paper No. 5343

November 1995

JEL No. J6

Labor Studies

This paper measures the long-term losses of wages and earnings among workers who lose their jobs because of plant closings and layoffs. I use a fixed-effects estimator to control for unobserved worker characteristics and longitudinal data from the Panel Study of Income Dynamics. The results show that displacement has large and persistent effects, with earnings and wages falling by 25 and 12 percent, respectively, in the year after the job loss. Six or more years later, earnings and wages remain approximately 9 percent lower than they otherwise would have been. Multiple job losses are responsible for much of this persistence. Those workers who avoid subsequent displacements experience more rapid recovery, with reductions in earnings and wages of 1 and 4 percent,

respectively, six or more years after displacement. These multiple job losses are not concentrated heavily among any identifiable group of workers, but instead affect the recovery patterns of workers with a variety of characteristics.

## **Expectations and the Effects of Monetary Policy**

**Laurence M. Ball and Dean Croushore**

NBER Working Paper No. 5344

November 1995

JEL Nos. E3, E5

Economic Fluctuations,  
Monetary Economics

This pair examines the predictive power of shifts in monetary policy—as measured by changes in the federal funds rate—for output, inflation, and survey expectations of these variables. We find that policy shifts have larger effects on actual output than on expected output, suggesting that agents underestimate the effects of policy on aggregate demand. Our results help to explain the real effects of monetary policy, and they provide a strong rejection of the rational expectations hypothesis.

## **Nonparametric Pricing of Interest Rate Derivative Securities**

**Yacine Aït-Sahalia**

NBER Working Paper No. 5345

November 1995

Asset Pricing

I propose a nonparametric estimation procedure for continuous-time stochastic models. Because prices of derivative securities depend crucially on the form of the instantaneous volatility of the underlying process, I leave the volatility function unrestricted, and estimate it nonparametrically. I use only discrete data, but the estima-

tion procedure still does not rely on replacing the continuous-time model with some discrete approximation. Instead, the drift and volatility functions must match the densities of the process. I estimate the stochastic differential equation followed by the short-term interest rate, and compute nonparametric prices for bonds and bond options.

### **Testing Continuous-Time Models of the Spot Interest Rate**

**Yacine Aït-Sahalia**

NBER Working Paper No. 5346  
November 1995  
Asset Pricing

Different continuous-time models for interest rates coexist in the literature. I test parametric models by comparing their implied parametric density to the same density estimated nonparametrically. I do not replace the continuous-time model with discrete approximations, even though the data are recorded at discrete intervals. The principal source of rejection of existing models is the strong nonlinearity of the drift. Around its mean, where the drift is essentially zero, the spot rate behaves like a random walk. The drift then mean-reverts strongly when far away from the mean. The volatility is higher away from the mean.

### **Financial Repression and Capital Mobility: Why Capital Flows and Covered Interest Rate Differentials Fail to Measure Capital Market Integration**

**Michael P. Dooley and Menzie Chinn**

NBER Working Paper No. 5347  
November 1995  
JEL Nos. E44, F41, G15  
International Finance and Macroeconomics

Required reserves on banks' deposit liabilities have been used by both industrial and developing countries to discourage and sterilize international capital flows. In this paper, we employ an open-economy macro model incorporating bank credit to evaluate this policy. The model suggests that high levels of reserve requirements are a perverse policy tool, in that they amplify the effects of foreign monetary shocks; but changes in reserve requirements can insulate a repressed financial market from international financial shocks. The model also suggests that traditional measures of capital mobility, such as interest parity conditions or the scale of gross private capital flows, are of no value in assessing the openness of repressed financial systems.

### **The Discovery of the Residual: An Historical Note**

**Zvi Griliches**

NBER Working Paper No. 5348  
November 1995  
Productivity

This note reviews the history of the "residual," from its earliest articulation in Copeland (1937) to its codification in Solow (1957), describing the various earlier contributions by Tinbergen, Stigler, Schmookler, Fabricant, Kendrick, Abramovitz, and others.

### **Carwars: Trying to Make Sense of U.S.-Japan Trade Frictions in the Automobile and Automobile Parts Market**

**James A. Levinsohn**

NBER Working Paper No. 5349  
November 1995  
JEL Nos. L1, F1  
International Trade and Investment

This paper tries to make sense of the recent trade dispute between the United States and Japan in autos and auto parts. The paper argues that there are structural differences between the way that the auto industries are organized in the United States and Japan, and that these differences have contributed to the growing bilateral trade deficit in auto parts. The paper also provides econometric estimates of what would have happened had the threatened 100 percent tariff on Japanese luxury cars not been withdrawn by the United States.

### **Humps and Bumps in Lifetime Consumption**

**Orazio P. Attanasio, James Banks, Costas Meghir, and Guglielmo Weber**

NBER Working Paper No. 5350  
November 1995  
Economic Fluctuations

We argue that once one departs from the simple classroom example, or "stripped-down life-cycle model," the empirical model for consumption growth can be made flexible enough to fit the main features of the data. More specifically, we show that allowing demographics to affect household preferences, and relaxing the assumption of certainty equivalence, can generate hump-shaped consumption profiles over age that are very similar to those observed in household-level data sources, without any alternative explanations (such as liquidity constraints, myopia, or mental accounting). The hump shape is attributable partly to precautionary savings and partly to demographics; the tracking (whereby consumption jumps with income) is caused instead by the permanent nature of the income shocks.

We use U.S. household-level data to estimate preference parame-

ters and income profiles, and then simulate consumption profiles for different education groups. Our simulated profiles show that the key features observed in the data can be matched closely in simulation. We also show that neglecting uncertainty produces consumption profiles that are "too flat," whereas neglecting demographics generates consumption profiles that peak "too late."

### **Nonparametric Estimation of State-Price Densities Implicit in Financial Asset Prices**

**Yacine Aït-Sahalia and Andrew W. Lo**

NBER Working Paper No. 5351

November 1995

JEL Nos. G12, G13, C14

Asset Pricing

Implicit in the prices of traded financial assets are Arrow-Debreu state prices or, in the continuous-state case, the state-price density (SPD). We construct an estimator for the SPD implicit in option prices and derive an asymptotic sampling theory for this estimator to gauge its accuracy. The SPD estimator provides an arbitrage-free method of pricing new, more complex, or less liquid securities, while capturing those features of the data that are most relevant from an asset-pricing perspective, for example, negative skewness and excess kurtosis for asset returns and volatility "smiles" for option prices. We perform Monte Carlo simulation experiments to show that the SPD estimator can be extracted successfully from option prices, and we present an empirical application using S&P 500 Index options.

### **A Survey of Academic Literature on Controls over International Capital Transactions**

**Michael P. Dooley**

NBER Working Paper No. 5352

November 1995

JEL Nos. F34, G15, G28

International Finance and Macroeconomics

This paper reviews recent theoretical and empirical work on controls over international capital movements. The theoretical contributions reviewed focus on "second-best" arguments for capital market restrictions, as well as on arguments based on multiple equilibriums. The empirical literature suggests that controls have been "effective" in the narrow sense of influencing yield differentials. But there is little evidence that controls have helped governments meet policy objectives, with the exception of reduction in the governments' debt service costs, and no evidence that controls have enhanced economic welfare in a manner suggested by theory.

### **The Effect of Catholic Secondary Schooling on Educational Attainment**

**Derek Neal**

NBER Working Paper No. 5353

November 1995

JEL Nos. I2, J24

Labor Studies

Using data from the National Longitudinal Survey of Youth, this paper provides a detailed analysis of the effect of Catholic secondary schooling on high school graduation rates, and examines the effect of Catholic schooling on college graduation rates and future wages. The paper uses data from the National Catholic Educational Association and the Survey of Churches

and Church Membership to construct measures of access to Catholic secondary schooling for each county in the United States. These measures of access provide potential instruments for Catholic school attendance.

The results indicate that Catholic secondary schools are concentrated geographically in urban areas, and that Catholic schooling greatly increases educational attainment among urban minorities. The gains from Catholic schooling are modest for urban whites and negligible for suburban whites. Related analyses suggest that urban minorities benefit greatly from access to Catholic schooling primarily because the public schools available to them are quite poor.

### **State Reproductive Policies and Adolescent Pregnancy Resolution: The Case of Parental Involvement Laws**

**Theodore J. Joyce and Robert Kaestner**

NBER Working Paper No. 5354

November 1995

JEL No. J1

Health Economics

State laws regulating abortion have increased markedly in the wake of recent Supreme Court decisions. We test whether one form of abortion regulation, parental involvement laws, affects how pregnancies are resolved. Specifically, we examine whether laws that require minors to notify or obtain consent from a parent before receiving an abortion affect the likelihood that a pregnancy will be terminated. We use individual data on births and abortions from three southern states, South Carolina, Tennessee, and Virginia. Distinguishing characteristics of our data are the large sample of abortions, the quality of reporting, and infor-

mation on individual and county characteristics. We detect no significant effects of parental involvement laws on the probability of abortion for minors as a single treatment group, a finding contrary to several recent studies. We do find, however, that for nonblack minors 16 years of age, South Carolina's parental consent statute is associated with a 10 percentage point fall in the probability of abortion, or a relative decline of over 20 percent. We believe this to be an upper bound estimate given potential underreporting of induced terminations. We also find a comparatively weak relationship between distance from an abortion provider and the probability that a pregnancy is aborted. We conclude that some minors include their parents in the decision to terminate a pregnancy. Other minors seek abortion in a neighboring state. Overall, the impact of parental involvement laws on the pregnancy resolution of minors is not large.

