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Program Report

Health Care

Alan M. Garber*

Managed care has brought with it numerous changes in health care delivery and financing. These changes, and the shifts in incentives that they create, can have important effects on the structure of markets for health care delivery and ultimately for the types of health care delivered, its costs, and outcomes. Most analyses of managed care compare HMOs and other managed care plans to non-managed care plans. But as managed care becomes more prevalent, its impact on the structure and functioning of the health care system as a whole may become more important than differences across plans.

In a body of work, Laurence C. Baker thus asks how managed care can bring about widespread effects on health care markets and health care delivery. In two papers on health care spending,[1] Baker finds that areas with high levels of HMO market share spent less on fee-for-service Medicare beneficiaries. Since prices for Medicare-covered services largely are fixed by regulation under Medicare's Prospective Payment System and physician fee schedule, the lower expenditures probably reflect reductions in the intensity of services that Medicare patients receive in areas with heavy penetration of managed care. Furthermore, because the patients studied were covered by the traditional fee-for-service Medicare program, the fact that their care appears to be influenced by the presence of managed care plans suggests that the managed care system can have important effects on the performance of the entire health care system.

Changes in health care spending lead to questions about the mechanisms by which managed care may affect expenditures on and outcomes of care. In more recent work, Baker and Martin L. Brown of the National Cancer Insti-

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tute report[2] that areas with high HMO market shares saw consolidation in mammography facilities through the early 1990s. In other words, higher market share areas had fewer mammography providers, each doing higher volumes. Because there are significant economies of scale in providing mammography, consolidation is associated with reductions in the cost and often the price of mammograms. But consolidation also could harm patients if it made it more difficult to obtain the procedure. To determine whether this occurred, Baker and Brown study cancer diagnoses and mortality rates. Although they find that waiting times for appointments were sometimes longer in markets with greater consolidation, they also find no evidence that cancers were diagnosed at later (and more severe) stages, or that mortality rates were higher, in such markets.

Two other recent studies by Baker explore the impact of managed care on the adoption of new technologies and the related implications for costs and health outcomes. Baker and Ciaran S. Phibbs study the relationship between HMO market share and the adoption of neonatal intensive care units (NICUs). They report that areas with high levels of HMO activity saw slower adoption of NICUs than other areas between 1980 and 1996.[3] There are different kinds of NICUs, though, and HMOs appear to have little effect on the adoption of high-level NICUs, which offer the most advanced services for the sickest newborns and tend to be located in advanced teaching hospitals. The strongest effect of HMOs appears to be on the adoption of mid-level NICUs, which provide less sophisticated services and frequently are located in smaller hospitals that may be influenced by managed care activity.

Reductions in NICU adoption also may have produced cost savings. Moreover, Baker and Phibbs report

that reductions in mid-level NICU availability seem to have improved outcomes because they were associated with increases in the probability that high-risk newborns would receive care in high-level NICUs, where outcomes are better. Interestingly, this runs counter to the typical assumption that managed-care induced reductions in technology availability are uniformly bad for patients.

Baker has also examined the relationship between HMO market share and the adoption of magnetic resonance imaging (MRI) equipment during the 1980s and 1990s.[4] His results suggest that high managed care areas experience substantially slower adoption and diminished MRI availability as compared to low managed care areas. Reductions in adoption accompany reductions in MRI utilization, leaving open questions about the impact of such reductions on patient welfare, which hinge on the value of the less-frequently used MRI procedures in high managed care areas.

Baker's work builds the case that changes in financial incentives and other impacts of managed care can have important effects on the structure and functioning of the health care system. While each of his studies looks at different services, they all tend to support the conclusion that managed care has led markets toward reductions in spending. None of the studies show worse health outcomes (although, of course, they only include evidence for a small number of the many health care services that could be influenced). If managed care can influence how the health care delivery system is organized, then regulatory policy toward it could benefit from a consideration of the structural effects of managed care as well as of the care delivered by such plans per se.

One of the ways that HMOs are believed to lower premium costs is by restricting access to expensive medical treatments. But according to Daniel Altman, David M. Cutler, and Richard J. Zeckhauser,[5] HMOs do not save money that way. After analyzing data on 200,000 Massachusetts state and local employees and family members who are insured in a single pool, they find that cost differences arise because HMOs have a lower incidence of diseases among their generally healthier members and the HMOs pay lower prices for the same medical treatments, but not because HMO members receive fewer expensive treatments.

In other research Martin N. Baily and I, reporting on a project carried out as part of the McKinsey Global Institute, examine the productivity of health care in the treatment of four conditions in the United States, Germany and England: diabetes, gallstones, lung cancer, and breast cancer.[6] This project looks at inputs used and types of health care delivered, along with overall resource utilization and health outcomes. We report that the United States generally uses higher levels of inputs than England and, with the exception of the management of diabetes, achieves better health outcomes. Germany uses high levels of resources for the various conditions but does not achieve better health outcomes. Much of the apparent increased health care costs for the management of these conditions in the United States could be attributed to higher prices for inputs, rather than the use of higher levels of each input.

Charles E. Phelps and I try to resolve controversies in the application of cost-effectiveness analysis by exploring the welfare theoretic foundations of the technique, which is used widely in studies of medical care technologies.[7] We use a standard von Neumann-Morgenstern utility framework to show how a cost-effectiveness criterion can be derived to guide resource allocation decisions, and how the criterion varies with age, gender, income level, and risk aversion. Although cost-effectiveness analysis can be a useful and powerful tool for resource allocation decisions, we report that a uniform cost-effectiveness criterion applied to a heterogeneous population is unlikely to yield pareto-optimal resource allocations.

In a series of projects, Thomas E. MaCurdy, Mark A. McClellan, and I explore the costs and outcomes of medical care among specific groups of Medicare beneficiaries.[8] We find that the introduction of hospice care and other services targeted toward end-of-life care did little to slow the rate of increase in Medicare expenditures for the care of dying beneficiaries. Further, the use of such forms of care depended heavily on the principal disease the beneficiary had in the year preceding death.[9] Finally, Medicare patients who generated large Medicare expenditures in one year were also likely to generate excess expenditures in subsequent years, although this effect was attenuated by the high mortality rates among high-cost beneficiaries.[10]

Martin S. Gaynor continues to explore his long-standing interest in incentives in health care organizations and has initiated a program of research on competition and antitrust policy in health care markets. William E. Encinosa, Gaynor, and James B. Rebitzer[11] examine the role of social interactions in determining compensation incentives, using data from medical group practices. They find that social interactions matter, along with conventional economic considerations such as risk spreading and multitasking. In a more recent paper,[12] Gaynor, Rebitzer, and Lowell J. Taylor use detailed data from a large HMO to examine the impact of physician compensation incentives used by HMOs. This particular HMO compensated physicians using incentives

based on a group target for enrollees' costs; one year, incentives for quality were also introduced. The results of this study are striking: physicians respond strongly to the HMO's financial incentives by reducing costs. Larger groups are less responsive to incentives, though. Moreover, in the year that quality incentives were introduced, no apparent tradeoff between costs and quality occurred. Groups that had lower costs also had higher quality. However, the measures of quality used in this study were limited, so other aspects of quality that were not rewarded may have been neglected or compromised. Nonetheless, this paper provides some intriguing initial evidence for the intense policy debate about the possibility of managed care incentives for physicians compromising the patients' quality of care.

In another body of work, Gaynor examines competition in health care markets and the implications for antitrust policy. He and Deborah Haas-Wilson have published a series of reviews on the dramatic consolidation that has occurred in health care markets generally,[13] and on vertical relations[14] and physician networks[15] specifically. They conclude that although consolidation generates some potential efficiency gains, it may also seriously threaten competition. In their analysis, Gaynor and William B. Vogt propose a different method for analyzing competitive conduct in hospital markets.[16] They focus on testing differences in competitive conduct between not-for-profit and for-profit hospitals. The issue of the competitive conduct of not-for-profit hospitals has arisen as such hospitals have defended themselves successfully in some prominent recent antitrust cases by claiming that their not-for-profit status implies they will not exercise market power. Gaynor and Vogt specifically analyze competition between California hospitals[17] and find preliminarily that not-for-profit hospitals do exercise market power, although their deviation from competitive pricing is less than that of similar for-profits. They also find that the demand facing individual hospitals is quite responsive to price and to travel time. These results, if they are sustained by the final analysis, have strong implications for hospital antitrust policy. In particular, rather than presuming that not-for-profit hospitals will not exercise market power, the presumption should be that they will do so, thus shifting the burden of proof in these cases.

Jean Abraham, Gaynor, and Vogt also have examined competition in hospital markets by considering how the numbers of hospitals in isolated local markets vary with the population of those markets.[18] Since entry will occur only if it is profitable, and since competition erodes profit margins, an increase in the local population per hospital should be required to obtain the profits necessary to sustain entry in more competitive markets. Abraham and colleagues find exactly that. Competition increases with the number of hospitals in the market, although none of the markets they examine is perfectly competitive.