### **Technology, Trade, and Factor Prices**

**Paul R. Krugman**

NBER Working Paper No. 5355

November 1995

International Trade and Investment

A number of recent studies appear to show that international trade is a secondary factor in the growing inequality of wages, and that technology is probably the main culprit. However, these studies have been subjected to severe and in some cases harshly worded criticism by trade theorists, who argue that the authors of these studies have misspecified the impacts of both technology and trade on factor prices. This paper shows that it is the critics who are confused. In particular, much recent discussion about technology, trade, and wages

is marked by a failure to distinguish between the models we all use and the particular thought experiments we typically use to teach these models—which happen not to be the appropriate thought experiments we need to analyze the real-world issues.

### **The Effects of HMOs on Conventional Insurance Premiums: Theory and Evidence**

**Laurence C. Baker and Kenneth S. Corts**

NBER Working Paper No. 5356

November 1995

JEL Nos. I1, L0

Health Care

We develop a model of imperfectly competitive insurers that compete with HMOs for consumers who have private information about their health status. We illustrate two conflicting effects of increasing HMO activity on conventional insurance premiums. We term these effects *market discipline*—HMO competition may limit the ability of insurers to exercise market power, thus driving prices down—and *market segmentation*—HMOs may skim the healthiest patients, thus driving insurers' costs and prices up. We empirically examine the relative importance of these effects using data from a firm-level survey that provides data on premiums, together with market-level measures of HMO activity. Our results suggest that the market segmentation effect is important, and that increases in HMO activity may increase insurance premiums.

### **Predation and Accumulation**

**Herschel I. Grossman and Minseong Kim**

NBER Working Paper No. 5357

November 1995

JEL Nos. O41, E21, D23

Economic Fluctuations, Growth

This paper incorporates the economic theory of predation into the theory of economic growth. The analytical framework is a dynamic general equilibrium model of the interaction between two dynasties, one of which is a potential predator and the other is its prey. Each generation of each dynasty has to decide how to allocate its endowment of inherited wealth not only to consumption and productive capital, as in standard growth models, but also to either defensive fortifications or offensive weapons. Productive capital forms the basis for accumulation of wealth, but predation in each generation can cause both the destruction of wealth and a redistribution of wealth from the prey dynasty to the predator dynasty.

We find that, if the current wealth of the potential predator dynasty is small relative to the current wealth of the prey dynasty, then the current generation of the prey dynasty chooses to tolerate predation rather than to deter it. We also find that, over generations, the security of the prey dynasty's property and the rate of accumulation of its productive capital both decrease steadily, while the inherited wealth of the predator dynasty grows relative to the inherited wealth of the prey dynasty. Eventually, a generation of the prey dynasty will find that with predation its property would be so insecure that it is better off increasing its defensive fortifications sufficiently to deter predation.

Importantly, the relationship between the security of the prey dynasty's property and its accumulation of productive capital, both of which are endogenous in the process of economic growth, is neither continuous nor monotonic. Gener-

ations of the prey dynasty that choose to deter predation, even though their property is perfectly secure, accumulate productive capital more slowly than the preceding generations that tolerated predation. Even if deterrence becomes a better choice for the prey dynasty than tolerating predation, deterrence is a costly choice.

### **Explaining Asset Bubbles in Japan** **Takatoshi Ito and** **Tokuo Iwaisako**

NBER Working Paper No. 5358  
November 1995

JEL Nos. E4, E5, G1  
International Finance and  
Macroeconomics

This paper examines the behavior of stock and land prices during the bubble economy period (the second half of the 1980s), paying considerable attention to the linkage between the two markets and the effects of monetary policy. In particular, we examine whether the booms in these asset prices can be justified by changes in the fundamental economic variables, such as the interest rates or the growth of the real economy. A complex chain of events is needed to explain the process of asset price inflation and deflation. Our empirical results suggest that: 1) the initial increases in asset prices are sown by a sharp increase in bank lending to real estate; 2) a considerable comovement between stock and land prices is consistent with a theory that emphasizes the relationship between the collateral value of land and cash flow for constrained firms; 3) although the real economy was doing well and the interest rates were still low, asset price increases from mid-1987 to mid-1989 cannot be justified fully by the movement in fundamentals alone;

and 4) the stock price increase in the second half of 1989 and the land price increase in 1990 are not explained by any asset pricing model based on fundamentals or rational bubbles.

### **Causes and Consequences of the Export Enhancement Program for Wheat**

**Pinelopi Koujianou Goldberg**  
**and Michael M. Knetter**

NBER Working Paper No. 5359  
November 1995

JEL Nos. F1, Q1  
International Trade and Investment

This paper uses regression analysis to study the causes and effects of the Export Enhancement Program (EEP) for wheat. We find that the overwhelming causes of the EEP, faltering export markets and swelling government stocks, are primarily attributable to the overvaluation of the dollar in the 1980s, not to the increase in EC subsidies to wheat farmers in 1985. We also find that what had been a fairly robust relationship among export shares, exchange rates, and loan rates broke down after 1985, probably because of changes in farm policy. In any case, export shares did not rebound in spite of the weaker dollar and the implementation of the EEP after 1985.

### **HMOs and Fee-for-Service Health Care Expenditures: Evidence from Medicare**

**Laurence C. Baker**

NBER Working Paper No. 5360  
November 1995

JEL No. I1  
Health Care

Increasing levels of HMO activity may influence health expenditures in other sectors of the market. Medicare provides fee-for-ser-

vice (FFS) coverage to the majority of its beneficiaries, and thus may provide a way of examining these so-called spillover effects. This paper examines 1986–90 Medicare FFS expenditures at the county and Metropolitan Statistical Area levels, along with measures of HMO market shares at both levels. All of the models imply that FFS expenditures are concave in market share, and that expenditures are decreasing in market share for market shares above about 18 percent. Many of the estimates suggest that expenditures become decreasing in market share at much lower levels (between 0 and 10 percent). Fixed-effects estimates imply that increases in market share from 20 to 30 percent would be associated with reductions in expenditures of 3.4–6.5 percent in Part A expenditures and 2.5–5.6 percent in Part B expenditures. IV estimates imply larger responses. The results are consistent with the hypothesis that managed care can affect non-managed-care expenditures.

### **Optimal Buffer Stocks and Precautionary Savings with Disappointment Aversion**

**Joshua Aizenman**

NBER Working Paper No. 5361  
November 1995

JEL No. F1  
International Trade and Investment

Developing countries use various risk-reduction schemes, ranging from active management of buffer stocks and international reserves to commodity stabilization funds. This paper reexamines these schemes in the context of a generalized expected utility maximization model in which agents are averse to disappointment. First, I derive the generalized risk premium, showing that aversion to dis-

appointment increases the conventional risk premium by a term proportional to the standard deviation times the degree of "disappointment aversion." Next, I show that aversion to disappointment modifies the characteristics of precautionary saving. The concavity of the marginal utility continues to determine precautionary saving, but its effect is of a *second-order* magnitude (proportional to the variance), compared to the *first-order* effect (proportional to the standard deviation) induced by aversion to disappointment. Hence, higher volatility increases the precautionary saving of an agent who is disappointment averse. This result applies even if the income process approaches a random walk. Finally, I reexamine the optimal size of buffer stocks, showing that aversion to disappointment increases its size by a *first-order* magnitude. A buffer stock that is rather small when agents are maximizing the conventional expected utility is rather large when agents are disappointment averse.

### **Privatizing Social Security: First-Round Effects of a Generic, Voluntary, Privatized U.S. Social Security System**

**Alan L. Gustman and  
Thomas L. Steinmeier**

NBER Working Paper No. 5362

November 1995

JEL No. H55

Aging, Labor Studies

This paper investigates individual responses to a simple scheme for privatizing Social Security. We explore the sensitivity of outcomes to how individuals project life expectancy and value spouse and survivor benefits, and to expected future reductions in Social Security benefits. Depending on assump-

tions made, first-year participation ranges from 20 percent to almost 100 percent. Estimated paths for taxes over time decline immediately with privatization, but the decline in benefits grows slowly over a period of two or three decades. Labor force participation rates are not affected greatly by privatization, even if major changes in pensions are induced.

### **The Effects of Irreversibility and Uncertainty in Capital Accumulation**

**Andrew B. Abel and  
Janice C. Eberly**

NBER Working Paper No. 5363

November 1995

JEL No. E22

Asset Pricing, Economic Fluctuations,  
Monetary Economics

When investment decisions cannot be reversed and returns to capital are uncertain, the firm faces a higher user cost of capital than if it could reverse its decisions. This higher user cost tends to reduce the firm's capital stock. Opposing this effect is the irreversibility constraint itself: when the constraint binds, the firm would like to sell capital but cannot. This effect tends to increase the firm's capital stock. We show that a firm with irreversible investment may have a higher or a lower expected capital stock, even in the long run, compared to an otherwise identical firm with reversible investment. Furthermore, an increase in uncertainty either can increase or decrease the expected long-run capital stock under irreversibility relative to that under reversibility. However, changes in the expected growth rate of demand, the interest rate, the capital share in output, and the price elasticity of demand all have unambiguous effects.