Abraham, Ashish Arora, Gaynor, and Douglas R. Wholey examine the factors determining HMO participation and enrollment in the Medicare market.[19] They find that HMO participation is affected by the Medicare payment rate, the HMO's volume of commercial enrollees, and the price of Medigap policies in the area. The implications are that while increased HMO participation in Medicare can be obtained via increasing payments, such a policy is inefficient. In particular, increasing payments across the board would result in excessive payments for some HMOs and too little for others. A targeted subsidy designed to cover the sunk costs of entry would be a more efficient method of inducing participation by HMOs. These findings are especially relevant because many HMOs have exited the Medicare program in recent years.

In a more theoretical paper,[20] Gaynor, Haas-Wilson, and Vogt examine the optimality of competition in health care markets in the presence of the distortion caused by moral hazard from health insurance. Since moral hazard leads to excess consumption, it has been thought that monopoly in health care markets actually could improve matters by increasing price and thus reducing consumption. Gaynor, Haas-Wilson, and Vogt show that under some standard assumptions this cannot be true. Specifically, if health care prices are lower, then an insurance policy can be offered to consumers which leaves their out-of-pocket health care expenses unchanged and has a lower premium. As a consequence, this particular distortion in health care markets does not affect the optimality of competition, as previously had been thought.

In a continuation of their work on the legal system, regulation, and health care markets, Kessler and McClellan investigate the consequences of medical malpractice liability reforms for medical treatment decisions, health care costs, and patient health outcomes. They analyze how statutory reforms to liability law affect doctors' and hospitals' incentives to administer precautionary medical treatments, and how these changes in incentives interact with the characteristics of health care markets to affect the care of elderly Medicare beneficiaries with heart disease. In one paper,[21] they report that malpractice reforms that directly reduce providers' liability lead to reductions in both financial and nonfinancial "malpractice pressures" facing physicians and hospitals. For example, "direct" reforms — such as caps on total or noneconomic dam-

ages — reduce the share of claims resolved with some compensation to plaintiffs, the share of claims with administrative and legal defense expenses, and the share of claims that take a long time to resolve. In turn, these changes in incentives lead to reductions in medical expenditures, especially expenditures on diagnostic treatments, with negligible effects on mortality and rates of cardiac complications. This implies that direct reforms improve medical productivity by reducing defensive medical practices.

In a second paper,[22] Kessler and McClellan investigate the extent to which liability reform affects medical productivity in those areas where HMOs are more widespread. Because the optimal level of medical malpractice liability depends on the incentives provided by the health insurance system, the rise of managed care in the 1990s may affect the relationship between liability reform and productivity. For example, more parsimonious practices associated with managed care may have reduced physicians' incentives and abilities to engage in defensive treatment, thereby reducing the productivity-enhancing effects of liability reform. The authors find that direct reforms improve medical productivity in areas with either low or high levels of managed care enrollment. In addition, managed care and direct reforms do not interact over the long run in a way that is harmful to patient health. However, at least for patients with less severe cardiac illness, managed care and direct reforms are substitutes: the improvement in productivity that can be achieved with direct reforms is therefore smaller in areas with high managed care enrollment. The authors observe that these results provide little evidence to support the expansion of liability to HMOs on the grounds that the overall level of liability is insufficient. But the consequences of a reallocation of liability from doctors and hospitals to HMOs, if the overall level of malpractice pressure were held constant, remain unknown.

Kessler and McClellan have also explored hospital competition and its implications for the costs and quality of care. Looking at Medicare claims of elderly Americans with hospital admissions for heart attacks,[23] they find that before 1991, hospital competition led to higher costs and, in some cases, lower rates of adverse health outcomes. After 1990, competition led both to substantially lower costs and to significantly lower rates of adverse outcomes. As of 1991, it was approximately 8 percent more costly to be treated in the least competitive fourth of hospital markets than in the most competitive fourth. The quality of care in competitive markets was also higher. Patients in the least competitive fourth of hospital markets experienced approximately 1.5 percentage points higher mortality (that is, were more likely to die) than those in the most competitive areas.

Kessler and McClellan conclude that increasing HMO enrollment over the sample period partially explains the dramatic change in the impact of hospital competition for two reasons: First, hospital competition unambiguously improves welfare throughout their sample period in geographic areas with above-median HMO enrollment rates. Second, point estimates of the magnitude of the welfare benefits of competition are uniformly larger for patients from states with high HMO enrollment as of their admission date, as compared to patients from states with low HMO enrollment.