### **Investment Creation and Investment Diversion: Simulation Analysis of the Single Market Programme**

**Richard E. Baldwin,  
Rikard Forslid, and  
Jan Haaland**

NBER Working Paper No. 5364

November 1995

JEL Nos. F12, F15, F17

International Trade and Investment

This paper studies the effects on investment creation and diversion of the EU's Single Market programme (EU92). We first present empirical evidence that suggests that EU92 caused investment diversion in the European Free Trade Association (EFTA) nations and investment creation in the EU. The economic logic behind this is simple: discriminatory liberalization shifts production of tradable goods from nonintegrating countries to the integrating region. Since tradable sectors are capital intensive relative to nontraded sectors, the production shifting raises the rental rate in the integrating regions, lowering it elsewhere. The result is investment creation and diversion. To simulate what would have occurred if those in the EFTA had never gained access to EU92 (via EU membership or the European Economic Area), we use a computable general equilibrium model with endogenous capital stocks. The results show a modest drop in EFTA capital stocks when they are excluded from EU92, but an important rise (almost 5 percent) when they are included. In terms of real income, the difference between the included and excluded cases is quite large for those in the EFTA (5.5 percent of GDP). In all cases, the EU experiences investment creation and income gains. The effects on the United States and Japan are trivially small, but mostly negative in terms of capital stocks and real income.

## **Large Countries, Small Countries, and the Enlargement of Trade Blocs**

**Alessandra Casella**

NBER Working Paper No. 5365

November 1995

JEL Nos. F12, F15

International Trade and Investment

Are there systematic forces that cause countries of different sizes participating in a free trade bloc to gain differently from the entry of new members? If economies of scale imply that firms located in large countries enjoy lower costs, then the gains from enlarging the bloc will fall disproportionately on small countries, because the entry of new members diminishes the importance of the domestic market and improves the small countries' relative competitiveness. The theoretical prediction is clear, but the empirical analysis of trade flows toward Spain and Portugal after their 1986 entry into the European Community (EC) yields mixed results. France and the United Kingdom appear to have lost market shares relative to the small countries in the EC, but the same is not true for Italy and, to a lesser degree, for Germany.

## **Beauty, Productivity, and Discrimination: Lawyers' Looks and Lucre**

**Jeff E. Biddle and Daniel S. Hamermesh**

NBER Working Paper No. 5366

November 1995

JEL Nos. J71, J19

Labor Studies

We propose several models in which an ascriptive characteristic generates earnings differentials and is sorted across sectors. The general approach shows how to distinguish the ultimate sources of labor

market returns to such characteristics; the specific example uses longitudinal data on a large sample of attorneys who graduated from one law school. Beauty is measured by ratings of their matriculation photographs. We find that better-looking attorneys who graduated in the 1970s earned more after five years of practice than their worse-looking classmates, other things equal, an effect that grew even larger by the fifteenth year of practice. There is no impact of beauty on earnings among 1980s graduates, though.

We also find that attorneys in the private sector are better-looking than those in the public sector, with the differences rising as workers sort across sector based on their beauty. Further, male attorneys' probability of attaining an early partnership rises with beauty. Our results support a theory of dynamic sorting and the role of customer behavior. We cannot determine whether this is because clients discriminate, or because better-looking lawyers are able to obtain greater pecuniary gains for their clients.

## **Why Do Companies Go Public? An Empirical Analysis**

**Marco Pagano, Fabio Panetta, and Luigi Zingales**

NBER Working Paper No. 5367

November 1995

Corporate Finance

This paper empirically analyzes the determinants of an initial public offering (IPO) and the consequences of this decision on a company's investment and financial policy. We compare both the ex ante and the ex post characteristics of IPOs with those of a large sample of privately held companies of similar size. We find that: 1) the likelihood of an IPO is related posi-

tively to the market-to-book ratio prevailing in the relevant industrial sector and to a company's size; 2) IPOs are followed by an abnormal reduction in profitability; 3) the new equity capital raised upon listing is not used to finance subsequent investment and growth, but to reduce leverage; 4) going public reduces the cost of bank credit; and 5) going public often is associated with equity sales by controlling shareholders, and is followed by a higher turnover of control than occurs for other companies.

## **Strikes and the Law in the United States, 1881-94: New Evidence on the Origins of American Exceptionalism**

**Janet Currie and Joseph Ferrie**

NBER Working Paper No. 5368

November 1995

JEL Nos. J52, J51, K31

Development of the American Economy, Labor Studies

The origins of American exceptionalism—the apolitical nature of American labor unions compared to their European counterparts—have puzzled labor historians. Recently, it has been suggested that organized labor abandoned attempts to win reform through legislation because the reforms did not have the desired consequences. We evaluate this claim using information on each state's legal environment and unique strike-level data on over 12,000 labor disputes between 1881 and 1894. We find that the law affected the costs and outcomes of strikes, although not always in the anticipated directions. For example, laws outlawing blacklisting were associated with the increased use of strikebreakers, while the legalization of unions, one of the hardest-won legislative

changes, had little impact. Only laws on maximum hours had clearly pro-labor effects. Our results are consistent with the view that the American labor movement abandoned political activism and embraced business unionism because unions found the law to be an inaccurate instrument for effecting change in labor markets.

### **Education Finance Reform and Investment in Human Capital: Lessons from California**

**Raquel Fernandez and Richard Rogerson**

NBER Working Paper No. 5369

November 1995

JEL Nos. I22, H42

International Finance and

Macroeconomics, Public Economics

This paper examines the effect of different systems of education financing on the level and distribution of resources devoted to public education. We focus on California, which in the 1970s moved from a system of mixed local and state financing to one of effectively pure state finance, and subsequently saw its funding of public education fall between 10 and 15 percent relative to the rest of the United States. We show that a simple political economy model of public finance can account for the bulk of this drop. We find that while spending became more evenly distributed, this was mainly at the cost of a large reduction in spending in the wealthier communities with little increase for the poorer districts. Our model implies that there is no simple trade-off between equity and resources; we show that if California had moved to the opposite extreme and abolished state aid altogether, funding for public education also would have dropped by almost 10 percent.

### **The Effect of Increased Tax Rates on Taxable Income and Economic Efficiency: A Preliminary Analysis of the 1993 Tax Rate Increases**

**Martin Feldstein and Daniel R. Feenberg**

NBER Working Paper No. 5370

November 1995

JEL Nos. H24, H21

Public Economics

The 1993 tax legislation raised marginal tax rates to 36 percent from 31 percent on taxable incomes between \$140,000 and \$250,000, and to 39.6 percent on incomes above \$250,000. This paper uses recently published IRS data on taxable incomes by adjusted gross income (AGI) class to analyze how the 1993 tax rate increases affected taxable income, tax revenue, and economic efficiency. Our estimates are based on a difference-in-difference procedure comparing growth of taxable incomes among taxpayers with AGIs over \$200,000 to the growth of incomes of lower-income taxpayers. We use the NBER TAXSIM model to adjust for interyear differences in the composition of the two taxpayer groups.

The results show that high-income taxpayers would have reported 7.8 percent more taxable income in 1993 than they did if their tax rates had not increased. Because of the high threshold for the increase in tax rates, this decline in taxable income caused the Treasury to lose more than half of the extra revenue that would have been collected if taxpayers had not changed their behavior.

The deadweight loss caused by the higher marginal tax rates (including the effects on labor supply and on consumption of those goods and services favored by de-

ductions and exclusions) is approximately twice as large as the \$8 billion in revenue raised by the 1993 tax rate.

Several possible statistical biases could cause the estimated effect of the tax changes to either underestimate or overestimate the true long-run effect. The paper concludes with a discussion of these problems and of plans for future analysis.

### **Real Versus Pseudo-International Systemic Risk: Some Lessons from History**

**Michael D. Bordo, Bruce Mizrach, and Anna J. Schwartz**

NBER Working Paper No. 5371

December 1995

JEL Nos. E44, G15

Monetary Economics

This paper considers the meaning of domestic and international systemic risk. It examines scenarios that have been adduced as creating systemic risk, both within countries and among them. It distinguishes between the concepts of real and pseudo-systemic risk. We examine the history of episodes commonly viewed either as financial crises or as evidencing systemic risk to glean lessons for today. We also present some statistical evidence on possible recent systemic risk linkages among the stock markets of emerging countries. The paper concludes with a discussion of the lessons yielded by the record.

### **Immigration and the Welfare State: Immigrant Participation in Means-Tested Entitlement Programs**

**George J. Borjas and Lynette Hilton**

NBER Working Paper No. 5372

December 1995

JEL No. J0  
Labor Studies

This paper documents the extent to which immigrants participate in the many programs that make up the welfare state. The immigrant-native difference in the probability of receiving cash benefits is small, but the gap widens once other programs are included in the analysis: 21 percent of immigrant households receive some type of assistance, as compared to only 14 percent of native households. The types of benefits received by earlier immigrants influence the types of benefits received by newly arrived immigrants. Hence there might be ethnic networks that transmit information about the availability of particular benefits to new immigrants.

### **Social Construction of Trust to Protect Ideas and Data in Space Science and Geophysics**

**Lynne G. Zucker and Michael R. Darby**

NBER Working Paper No. 5373  
December 1995  
JEL No. O31  
Productivity

This paper applies a rational-action/economic-sociology approach to the central question in organizational theory of whether action is embedded in preformed institutions that are relatively cheap in terms of time and energy, or in newly constructed institutions that are more costly but perhaps better adapted to task goals. We develop a new model of the social construction of trust-producing social structure based on the initial endowment of this structure, the demand for it, and the cost of social construction. We test the model with data developed in a large number of interviews conducted

by the Center for History of Physics of the American Institute of Physics, on construction of social structure in collaborations in space science and geophysics. We find that greater preexisting endowment reduces social construction of new institutions, while greater demand for trust increases that construction. We also find that social construction of trust-producing social structure results in production of high-value science.