Kessler and McClellan suggest that spillover effects from increasingly efficient treatment of privately insured patients may have affected the treatment regimen of Medicare patients by mediating the consequences of hospital competition in a way that enhances medical productivity. In particular, managed care appears to increase efficiency by reducing the tendency of hospital competition to result in a "medical arms race" of expenditure growth: excessive spending on medical care producing minimal benefits for patients.

Darius Lakdawalla and Tomas J. Philipson consider the forces that determine the fraction of the market that is nonprofit.[24] Industries in which private nonprofit production is present and significant, such as health care and education, account for more than one-fifth of U.S. economic activity. The authors argue that previous analyses of nonprofits have not separated preferences for prestige, service to the community, or size rather than profit maximization from the state-defined regulatory status of nonprofit production. They claim that this separation is crucial in predicting the underlying forces that allow the coexistence of nonprofit and for-profit production in an industry, as well as predicting such fundamental matters as the share of nonprofit activity. According to the authors, the share of nonprofit production in an industry falls with the share of the demand that is publicly subsidized, rises with the total number of firms in the industry, and rises with growth in the pace or extent of cost reductions resulting from learning-by-doing. These predictions stem from a basic aspect of regulatory nonprofit choice that links the degree of competition in a market with the share of nonprofits: the availability of economic profits under for-profit status raises the cost of choosing nonprofit status when such a status is associated with a distribution constraint. Empirical evidence based on U.S. states' panel data for the long-term care industry in 1989-94 suggests that the predictions discussed here are valid.

Philipson, William H. Dow, and

Xavier Sala-I-Martin investigate the positive complementarities between disease-specific policies introduced by competing risks of mortality.[25] The incentive to invest in prevention against one cause of death decreases with increases in death rates from other causes. This means that a specific public health intervention has benefits other than the direct medical reduction in mortality: it affects the incentives to fight other diseases. Thus the overall reduction in mortality in general will be larger than that predicted by the direct medical effects. The authors discuss evidence of these cross-disease effects by using data on neonatal tetanus vaccination from the Expanded Programme on Immunization of the World Health Organization.

Lakdawalla and Philipson also analyze how markets for old-age care respond to the aging of populations.[26] They consider how biological forces, which govern the stocks of frail and healthy persons in a population, interact with economic forces, which govern the demand for and supply of care. They argue that aging may lower the demand for market care by increasing the supply of family-provided care, which substitutes for market care. By providing healthy spouses, aging may increase the supply of family caregivers. Unexpectedly, this implies that relative growth in healthy elderly males may contract the long-term care market, while relative growth in healthy elderly females may expand that market. The authors use individual, country, and national evidence on the U.S. market for long-term care and find a negative output effect of the growth in elderly males. The novel effects of unbalanced gender growth among the elderly appear important in explaining the net decline in U.S. per capita output of nursing home care over the last 30 years, a decline that seems remarkable given the simultaneous rise in demand subsidies for long-term care, declining fertility rates, rising female labor-force participation, and the deregulation of entry barriers to the nursing home industry.

Frank A. Sloan, V. Kerry Smith, and Don H. Taylor have been studying smoker information and risk perceptions and their relationship to smoking behavior. They are writing a book, tentatively entitled *Information, Risk Perceptions, and Smoking Behavior,* as well as several journal articles on the subject. Since smoking is a major cause of death, morbidity, and disability, the subject is of interest in its own right. But the topic also provides a window on a number of larger questions of interest to economists and others. Why do people engage or not engage in behaviors that are potentially harmful to their own health? How do people process information that affects their risk perceptions and ultimately their behavior? What is the appropriate role of government? Should the role be limited to informing people about the probabilities associated with different actions they take? Or should government seek to intervene directly into personal decisions, such as those that are highly pertinent to individuals' future health?

Individuals receive information relevant to making decisions about their health from the media, family, friends, acquaintances, clergy, health professionals, and others. They then use such information to modify prior beliefs. Sloan and his colleagues focus on people who were 50 to 64 years of age when they entered the study; at that age, people receive personalized risk messages in the form of "health shocks" that reflect past decisions about their health. The principal data for this study come from the Health and Retirement Study (HRS), focus groups consisting of current and former smokers, and a survey of current smokers in Raleigh, North Carolina. The focus groups and the survey duplicate some of the questions from HRS, allowing the investigators to learn more about the formation of risk perception and the effects of information on the individual's expectation of living to age 75, a question asked in the HRS.

In one paper based on this research, Smith, Taylor, and Sloan use four waves of HRS, spanning the years 1992–8, to test whether longevity expectations match actual mortality at the individual level.[27] They conclude that subjective beliefs about longevity are consistent with individuals' survival patterns. After accounting for the selected nature of the sample of surviving respondents for each wave of the HRS, the investigators find that observed deaths are "signaled" through the lower longevity expectations of respondents in earlier interviews. Over time the evolution of subjective beliefs from those who later die displays a consistent decline. In contrast, the longevity expectations of survivors on average are higher and approximately constant over the time span observed by the panel. Longevity expectations do respond negatively to serious, new health shocks and to increases in individuals' functional limitations. Thus, an individual's longevity expectation is a fairly accurate index of a personal survival probability. However, this subjective probability does not serve as a sufficient statistic, reflecting all the private information people have about their survival prospects. In the end, though, the paper indicates that people do have well-formed views about their longevity prospects.

In another paper, the same authors use the first two waves of the HRS panel to determine how people use new information acquired through exogenous health shocks (for example, a heart attack) in revising their longevity expectations.[28] Measuring perceived risk as the likelihood of living to age 75 or older, current

smokers are more pessimistic than nonsmokers. Smokers also differ from nonsmokers in using new information to update their longevity expectations. Smokers are particularly sensitive to their own smoking-related illnesses and to increasing limitations in their ability to undertake physical activities (for example, walking a block, climbing stairs, lifting ten pounds, and so on). Former smokers and those who never smoked react to a much wider range of health-related signals, more specifically to diseases that are not smoking-related (for example, onset of diabetes). One implication of these findings is that generalized messages about the hazards of smoking may be less effective than information about smoking-induced activity restrictions.

Sloan has also been studying alcohol use. In a book just published, he and his coauthors investigate the relative effectiveness of alternative legal approaches for curbing excessive alcohol use and its effects, most particularly on drunk driving: administrative law, criminal law, and tort law.[29] Dram shop liability laws (tort laws) impose an obligation on the commercial server of alcohol to monitor service to obviously intoxicated adults and to minors. If these individuals are served and cause an accident, the server may be liable for damages. For this study, 800 owners or managers of bars and one or two of their employees were surveyed, along with police departments in the locations where the bars were located, state insurance departments, state alcoholic beverage commissions, and insurers that sell dram shop liability policies. The major result was that the threat imposed by tort law was highly effective in making commercial servers more cautious in their serving practices; tort was more effective on average than the other types of law. Imposing tort liability on commercial alcohol servers clearly reduced motor vehicle fatalities and curbed heavy use of alcohol.

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Research Summaries

Economic Growth and Financial Liberalization

Geert Bekaert and Campbell R. Harvey*

From 1980 to 1997, Chile experienced average real GDP growth of 3.8 percent per year while the Ivory Coast had negative real growth of 2.4 percent per year. Why? Attempts to explain differences in economic growth across countries have taken center stage in the macroeconomic literature again.[1] Although there is no agreement on what determines economic growth, most of the literature points out evidence of conditional convergence. Poorer countries grow faster than richer countries, once it is taken into account that poor countries tend to have lower long-run per capita GDP, for example, because of the poor quality of their capital stock (both physical and human). Jeffrey Sachs and Andrew Warner[2] have argued that policy choices, such as respect for property rights and open international trade, are important determinants of long-run growth.

There are some interesting differences between the two countries we mentioned. First, the Ivory Coast has a larger trade sector than Chile, but the role of trade openness remains hotly debated.[3] Second, Chile liberalized its capital markets, in particular its equity market, to foreign investment in 1992. After the liberalization, it grew by 6.4 percent a year. The 1980s and 1990s witnessed a number of financial liberalizations. Given the recent currency crises and their adverse economic consequences, what is the role of financial liberalizations and foreign capital flows in the economic welfare of developing countries? What effect did they have on growth? Our recent work with Christian Lundblad tries to answer this question.

Why Would Financial Liberalization Affect Economic Growth?

There are a number of channels through which financial liberalization may affect growth. First, foreign investors, enjoying improved benefits of diversification, will drive up local equity prices permanently, thereby reducing the cost of capital. We and Peter Henry[4] show that the cost of capital goes down after major regulatory reforms. Writing with Robin L. Lumsdaine,[5] we also show that a capital inflow leads to a permanent positive effect on equity prices. Moreover, our work and Henry's[6] indicates that investment increases. If this additional investment is efficient, then economic growth should increase. However, in the aftermath of the recent crises, some economists feel that foreign capital has been wasted on frivolous consumption and inefficient investment, undermining the benefits of financial liberalization.