### **A Cross-Market Comparison of Institutional Equity Trading Costs**

**Louis K. C. Chan and Josef Lakonishok**

NBER Working Paper No. 5374  
December 1995  
JEL Nos. G10, G18, G20  
Asset Pricing

We compare execution costs (market impact plus commission) for institutional investors on the New York Stock Exchange (NYSE) and on NASDAQ. The differences in cost generally conform to each market's area of specialization. Controlling for firm size, trade size, and the money management firm's identity, costs are lower on NASDAQ for trades in comparatively smaller firms. For the smallest firms, the cost advantage under a preexecution benchmark is 0.68 percent. However, trading costs for the larger stocks are lower on the NYSE. For the largest stocks, costs are lower by 0.48 percent on the NYSE. Given the extreme difficulty of controlling for variables other than market structure, however, comparisons of costs should be interpreted with extreme caution.

### **Momentum Strategies**

**Louis K. C. Chan, Narasimhan Jegadeesh, and Josef Lakonishok**

NBER Working Paper No. 5375  
December 1995  
JEL Nos. G12, G14  
Asset Pricing

We relate how past returns predict future returns to the market's underreaction to information, focusing on news about past earnings. Surprises in past returns and past earnings each predict large drifts in future returns (after controlling for the other). There is little evidence of subsequent reversals in the returns of stocks with high momentum in price and earnings. Market risk, size, and book-to-market effects do not explain the drifts. Security analysts' earnings forecasts also respond sluggishly to past news, especially in the case of stocks with the worst past performance. The results suggest a market that responds only gradually to new information.

### **Heterogeneous Expectations and Tests of Efficiency in the Yen/Dollar Forward Foreign Exchange Rate Market**

**Graham Elliott and Takatoshi Ito**

NBER Working Paper No. 5376  
December 1995  
JEL Nos. F31, G14, G15  
International Finance and Macroeconomics

This paper examines the efficiency of the forward yen/dollar market using micro survey data. We first argue that the conventional tests of efficiency (unbiasedness) of the forward rate, or of the survey forecasts, do not correspond directly to the zero-profit condition. In-

stead, we use the survey data to calculate directly potential profits of individual forecasters based on a natural trading rule. We find that although the survey data are not the best predictor of future spot rates, in terms of typical mean square forecast error criteria, they can be used to obtain on-average positive profits. However, these profits are small and highly variable. We also examine profits generated by a trading rule using regression forecasts, in which the forward premium is an explanatory variable. These profits are also small and highly variable.

### **Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?**

**Alan V. Deardorff**

NBER Working Paper No. 5377

December 1995

JEL No. F11

International Finance and  
Macroeconomics

This paper derives bilateral trade from two cases of the Heckscher-Ohlin (H-O) Model, both also representing a variety of other models as well. First there is frictionless trade, in which the absence of all impediments to trade in homogeneous products causes producers and consumers to be indifferent among trading partners. Resolving this indifference randomly, I find that expected trade flows correspond exactly to the simple frictionless gravity equation if preferences are identical and homothetic, or if demands are uncorrelated with supplies; trade flows depart from the gravity equation systematically when there are such correlations. In the second case, countries produce distinct goods—as in the H-O Model with complete specialization or a variety of other models—and preferences are either

Cobb-Douglas or CES. Here trade tends to the standard gravity equation with trade declining in distance, and departures from that depending on relative transport costs. I conclude first that even a simple gravity equation can be derived from standard trade theories; second, because the gravity equation characterizes many models, its use to test any of them is suspect.

### **Parental Altruism and Inter Vivos Transfers: Theory and Evidence**

**Joseph G. Altonji,  
Fumio Hayashi, and  
Laurence J. Kotlikoff**

NBER Working Paper No. 5378

December 1995

JEL Nos. D10, D19

Labor Studies, Public Economics

This paper uses Panel Survey on Income Dynamics data on the extended family to test whether inter vivos transfers from parents to children are motivated by altruism. Specifically, the paper tests whether an increase of one dollar in the income of parents actively making transfers to a child, coupled with a one-dollar reduction in that child's income, results in the parents increasing their transfer to the child by one dollar. This restriction on parental and child transfer-income derivatives is estimated for the standard altruism model augmented to include uncertain and liquidity constraints. These additional elements pin down the timing of inter vivos transfers. Our method of estimating income-transfer derivatives takes into account unobserved heterogeneity across families in the degree of altruism. The findings strongly reject the altruism hypothesis. Redistributing one dollar from a recipient child to donor parents leads to less than a 13-cent increase in the parents' transfer to the child—far less than the one-dollar increase implied by altruism.

### **Predicting U.S. Recessions: Financial Variables as Leading Indicators**

**Arturo Estrella and  
Frederic S. Mishkin**

NBER Working Paper No. 5379

December 1995

JEL Nos. E52, C53

Economic Fluctuations,  
Monetary Economics

This paper examines the performance of various financial variables as predictors of subsequent U.S. recessions. We evaluate series such as interest rates and spreads, stock prices, currencies, and monetary aggregates singly and in comparison with other financial and nonfinancial indicators. Our analysis focuses on out-of-sample performance from one to eight quarters ahead. We show that stock prices are useful with one- to two-quarter horizons, as are some well-known macroeconomic indicators. Beyond two quarters, the slope of the yield curve emerges as the clear choice, and typically performs better by itself out-of-sample than in conjunction with other variables.

### **Why Have Separate Environmental Taxes?**

**Don Fullerton**

NBER Working Paper No. 5380

December 1995

JEL Nos. H2, Q2

Public Economics

Each environmental tax in the United States is designed to collect revenue for a trust fund used to clean up a particular pollution problem. Each might be intended to collect from a particular industry thought to be responsible for that pollution problem, but none is a good example of an incentive-based tax designed to discourage the polluting activity itself.

Having a different tax for each

trust fund means that each tax rate is typically less than 1 percent. But each separate tax has its own cost of administration and compliance, since taxpayers must read a set of rules and fill out a set of forms for each tax. This paper shows that compliance costs are high relative to the small revenue raised by each separate tax. In addition, an input-output model shows how current U.S. environmental tax burdens are passed from the taxed industries to all other industries. Thus the extra cost incurred to administer each separate tax neither achieves targeted incentives nor eliminates targeted burdens.

### **Turning Points in the Civil War: Views from the Greenback Market**

**Kristen L. Willard,  
Timothy W. Guinnane,  
and Harvey S. Rosen**

NBER Working Paper No. 5381

December 1995

JEL Nos. N21, G1

Development of the American Economy

In early 1862, the U.S. government began issuing Greenbacks, a legal tender currency that was not convertible into gold. The government promised eventually to redeem the Greenbacks in gold, but speculators understood that the probability of redemption depended on the military fortunes of the Union Army and on political developments that affected the total cost of the war. To serve the speculative interest in gold, a market emerged for trading Greenbacks for gold dollars. Because the market price of a Greenback reflected the public's perceptions of future war costs, the movement of these prices provides unique insights into how people perceived various events at the time. We use daily

quotations of the gold price of Greenbacks to identify a set of dates during the Civil War that market participants regarded as turning points. In some cases, these dates coincide with familiar events from conventional historical accounts of the war. In other instances, however, market participants reacted strongly to events that historians have not viewed as very significant.

### **Aggregate Productivity and the Productivity of Aggregates**

**Susanto Basu and  
John G. Fernald**

NBER Working Paper No. 5382

December 1995

JEL Nos. C43, D24, E32

Economic Fluctuations,  
Monetary Economics

Explanations of procyclical productivity play a key role in a variety of business cycle models. Most of these models, however, explain this procyclicality within a representative-firm paradigm. This procedure is misleading. We decompose aggregate productivity changes into several terms, each of which has an economic interpretation. However, many of these terms measure composition effects, such as reallocations of inputs across productive units. We apply this decomposition to U.S. data by aggregating from roughly the two-digit level to the private economy. We find that the compositional terms are significantly procyclical. Controlling for these terms virtually eliminates the evidence for increasing returns to scale, and implies that input growth is uncorrelated with technology change.

### **Learning and Growth**

**Boyan Jovanovic**

NBER Working Paper No. 5383

December 1995

JEL No. O3

Productivity

This paper discusses four sources of growth of knowledge: research, schooling, learning-by-doing, and training. I emphasize two facts: 1) even the most advanced countries spend far more on adoption of existing technologies than on inventing new ones; and 2) countries frequently adopt "dominated" technologies. These facts provide a useful background for evaluating the different theories. They also sharpen the point that it is important to distinguish between technology and human capital.

My conclusion is simply that, in generating world growth, the world's research outlays are an essential ingredient. For most agents, though, the decision determining growth is whether to adopt existing technologies. Perhaps we have underemphasized this in our modeling so far. Moreover, the handful of models that I survey contains a bewildering array of diverse engines of growth, most of which are not based on any hard evidence.

### **Capital Structure Choice When Managers Are in Control: Entrenchment Versus Efficiency**

**Walter Novaes and  
Luigi Zingales**

NBER Working Paper No. 5384

December 1995

Corporate Finance

Recent theories of capital structure have emphasized the role of debt in minimizing the agency costs that arise from the separation between ownership and control. In this paper we argue that *capital structure choices themselves* are affected by the same agency problem. We show that, in general, the shareholders' and the manager's

choices about capital structure differ not only in their levels, but also in their sensitivities to the cost of financial distress and taxes. We argue that only the managerial perspective can explain why firms are generally reluctant to issue equity, why they issue it only following a stock price run-up, and why corporate America recently "deleveraged" under the same tax system that supposedly generated the increase in leverage in the 1980s.

### **Internationalized Production in World Output**

**Robert E. Lipsey, Magnus Blomström, and Eric Ramstetter**

NBER Working Paper No. 5385

December 1995

JEL Nos. F20, F23

International Trade and Investment

Internationalized production—that is, production by multinational firms outside their home countries—has increased over the last two decades, but in 1990 was still only about 7 percent of world output. The share was 15 percent in "industry"—including manufacturing, trade, construction, and public utilities—but was negligible in "services," which are about 60 percent of world output.

Given all the attention that "globalization" has received from scholars, international organizations, and the press, these numbers are a reminder of how large a proportion of economic activity is confined to single geographical locations and home country ownership. Internationalization of production clearly is growing in importance, but the vast majority of production still is carried out by national producers within their own borders.

### **Volatility, Investment, and Disappointment Aversion**

**Joshua Aizenman and Nancy Marion**

NBER Working Paper No. 5386

December 1995

JEL Nos. F21, F43

International Trade and Investment

This study uncovers a statistically significant negative correlation between volatility and private investment from 1970–93 in almost 50 developing countries, and provides a possible interpretation of this result by using the disappointment-aversion-expected-utility framework first described by Gul (1991). We consider a number of different volatility measures related to domestic policies or to external factors. As the various measures of volatility tend to be correlated positively, we do not claim to identify a unique measure as the dominant source of volatility. Instead, we demonstrate that for a number of different measures, volatility reduces private investment in developing countries. We then show that the disappointment-aversion framework provides a useful way of illustrating the adverse first-order effects of volatility. When agents are averse to disappointment, they put more weight on "bad" outcomes and less weight on "good" outcomes than in the standard case. The asymmetric weighting of outcomes introduces additional concavity into the utility function and causes volatility to have significant, negative effects on economic performance. The large, negative effects of increased volatility continue to hold even if the coefficient of relative risk aversion approaches zero (that is, even if the marginal utility of income is constant, so that agents are risk neutral in the conventional sense).

### **Sampling Errors and Confidence Intervals for Order Statistics: Implementing the Family Support Act**

**William C. Horrace, Peter Schmidt, and Ann Dryden Witte**

NBER Working Paper No. 5387

December 1995

JEL Nos. C42, C82, H52

Labor Studies, Public Economics

The Family Support Act allows states to reimburse child care costs up to the 75th percentile of the local market price for child care. States are required to carry out surveys to estimate these 75th percentiles. This estimation problem raises two major statistical issues: picking a sample design that allows the estimation of 75th percentiles cheaply, efficiently, and equitably; and assessing the sampling variability of the estimates obtained.

We develop a sampling design for Massachusetts that equalizes the standard errors of the estimated percentiles across 65 distinct local markets. We selected this design because state administrators felt that public day care providers and child advocates would find it equitable, thus limiting costly appeals.

Substantively, we find wide variation in the price of child care, depending on the age of the child, the type of care, and geographic location. For full-time care, the 75th percentiles ranged from \$242 per week for infants in child care centers in Boston to \$85 per week for family day care in western Massachusetts.

### **Do Children of Immigrants Make Differential Use of Public Health Insurance?**

**Janet Currie**

NBER Working Paper No. 5388

December 1995

Medicaid is one of the most costly welfare programs available to immigrants. This paper uses data from the 1989 to 1992 National Health Interview Survey to compare the effects of Medicaid eligibility on public and private health insurance coverage and on the utilization of medical services among children of both natives and immigrants.

Children of immigrants are more likely to be covered by Medicaid, but less likely to receive health care. However, after I condition on eligibility and other observable characteristics, and instrument individual eligibility with an index of the generosity of state Medicaid regulations, I find that recent expansions of eligibility had negligible effects on Medicaid coverage among children of immigrants. Coverage rose among children of the native born, though. Among immigrants in border states, eligibility also was associated with declines in private health insurance coverage.

Effects on utilization were quite different: becoming eligible increased more for immigrants than nonimmigrants the probability that a child had a doctor's visit. However, the hospitalization rate only increased among children of the native born. Hence, recent Medicaid expansions shifted as much as one-quarter of the cost of providing in-framarginal services to immigrants' children from private to public insurers in border states, but drew many previously unserved immigrants' children into care.

### **Changes in the Distribution of Wages, 1940–50: The Public Versus the Private Sector**

**Robert A. Margo and T. Aldrich Finegan**

NBER Working Paper No. 5389

December 1995

JEL Nos. N32, J31

Development of the American Economy

Between 1940 and 1950 wage differentials within and between labor market groups narrowed significantly; this was the so-called "Great Compression." This paper disaggregates the Great Compression into its public and private components. Wage compression in the public sector, along with a decline in the pay premiums received by public sector workers, explains about 40 percent of aggregate wage compression in the 1940s. The experience of the 1940s stands in stark contrast with that of the past two decades, in which a rigid public sector wage structure has dampened increases in aggregate wage inequality.

### **Climbing out of Poverty, Falling Back in: Measuring the Persistence of Poverty over Multiple Spells**

**Ann Huff Stevens**

NBER Working Paper No. 5390

December 1995

JEL No. I32

Labor Studies

This paper investigates the persistence of poverty over individuals' lifetimes using a hazard rate, or spells, approach. Previous research on poverty dynamics using the spells approach has been limited by its failure to take into account multiple episodes of poverty. Using longitudinal data from the Panel Study of Income Dynamics, I estimate hazard models for exiting

from and returning to poverty, and use the estimated parameters to calculate distributions of total time spent in poverty over multiple spells. These models incorporate observable personal and household characteristics, as well as unobserved heterogeneity. My findings emphasize the importance of considering multiple spells in an analysis of poverty persistence. For black and white individuals falling into poverty in a given year, approximately 50 and 30 percent respectively will have family income below the poverty line in at least five of the next ten years. A single spells approach predicts comparable figures of only 26 and 13 percent. To check the robustness of these predictions, I also use two alternative approaches—direct tabulations from panel data and estimation of a components-of-variance model—and compare the predictions of poverty persistence based on the three methods.

### **How Tax Complexity and Enforcement Affect the Equity and Efficiency of the Income Tax**

**Louis Kaplow**

NBER Working Paper No. 5391

December 1995

JEL Nos. H26, H23, H21

Public Economics

Much criticism of the income tax involves administration: the enormous complexity of the system is responsible for large compliance costs, both public and private, and the tax gap is large despite the substantial resources devoted to enforcement. The desire for simplification and improved compliance motivates various incremental reforms as well as proposals for fundamental restructuring of the tax system. But evaluation of such changes is difficult because the un-

derlying problems have not been analyzed in terms of the equity and efficiency concerns that animate more familiar assessments of income tax policy. This paper provides a framework for a unified analysis, in which the same factors that are used to justify the choice of the tax base and the rate structure are employed to resolve problems involving complexity, compliance costs, and enforcement difficulties.

### **Around the European Periphery, 1870–1913: Globalization, Schooling, and Growth**

**Kevin H. O'Rourke and Jeffrey G. Williamson**

NBER Working Paper No. 5392  
December 1995

Development of the American Economy

On average, the poor European periphery converged on the rich industrial core in the four or five decades prior to World War I. Some countries, including the three Scandinavian economies, used industrialization to achieve a spectacular convergence on the leader countries, especially in real wages and living standards. Some, like Ireland, seemed to accomplish convergence without industrialization. Some, like Italy, experienced a less spectacular catchup, limited to the industrializing North. Some, like Iberia, actually fell back. What accounts for this variety? What role did trade and tariff policy play? Emigration and capital flows? Schooling? We offer a tentative assessment of these contending explanations and conclude that globalization was by far the dominant force accounting for convergence (and divergence) around the periphery. Some countries exploited it well, and some badly.

### **Employer Size and the Wage Structure in U.S. Manufacturing**

**Steven J. Davis and John C. Haltiwanger**

NBER Working Paper No. 5393

December 1995

JEL No. J31

Labor Studies

We study how the hourly wage structure varies with establishment size and how wage dispersion breaks down into between-plant and within-plant components. Our study combines household and establishment data for the U.S. manufacturing sector in 1982. We find that:

1) Wage dispersion falls sharply with establishment size for nonproduction workers and mildly for production workers.

2) Size-class differences in wage dispersion often mask even sharper differences in the dispersion of wages generated by observable worker characteristics and in the "skill prices" on those characteristics.

3) In terms of dispersion in [predicted log] wages, worker heterogeneity tends to rise with establishment size; and production workers are much more homogenous in the union sector, but only at plants with 1000 or more workers.

4) Unobserved factors generate sharply greater wage dispersion at smaller establishments.

5) The variance in mean wages across establishments accounts for 59 percent of total variance. Within-plant wage variance among production workers accounts for a mere 2 percent.

6) Mean wage differences by size of establishment account for about one-fourth of the total between-plant variance of wages.

7) Between-plant wage dispersion falls sharply with establishment

size, entirely accounting for the negative relationship of establishment size to overall wage dispersion.

Guided by these and other empirical findings, we assess several hypotheses about the determination of the wage structure.