Second, there is now a large literature on how improved financial

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markets and intermediation can enhance growth[7] and how financial liberalization may promote financial development. Furthermore, foreign investors may also demand better corporate governance to protect their investments, reducing the wedge between the costs of external and internal financial capital, and further increasing investment.[8]

Measuring the Liberalization Effect on Economic Growth

Most of the literature on growth implements purely cross-sectional techniques for measuring growth. The nature of our question forces us to introduce a temporal dimension into the econometric framework. In work with Lundblad,[9] we propose a time series panel methodology that fully exploits all the available data to measure how much a financial liberalization increases growth. We regress future growth (in logarithmic form), averaged over periods ranging from three years to five years, on a number of predetermined determinants of long-run steady state per capita GDP, including secondary school enrollment, the size of the government sector, inflation, and trade openness, and on initial GDP (measured in logarithms) in 1980. The right-hand side variables also include an indicator of liberalization based primarily on the analysis of regulatory reforms in our most recent work.[10]

To maximize the time-series content in our regressions, we use overlapping data. For example, we use growth from 1981 to 1986 and from 1982 to 1987 in the same regression. We correct for the resulting correlation in the model's residuals in the standard errors. Estimating the model by the Generalized Method of Moments, we can allow adjustments for correlations of residuals across countries and different variances of residuals both across countries and over time (heteroskedasticity).

We are mainly interested in the t-statistic on the liberalization indicator variable. Since we have so little time-series data, we also conduct a Monte Carlo analysis to examine how well this statistic behaves in sample sizes similar to those available for our analysis, under the null of a zero liberalization effect. We do find that we have to raise the normal cut-off values of the t-statistics somewhat before we can conclude that there truly is a statistically significant rejection of the null hypothesis of no liberalization effect.

The Liberalization Effect: Magnitude and Robustness

In work with Lundblad,[11] we consider the liberalization effect in a small sample of 30 emerging and frontier markets as defined by the IFC. We confirm many of the results in the literature. For example, we only observe convergence (a negative coefficient on initial GDP) when variables used to control for long-run per capita GDP are included in the regression. We also observe that many variables have the wrong sign and seem to lack robustness across specifications, confirming the analysis of Ross Levine and David Renelt.[12] One variable delivers a consistently positive and mostly statistically significant coefficient: the liberalization indicator variable. Taken by itself, financial liberalization leads to an increase in average annual per capita GDP growth of anywhere from 1.5 percent to as much as 2.3 percent per year. When we factor in a host of other variables that might also boost economic performance, improvements associated with financial liberalization still remain strong, 0.7 to 1.4 percent per year.

In more recent work with Lundblad,[13] we expand our sample to 95 countries, including countries that may not even have financial markets, as well as developed countries. The liberalization effect now has a cross-sectional component that measures the difference in growth between segmented and financially open countries, as well as a temporal component (countries before and after liberalization). It is this cross-sectional dimension that has been the main focus of the trade openness literature.

Expanding our sample of countries strengthens our results. In examining a number of different samples (whose size depends on the availability of control variables), we find that the financial liberalization effect is robust. We also consider an alternative set of liberalization dates. The main results are robust to these alternative dates. Further, we carry out a Monte Carlo experiment whereby one country's liberalization date is assigned randomly to another country. This allows us to test whether we are picking up some overall growth effect in the late 1980s and early 1990s (when the liberalization dates are concentrated). The Monte Carlo exercise shows that the liberalization dates do not really explain economic growth when they are decoupled from the specific country to which they apply. We also

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show that the effect is not related to the world business cycle during these years.

The Channels of Growth

Components of GDP

In work with Lundblad,[14] we attempt to discover what drives the liberalization effect. First we confirm the results of our earlier work and Henry's, showing that the ratio of investment to GDP actually increases. We also find that the ratio of consumption to GDP does not increase after liberalization. Indeed, in a number of specifications, consumption decreases significantly. Given that we establish that GDP growth increases, the claims about frivolous consumption and inefficient investment cannot be generally true. We find that the trade balance decreases across all specifications. Both imports and exports increase after financial liberalizations, but imports increase more than exports. Interestingly, in our broadest sample, we find a smaller government sector after liberalization. However, with more limited samples, there is little evidence that a financial liberalization is associated with a change in the size of the government sector. In the remainder of the paper, we try to determine what variables capture the liberalization effect.

Financial Liberalization and Macroeconomic Reforms

It is possible that financial liberalizations typically coincide with other more macro-oriented reforms[15] that provide the source of increased growth — not the financial liberalizations. However, when we add variables capturing macroeconomic reforms, such as inflation and trade openness, the liberalization effect is mostly not affected.

Financial Liberalization and Financial Market Development

A second possibility is that financial liberalization is the natural outcome of a financial development process, and that, consistent with many endogenous growth theories, it is financial development that leads to increased growth. However, when we add a number of banking and stock market development indicators to our regressions, the liberalization effect is only reduced marginally. Moreover, we find that financial liberalization strongly predicts additional financial development, but that the decision to liberalize does not seem to be affected by the degree of financial development. Hence, it is likely that one channel through which financial liberalization increases growth is by its impact on financial development.

Financial Liberalization and the Cost of Capital

A third possibility is that the growth effect is a pure cost-of-capital effect. Unfortunately, the cost-of-capital effect is very difficult to measure. First, liberalization induces a structural break in most financial data, making the use of a financial model to measure the change in the cost of capital after liberalization very difficult.[16] We use two imperfect proxies. Our first is the dividend yield minus its mean before liberalization (to capture cross-country differences in tax regimes). We have also argued that the change in the dividend yield is a good measure of the permanent price effect that induces the lower cost of capital after liberalization.[17] However, it also may measure improved growth opportunities. When we add the modified dividend yield to our explanatory variables, we find that the liberalization effect is unchanged. The dividend yield variable has the correct sign (decreases in the cost of capital lead to more economic growth), but it is only marginally significant.

Our second proxy for the cost of capital is the credit rating of the various countries. Claude Erb, Harvey, and Tadas Viskanta argue that this measure captures the cross-section of expected returns well, especially in emerging markets.[18] Unfortunately, it is also a measure of political instability, which has been shown to be related to economic growth in numerous studies. When we add the credit rating to our regressions, the liberalization effect declines, but not by much. The credit rating variable does have the expected sign and is highly significant.

Functional Capital Markets

A final possibility acknowledges the imperfection of capital markets, which drives a wedge between the cost of internal and external capital[19] and makes investment sensitive to the presence of cash flows. Foreigners may demand better corporate governance that in turn reduces the wedge between external and internal costs of capital and drives up investment. To capture this, we use a variable constructed by Utpal Bhattacharya and Hazem Daouk,[20] who trace the implementation and enforcement of insider trading laws in a large number of countries. We find that the enforcement of insider trading laws has a positive effect on growth and is statistically significant in three of our four largest samples. Importantly, it does not diminish the impact of financial liberalizations on economic growth. Another reason to suspect that corporate governance matters for growth prospects is that we find larger liberalization effects for countries with an Anglo-Saxon legal system. Rafael La Porta and his coauthors[21] analyze the link between corporate governance and legal systems.

Conclusions

Many papers have examined the determinants of growth, especially focusing on the role of macroeconomic reforms and the development of the financial sector. Our research agenda has a simple message. It is not just the existence of capital markets that is important for growth prospects — it is crucial that these capital markets be liberalized to allow foreign investors to participate and local investors to diversify their portfolios across borders. Our research shows that the financial liberalization effect is not subsumed by economic reforms or proxies for the development of capital markets and financial intermediation.

It is remarkable that the impact of financial market liberalizations on growth prospects has not received more attention in the literature. Indeed, we conducted a simple experiment to assess the economic impact of liberalization. We considered a hypothetical country that moved from the 25th percentile to the median in the cross-sectional distribution of the variables that are usually associated with economic growth, for example, secondary school enrollment. We also assumed that the country experiences a financial liberalization. Given the results of our estimation, the financial liberalization alone contributes 30 percent of the total increased growth. This is a very substantial contribution, especially considering the dramatic assumption of a quartile advance in other variables associated with economic growth.

Finally, the conditional convergence effect documented in the literature is much stronger once you allow for a financial liberalization. Our results suggest that a financial liberalization allows many countries to join the "convergence club" much faster.

Our work on understanding the channels of economic growth has just begun. We believe the next step is to examine firm level data. With these data, we will be able to examine more closely the response of investment and capital structure to financial liberalization. With firm specific expected cash flows, we will be able to disentangle the cost of capital and growth opportunity effects after financial liberalizations.

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The Globalization of Production

Gordon H. Hanson*

Globalization is transforming the ways in which nations interact. National economies become integrated as the flow of goods and capital across borders expands. In standard theoretical models, a fall in trade barriers or transport cost triggers an increase in trade between producers in one country and consumers in another country. Part of what globalization entails is greater international trade in final goods, but that is by no means the whole story. In the current environment, firms are more able to fragment their operations internationally, locating each stage of production in the country where it can be done at the least cost, and transmitting ideas for new products and new ways of making products around the globe.