### **Accounting for U.S. Real Exchange Rate Changes**

**Charles M. Engel**

NBER Working Paper No. 5394

December 1995

JEL Nos. F4, F3

International Finance and Macroeconomics

This study measures the proportion of U.S. real exchange rate movements that can be accounted for by movements in the relative prices of nontraded goods. The decomposition is done at all possible horizons that the data allow, from one month up to 30 years. The accounting is performed with five different measures of nontraded goods prices and real exchange rates, for exchange rates of the United States relative to a number of other high-income countries in each case. The outcome is surprising: relative prices of nontraded goods appear to account for essentially none of the movement of U.S. real exchange rates at any horizon. Only for one crude measure, which uses the aggregate producer price index as an index of traded goods prices, do nontraded goods prices seem to account for more than a tiny portion of real exchange rate changes. This pattern appears to be true even during fixed nominal exchange rate episodes. I pay special attention to the U.S. real exchange rate with Japan, and explore the possibility of mismeasurement of traded goods prices.

## **Regional Patterns in the Law of One Price: The Roles of Geography Versus Currencies**

**Charles M. Engel and John H. Rogers**

NBER Working Paper No. 5395

December 1995

JEL Nos. F4, F1

International Trade and Investment,  
International Finance and  
Macroeconomics

We find evidence that the law of one price (LOOP) holds more nearly for country pairs that are within geographic regions than for country pairs that are not. We establish these findings using disaggregated consumer price data from 23 countries (including data from eight North American cities). We find that failures of LOOP are related closely to the variability of nominal exchange rates, suggesting a link to sticky nominal prices. We also find that distance can explain failures of LOOP, suggesting that the failures arise from imperfect market integration. However, these two sources do not explain all of the failure of LOOP. We speculate that integrated marketing and distribution systems within regions cause LOOP to hold more nearly intraregionally. We present a formal model of marketing and distribution to illustrate this hypothesis.

## **The Tyranny of the Inefficient: An Enquiry into the Adverse Consequences of Power Struggles**

**Raghuram G. Rajan and Luigi Zingales**

NBER Working Paper No. 5396

December 1995

Corporate Finance

Life is replete with instances in which two closely related parties

forego mutually advantageous opportunities: peace treaties are not signed; inefficient regulations are not altered; and possibilities for investment are frittered away. Since the parties are in close contact, asymmetric information cannot be an explanation for the failure to agree. The explanation this paper offers is based on the assumption that when two parties interact repeatedly, not all aspects of the relationship can be contracted. Each party's property rights in the relationship then become endogenous. Efficiency and distribution are not separable in such a world, leading the parties to forego perfectly contractible opportunities. The inability to cooperate is especially severe when one of the parties has relatively poor production opportunities, which may explain why the inefficient have undue sway. We explore a number of applications.

## **The Effect of a Consumption Tax on the Rate of Interest**

**Martin Feldstein**

NBER Working Paper No. 5397

December 1995

JEL Nos. H21, H24

Public Economics

This paper analyzes the ways in which substituting a consumption tax for the existing personal and corporate income taxes would affect equilibrium pretax interest rates. The analysis indicates that whether the pretax rate of interest rises or falls depends on the strength of the response of personal saving and the owner-occupied housing sector, and the nature of the capital market equilibrium between debt and equity yields. I present a formal two-sector model with endogenous saving, housing, and corporate capital. With plausible parameter values, my analysis

suggests that the shift from an income tax to a consumption tax is more likely to raise rates than to lower them.

## **Natural Resource Abundance and Economic Growth**

**Jeffrey D. Sachs and Andrew M. Warner**

NBER Working Paper No. 5398

December 1995

JEL Nos. O40, Q32

Growth, International Finance and  
Macroeconomics

One of the surprising features of modern economic growth is that economies with abundant natural resources have tended to grow less rapidly than economies with scarce natural resources. In this paper we show that economies with a high ratio of natural-resource-exports-to-GDP in 1971 (the base year) tended to have low growth rates during the subsequent period, 1971-89. This negative relationship holds even after we control for variables found to be important for economic growth, including initial per capita income, trade policy, government efficiency, investment rates, and other variables. We explore the possible pathways for this negative relationship by studying the cross-country effects of resource endowments on trade policy, bureaucratic efficiency, and other determinants of growth. We also provide a simple theoretical model of endogenous growth that might help to explain the observed negative relationship.

## **Schooling, Labor Force Quality, and Economic Growth**

**Eric A. Hanushek and Dongwook Kim**

NBER Working Paper No. 5399

December 1995

JEL Nos. O4, I2

## Labor Studies

Human capital is almost always identified as a crucial ingredient for growing economies, but empirical investigations of cross-national growth have done little to clarify the dimensions of relevant human capital or any implications for policy. This paper concentrates on the importance of labor force quality, as measured by cognitive skills in mathematics and science. By linking international test scores across countries, we develop a direct measure of quality; it proves to have a strong and robust influence on growth. One standard deviation in measured cognitive skills translates into a 1 percent difference in average annual real growth rates, an effect much stronger than that of changes in average years of schooling, the more typical quantity measure of labor force skills. Further, the estimated growth effects of improved labor force quality are very robust to the precise specification of the regressions. Using measures of quality significantly improves the predictions of growth rates, particularly at the high and low ends of the distribution. The importance of quality implies a policy dilemma, because production function estimates indicate that simple resource approaches to improving cognitive skills appear generally ineffective.

### **The Effects of Offshore Assembly on Industry Location: Evidence from U.S. Border Cities**

**Gordon H. Hanson**

NBER Working Paper No. 5400

December 1995

JEL No. F15

International Trade and Investment

In this paper, I examine how the growth of offshore assembly in

Mexico has affected manufacturing activity in U.S. border cities. Under the offshore assembly provision of the U.S. tariff schedule, goods that are assembled abroad using U.S.-manufactured components receive preferential tariff treatment upon reentry into the United States. Foreign assembly plants in Mexico, most of which are owned by U.S.-based multinationals, overwhelmingly are concentrated along the border with the United States. I combine data on employment and earnings in two-digit manufacturing industries for U.S. border cities with data on employment and value added in foreign assembly plants in the corresponding Mexican border cities. I study the effect that the expansion of offshore assembly in a Mexican border city has on durable and nondurable manufacturing activities in the neighboring U.S. border city. The results show that the growth of export assembly in Mexico increases the demand for manufacturing goods produced in U.S. border cities. I also discuss implications of the North American Free Trade Agreement for the U.S.-Mexico border region.

### **International R and D Spillovers Between Canadian and Japanese Industries**

**Jeffrey I. Bernstein and Xiaoyi Yan**

NBER Working Paper No. 5401

December 1995

JEL Nos. D24, D33

Productivity

This paper estimates the effects of intranational and international R and D spillovers on the cost and production structure for ten Canadian and Japanese manufacturing industries. Domestic spillovers generate greater effects on average va-

riable cost and factor intensities than do international spillovers between the two countries.

We also calculate private and social rates of return to R and D for each industry in both countries. Social rates of return to R and D are 1.5 to 12 times the private returns. The Canadian social rates of return generally are two to three times higher than the Japanese rates.

### **Do "Shortages" Cause Inflation?**

**Owen Lamont**

NBER Working Paper No. 5402

December 1995

JEL Nos. E31, C82

Monetary Economics

I count the number of times per month that the word "shortage" appears on the front page of the *Wall Street Journal* and the *New York Times* during 1969-94. Using this as a general measure of shortages in the U.S. economy, I test whether shortages help to predict inflation. Using a variety of different specifications, I find that this time-series measure of shortages strongly predicts inflation, and that it contains information not captured by commodity prices, monetary aggregates, interest rates, and other proposed predictors of inflation. This suggests that disequilibrium was an important part of the adjustment of prices to macroeconomic shocks during this period.

### **Risk Management, Capital Budgeting, and Capital Structure Policy for Financial Institutions: An Integrated Approach**

**Kenneth A. Froot and Jeremy C. Stein**

NBER Working Paper No. 5403

January 1996

Asset Pricing, Corporate Finance

We develop a framework for analyzing the decisions about capital allocation and capital structure that face financial institutions, including banks. Our model incorporates two key features: 1) value-maximizing banks have a well-founded concern with risk management; and 2) not all the risks they face can be hedged without friction in the capital market. This approach allows us to show how bank-level risk management considerations should factor into the pricing of those risks that cannot be hedged easily. We examine several applications, including the evaluation of proprietary trading operations, and the pricing of unhedgeable derivatives positions.

### **Reforms in Eastern Europe and the Former Soviet Union in Light of the East Asian Experiences**

**Jeffrey D. Sachs**

NBER Working Paper No. 5404

January 1996

JEL Nos. P5, F02

Economic Fluctuations, International Finance and Macroeconomics

During the past five years, there has been an important debate over the differing styles of market reforms in the formerly planned economies in East Asia as opposed to Eastern Europe and the former Soviet Union (EEFSU). This paper puts forward three related propositions. First, the rapid growth of East Asia, compared with economic contraction in EEFSU, reflects differences in economic structure and initial conditions, rather than differences in economic policymaking. Second, East Asian gradualism could not, and did not, work in EEFSU. Third, EEFSU continues to face serious problems with an overextended welfare state inherited from the socialist period.

### **The Determinants and Impact of Property Rights: Land Titles on the Brazilian Frontier**

**Lee J. Alston, Gary D. Libecap, and Robert Schneider**

NBER Working Paper No. 5405

January 1996

JEL Nos. D23, K11, N46

Development of the American Economy

This paper provides new empirical results on the demand and supply of title, its impact on land value, and its effects on agricultural investment on Brazilian frontiers. We use survey data from the state of Pará for 1992 and 1993 along with data on the characteristics of the settlers, land tenure, land agencies involved, land values, and investment. We then turn to data from the Brazilian agricultural census for 1940 through 1985, with observations at the municipio (county) level, to examine the development of property rights to land in the southern state of Paraná during the 1940–70 agricultural boom and in the Amazon state of Pará during the period of rapid migration to the region after 1970. By examining frontiers, we can follow the rise in land values, the increase in the demand for title, and the response of government. Our empirical findings support the predictions of the theory regarding the effects of title and investment on land value; the role of expected change in value on demand for title; and the contribution of title in promoting investment. However, governments have not exactly followed the predictions of the analytical framework in supplying title. Political and bureaucratic factors play an important role in the government response to demands for title. This result suggests that researchers must pay special attention to the complex political process by which

property rights are assigned in studying the emergence of tenure institutions.

### **Schooling and Labor Market Consequences of the 1970 State Abortion Reforms**

**Joshua D. Angrist and William N. Evans**

NBER Working Paper No. 5406

January 1996

JEL Nos. J12, J13, J24

Labor Studies

This study uses the state abortion reforms of 1970 to estimate the effect of teen and out-of-wedlock childbearing on the schooling and labor market outcomes of mothers observed in 1980 and 1990 Census microdata. Reduced-form estimates suggest that state abortion reforms had a negative impact on teen marriage, teen fertility, and teen out-of-wedlock childbearing. The teen marriage effects are largest and most precisely estimated for white women, while the teen fertility and out-of-wedlock childbearing effects are largest and most precisely estimated for black women. The relatively modest consequences of abortion reform for fertility and marriage for white women do not appear to have changed schooling or labor market outcomes. In contrast, black women who were exposed to abortion reforms experienced large reductions in teen fertility and teen out-of-wedlock fertility that appear to have led to increased schooling and employment rates. Instrumental variables estimates of the effects of teen and out-of-wedlock childbearing on the schooling and employment status of black women, using measures of exposure to abortion reform as instruments, are marginally significant and larger than the corresponding ordinary least squares estimates.

## **Public Sector Deficits and Macroeconomic Stability in Developing Economies**

**Sebastian Edwards**

NBER Working Paper No. 5407

January 1996

International Finance and  
Macroeconomics

This paper analyzes Latin America's experience with fiscal adjustment during the last decade. I discuss in detail how some countries—most notably Argentina, Chile, and Mexico—were successfully able to eliminate their fiscal deficits in a relatively short time. I analyze their experiences with tax reform and expenditure reduction, and emphasize some political economy angles of the fiscal adjustment process. I also discuss the interaction between privatization and fiscal adjustment, and analyze the relationship between social security systems and fiscal imbalances. In particular, I analyze the reform of the Chilean pension system—which replaced an insolvent and inefficient pay-as-you-go system with a fully funded one administered by private companies—in some detail. I conclude with a discussion of the main lessons from the Latin American reforms for the transitional economies and other reforming countries.

## **High Yields: The Spread on German Interest Rates**

**Carlo Favero,  
Francesco Giavazzi, and  
Luigi Spaventa**

NBER Working Paper No. 5408

January 1996

International Finance and  
Macroeconomics

This paper is a first attempt at evaluating the determinants of the total interest rate differentials on government bonds among high

yielders: Italy, Spain, Sweden, and Germany. In particular we address the question of the relative importance of local and global factors in the determination of such spreads. We identify and measure two components of total yield differentials: one attributable to expectations of exchange rate depreciation, which we call the exchange rate factor, and another that reflects the market assessment of default risk. We propose and discuss a measure of the exchange rate factors and of the default risk premium based on interest rate swaps.

Overall our investigation provides strong evidence in favor of the existence of a common trend for the Italian and Spanish spreads on Bunds, which is not shared by the Swedish spread. Such a trend is driven by international factors and is independent of country-specific shocks. Country-specific shocks are relevant only in explaining short-term cycles around the common stochastic trend.

## **Cause-Specific Mortality Among Medicare Enrollees**

**Jay Bhattacharya,  
Alan M. Garber, and  
Thomas E. MaCurdy**

NBER Working Paper No. 5409

January 1996

JEL Nos. I12

Aging, Health Care

Life tables with specific causes of death, particularly when adjusted for demographic and other personal characteristics, can be important components of cost-effectiveness studies and other economic studies. However, there are few sources of nationally representative information that can be used to develop life tables that incorporate cause-specific mortality. To produce such estimates, we relate annual mortality rates to a set of indi-

vidual characteristics, applying a statistical model with a flexible functional form to data obtained from a random sample of Medicare eligibility and hospital insurance files covering 1986–90. Insofar as national data sources compare to the estimates of these models, the results are comparable. For example, the survival figures are comparable to the life table figures supplied as part of the series of vital statistics of the United States. The framework can be extended to analyze expenditures for both inpatient and outpatient care, and to estimate lifetime profiles of Medicare expenditures for individuals in various demographic and clinical categories. The framework also can be extended to analyze the mortality and utilization associated with specific procedures.

## **Consumption, Stock Returns, and the Gains from International Risksharing**

**Karen K. Lewis**

NBER Working Paper No. 5410

January 1996

Asset Pricing, International Finance and  
Macroeconomics

Standard theoretical models predict that domestic residents should diversify their portfolios into foreign assets much more than actually occurs. Whether this lack of diversification is important depends upon the potential gains from risk-sharing. General equilibrium models and consumption data tend to find that the costs are small, typically less than 0.5 percent of permanent consumption. On the other hand, stock returns imply gains that are several hundred times larger. In this paper, I examine the reasons for these differences. I find that the primary differences are attributable to either: 1) the much higher varia-

bility of stocks; and/or 2) the higher degree of risk aversion required to reconcile an international equity premium. On the other hand, the significant differences do not arise in treating stock returns as exogenous.

## **The Subsidiarity Principle and Market Failure in Systems Competition**

**Hans-Werner Sinn**

NBER Working Paper No. 5411

January 1996

JEL Nos. H70, L51, H41

Public Economics

Contrary to a frequent contention, systems competition cannot work when governments respect the Subsidiarity Principle. The principle implies that governments step in where markets fail. Reintroducing markets through the back door of systems competition again will result in market failure. I present three models that illustrate this wisdom. The first is concerned with congestion-prone public goods, and shows that fiscal competition may be ruinous for the governments. The second considers the insurance function of redistributive taxation, and shows that systems competition may suffer from adverse selection. The third studies the role of quality regulation, and shows that systems competition may be a competition of laxity resulting in inefficiently low quality standards.

## **Trends in Regional Inequality in China**

**Tianlun Jian, Jeffrey D. Sachs, and Andrew M. Warner**

NBER Working Paper No. 5412

January 1996

JEL Nos. O40, O53

Growth

Several recent studies have examined the tendency of regions

within a nation to exhibit long-term convergence in per capita income levels. Barro and Sala-i-Martin (1991, 1992, 1995) have found a tendency toward convergence among the U.S. states, among Japanese prefectures, and among regions within Western Europe. In this paper we examine the tendency toward convergence among the provinces of China during 1952-93. We find that real income convergence of the provinces in China has been a relatively recent phenomenon, emerging strongly only since the reform period began in 1978. During the initial phase of central planning, 1952-65, there is some evidence of convergence, but it is weak and sensitive to the time period being analyzed. During the cultural revolution, 1965-78, there is strong evidence of divergence rather than convergence. We find that strong evidence for convergence during the reform period is associated with rural reforms, and is especially apparent within the coastal regions where there has been liberalization of international trade and investment flows. However, since 1990 regional incomes have begun to diverge. Such divergence is explained entirely by the variance between the coastal and interior provinces, rather than by increases in variance within each region. Therefore, it seems that China is now on a dual track, with a prosperous and fast-growing coastal region and a poor interior growing at a lower rate.

## **The Missing Piece in Policy Analysis: Social Security Reform**

**Martin Feldstein**

NBER Working Paper No. 5413

January 1996

JEL No. H55

Public Economics

In this paper, I discuss the economic losses that result from an unfunded social security retirement system and the potential gain from shifting to a funded system. The social security payroll tax distorts labor supply and the form in which compensation is paid. Although each individual's benefits in principle are linked to that individual's previous payroll tax payments, the low equilibrium rate of return that is inherent in an unfunded system implies that there is an inevitable "net" payroll tax that causes substantial distortions. The resulting deadweight loss is approximately 1 percent of each year's GDP in perpetuity, an amount equal to 20 percent of payroll tax revenue and a 50 percent increase in the deadweight loss of the personal income tax.

Even more important is the loss of investment income that results from forcing employees to accept the low implicit return of an unfunded program rather than the much higher return on real capital that would be paid on private saving or in a funded social security program. The present value of the annual losses from using an unfunded rather than a funded system substantially exceeds the benefit to those who received windfall transfers when the program began and when it was expanded.

Shifting to a funded program cannot reverse the crowding out of capital that has occurred already. Recognizing the existing unfunded obligation only makes explicit that piece of the national debt. But shifting to a funded program limits the crowding out of capital formation to what has occurred already. Future increases in annual saving that automatically result from economic growth are able to earn the higher rate of return on real capital.

The present value of these gains is equivalent to more than 2 percent of GDP a year in perpetuity.

The combination of the improved labor market incentives and the higher real return on saving represent a net present value gain of more than \$15 trillion, or 3 percent of each future year's GDP forever.

### **The Poverty of Nations: A Quantitative Exploration**

**V. V. Chari, Patrick J. Kehoe,  
and Ellen R. McGrattan**

NBER Working Paper No. 5414

January 1996

JEL Nos. O11, O23, O41

Economic Fluctuations

We document regularities in the distribution of relative incomes and in patterns of investment, both in countries and over time. We develop a quantitative version of the neoclassical growth model with a broad measure of capital in which investment decisions are affected by distortions. These distortions follow a stochastic process common to all countries. Our model generates a panel of outcomes that we compare to the data. In both the model and the data, there is greater mobility in relative incomes in the middle of the income distribution than at the extremes. The 10 fastest-growing countries and the 10 slowest-growing countries in the model have growth rates and investment-output ratios similar to those in the data. In both the model and the data, the "miracle" countries have nonmonotonic investment-output ratios over time. The main quantitative discrepancy between the model and the data is that there is more persistence in growth rates of relative incomes in the model than in the data.

### **Whither Flat Panel Displays?**

**Kala Krishna and  
Marie C. Thursby**

NBER Working Paper No. 5415

January 1996

JEL Nos. F1, L5

International Trade and Investment

This paper examines possible consequences of subsidies to R and D and to volume production proposed under the Clinton administration's flat panel display initiative. In our model, firms behave competitively in the short run, while realizing that their choices of capacity and yield-improving R and D in the medium and long run will affect market price. Our policy simulations show that steady-state yields and profits are lower, while prices are higher, with subsidies for capacity acquisition than with subsidies for R and D. This is because a firm's incentives to perform R and D are diminished by a subsidy on capacity costs.

### **Testing for Trade-Induced Investment-Led Growth**

**Richard E. Baldwin and  
Elena Seghezza**

NBER Working Paper No. 5416

January 1996

JEL Nos. F10, F43

International Trade and Investment

Many studies have found a positive correlation between trade and growth, but do not attempt to identify the economic mechanisms involved. This paper attempts to identify one of the mechanisms linking trade and growth. In particular, we present a novel theoretical model that establishes a link between trade liberalization and investment-led growth. We derive estimating equations from the model, and estimate with three-stage-least-squares on a cross-country data

sample. We find that domestic protection depresses investment and thereby slows growth. Foreign trade barriers also lower domestic investment, but the anti-investment effect is weaker and is less robust to sample and specification changes.

### **Wage Dispersion and Technical Progress**

**Joshua Aizenman and  
Pierre-Richard Agénor**

NBER Working Paper No. 5417

January 1996

JEL Nos. J31, J42, E24

International Trade and Investment

Since the early 1980s, wage dispersion and the ratio of skilled to unskilled employment have increased significantly in several industrial countries. A number of economists have attributed these trends to skill-biased technical progress. This paper studies the wage and employment effects of this type of technological change. The analysis is based on a model with a heterogeneous work force and a segmented labor market. Skill-biased technical progress is modeled as a shock that switches demand from unskilled to skilled labor in the primary, high-wage sector, while leaving the total demand for labor in that sector constant at initial wages. Such a shock reduces total employment in the primary sector, because the equilibrium increase in skilled labor employment is smaller than the decrease in unskilled labor employment. Efficiency factors magnify the adverse effects on employment of pro-skilled technical change.

### **The Effect of Pharmaceutical Utilization and Innovation on Hospitalization and Mortality**

**Frank R. Lichtenberg**

NBER Working Paper No. 5418

This paper econometrically analyzes how changes in the quantity and type of pharmaceuticals prescribed by physicians in outpatient visits affect rates of hospitalization, surgical procedure, mortality, and related variables. I examine the statistical relationship across diseases between changes in outpatient utilization of pharmaceuticals and changes in utilization of inpatient care and mortality during 1980–92. The estimates indicate that the number of hospital stays, bed-days, and surgical procedures declined most rapidly for those diagnoses with the greatest increase in the total number of drugs prescribed and the greatest change in the distribution of drugs, by molecule. The estimates imply that an increase of 100 prescriptions is associated with 1.48 fewer hospital admissions, 16.3 fewer hospital days, and 3.36 fewer inpatient surgical procedures. A \$1 increase in pharmaceutical expenditure is associated with a \$3.65 reduction in hospital care expenditure.

## Historical Factors in Long-Run Growth

### Long-Term Trends in Health, Welfare, and Economic Growth in the United States

Dora L. Costa and  
Richard H. Steckel

NBER Historical Paper No. 76

November 1995

JEL Nos. N31, N32, J11

We present evidence showing that the course of economic growth, and of health—as measured by stature, Body Mass Index (BMI), mortality rates, or the prevalence of chronic conditions—diverged in the nineteenth century and converged in the twentieth. To analyze the change in welfare resulting from changes in health, we estimate a Human Development Index and a Borda Ranking, and we calculate Usher-adjusted incomes and the willingness to pay for a reduction in the risk of mortality. Prior to the Civil War, the increase in income was not sufficient to compensate for the decline in health, whereas in the twentieth century improvements in health outpaced economic growth. We identify a number of possible causes of the nineteenth-century decline in health, including greater exposure to disease, hardship created by the Civil War, and rising inequality.

Our evidence on trends in waist-hip ratio, BMI, and the prevalence of chronic conditions at older ages suggests that early life conditions may have an effect on mortality and morbidity that does not show up until older ages. The dramatic twentieth-century improvement in early life conditions implies that cohorts who are now approaching their sixties will experience a much great-

er rate of increase in health and longevity than past generations did.

### From Plowshares to Swords: The American Economy in World War II

Hugh Rockoff

NBER Historical Paper No. 77

December 1995

JEL No. N12

This paper examines the U.S. economy in World War II. It argues that the mobilization must be viewed as a rapidly evolving historical process rather than, as is often the case, a single undifferentiated event. For example, the employment of unemployed resources, a factor often cited to explain the success of the mobilization, was important during the national defense period, but was relatively unimportant during the period of active U.S. involvement. On the financial side, money creation was more important during the first year of active involvement than in subsequent years. The most significant legacy of the war, viewed in relation to the prosperous era that followed, may have been the change in the macroeconomic regime. This paper also discusses the limitations of the basic time series.

### The Extent of the Labor Market in the United States, 1850–1914

Joshua L. Rosenbloom

NBER Historical Paper No. 78

January 1996

JEL Nos. N31, J61

Between the middle of the nineteenth century and the beginning of World War I, improvements in transportation and communication encouraged increasing economic integration between regions and in-

ternationally. This paper traces and analyzes the progress of labor market integration in the United States during this period of "globalization." I argue that, although the falling cost and increasing speed of transportation and communication initiated a substantial expansion of labor market boundaries, the pattern of increasing integration was strikingly uneven. By the end of the nineteenth century, labor markets in the northern United States were part of a tightly integrated regional network that in turn was linked closely with labor markets in northern Europe. But this regional and international integration coincided with the persistent failure of integration between northern and southern labor markets within the United States. This finding is important for two reasons. First, it suggests that the forces shaping the determination of wages, the evolution of the wage structure, and the growth of unions cannot be understood at either a purely local, or a purely national level. Second, it shows that the process of market integration was complex, depending on the interaction between historically determined market institutions and falling transportation and communication costs.

## Technical Papers

### On the Validity of Using Census Geocode Characteristics to Proxy Individual Socioeconomic Characteristics

**Arline T. Geronimus,  
John Bound, and  
Lisa J. Neidert**

NBER Technical Paper No. 189

December 1995

JEL No. C80

Labor Studies

Investigators of social differentials in health outcomes commonly augment incomplete microdata by appending socioeconomic characteristics of residential areas (such as median income in a zip code) to proxy for individual characteristics. However, little empirical attention has been paid to how well this aggregate information serves as a proxy for the individual characteristics of interest. We build on recent work addressing the biases inherent in proxies, and consider two health-related examples within a statistical framework that illuminates the nature and sources of biases. Data from the Panel Study of Income Dynamics and the National Maternal and Infant Health Survey are linked to Census data. We assess the validity of using the aggregate Census information as a proxy for individual information when estimating main effects, and when controlling for potential confounding between socioeconomic and sociodemographic factors in measures of general health status and infant mortality. We find a general, but not universal, tendency for aggregate proxies to exaggerate the effects of microlevel variables, and to do more poorly than microlevel variables at controlling for confounding. The magnitude and direction of these biases, however, vary across samples. Our statistical framework and empirical findings suggest the difficulties in and limits to interpreting proxies derived from aggregate Census data as if they were microlevel variables. The statistical framework we outline for our study of health outcomes should be generally applicable to other situations in which researchers have merged aggregate data with microdata samples.

### Existence of Equilibrium and Stratification in Local and Hierarchical Tiebout Economies with Property Taxes and Voting

**Thomas J. Nechyba**

NBER Technical Paper No. 190

January 1996

JEL No. H7

Public Economics

This paper presents the first fully closed general equilibrium model of hierarchical and local public goods economies with the following features: 1) multiple agents who are endowed with both some amount of private good (income) and a house, who are mobile between houses and jurisdictions, and who vote in local and national elections; 2) multiple communities that finance a local public good through property taxes that are set in accordance with absolute majority rule; and 3) a national government that produces a national public good financed through an income tax whose level is determined through majority rule voting. In contrast to previous models, this one requires no overly restrictive assumptions on preferences and technologies to prove that there is an equilibrium in the presence of property taxation and voting. Thus, it confirms the existence of an equilibrium without any of the major restrictions used in the past, and finds sufficient conditions for stratification of agents into communities based on their public good preferences and their wealth. This model lays the groundwork for a positive applied analysis of local public finance and intergovernmental relations. Furthermore it builds the foundation for a parameterized computable general equilibrium model of local public goods and fiscal federalism that is used elsewhere to analyze a variety of policy issues.

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