My research examines how these new aspects of globalization affect labor markets, industry structure, and industry location in national and regional economies. When U.S. firms fragment production internationally, they typically move less skill-intensive activities abroad and keep more skill-intensive activities at home. Foreign outsourcing of this type can change the demand for skilled and unskilled labor and alter the structure of wages both at home and abroad. In addition, when outsourcing occurs between neighboring countries, such as the United States and Mexico or Hong Kong and China, the globalization of production raises the incentive to produce in regions with relatively low-cost access to foreign markets. Thus, it may alter the location of economic activity inside countries.

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International Trade, Foreign Outsourcing, and Wage Inequality

Globalization has attracted a great deal of academic attention in part because it has coincided with dramatic changes in the structure of wages in advanced countries.[1] Since the late 1970s, the real wages of more-skilled workers in the United States have risen steadily, while those of less-skilled workers have stagnated or even fallen.[2] More trade with low-wage countries is one possible factor behind rising wage inequality. What complicates identifying the impact of trade on wages is that other profound shocks to labor markets have occurred at the same time. The advent of information technology, for instance, appears to have increased the demand for skilled labor and allowed firms to eliminate many jobs performed by the less skilled.[3] In the absence of clear evidence linking trade and wages, many have attributed the rise in the skilled wage gap to technological change.

Naturally, we would like to have an empirical framework that allows us to estimate the impact of trade and technology shocks on labor demand and wages at the same time. This is particularly important where international trade takes the form of foreign outsourcing, since moving less-skill intensive production activities abroad makes production at home more skill-intensive. This may be observationally equivalent to changes in technology that are biased in favor of skilled labor. A large fraction of the growth in world trade since the 1970s has taken the form of trade in intermediate inputs, in general, and foreign outsourcing, in particular.[4] To cite some well-known examples, Nike outsources production of its footwear to firms in Asia, and Dell outsources production of the components and peripheral devices that make up its personal computers to suppliers around the world.

One surprising consequence of foreign outsourcing is that it can increase the demand for skilled labor both at home and abroad. Suppose firms in the skill-abundant United States use firms in non-skill-abundant Mexico to produce intermediate inputs.[5] We imagine that production involves many stages, such as design, parts production, and assembly, each of which differs in terms of how much skilled labor is required. Assuming wages differ between the two nations, we expect the United States to specialize in high-skill tasks and Mexico to specialize in low-skill tasks. If U.S. firms outsource production to Mexico, they will choose to move the least skill-intensive activities that they perform. By moving low-skill activities to Mexico, the average skill intensity of production rises in the United States. The same also happens in Mexico, since Mexico initially specializes in low-skill tasks. Outsourcing from more skill-abundant to less skill-abundant countries then raises the relative demand and the relative earnings of skilled workers in both, contributing to a global increase in wage inequality.

The impact of foreign outsourcing on the relative demand for skilled labor appears to be quantitatively important in both the United States and Mexico. For the 1980s, when wage inequality rose in both coun-

tries, foreign outsourcing accounts for 15 to 20 percent of the increase in the relative demand for skilled labor in U.S. manufacturing industries and 45 percent of the increase in the relative demand for skilled labor in Mexican manufacturing industries.[6]

The main question of interest is what is the relative contribution of trade and technological change to rising wage inequality in the United States and elsewhere. To answer this question, we need a measure of technological change. One approach is to capture changes in technology by the upgrades that firms apply to their production processes, through investments in computers, communications equipment, and other high-tech capital. For the United States, foreign outsourcing and technological upgrading may affect wages directly by shifting production away from unskilled workers and towards skilled workers, thus raising the relative demand for skilled labor, and indirectly by changing the relative prices of goods that use less-skilled labor intensively, thus changing the relative demand for skilled labor.

By modeling how trade and technological upgrading affect product prices and technology, we can explain their direct and indirect effects on wages. Using this approach, we find that for U.S. manufacturing industries during the 1980s, foreign outsourcing accounts for 15 percent of the observed rise in the skilled-unskilled wage gap and that technological upgrading accounts for 35 percent of this rise.[7] For the United States, then, it appears that both trade and technological change have influenced wages, with the latter having the larger effect.

Globalization and the Location of Economic Activity

Until recently, most research in international economics ignored the location of economic activity inside countries. In fact, the majority of industrial firms are located in cities and produce goods for urban consumers. In many industrializing countries, such as Argentina, Mexico, and Thailand, most industrial production occurs in a single region or city. Beginning in the early 1990s, theoretical work in international trade began to incorporate geography into trade models.[8] Some of my recent research involves testing these theories empirically.

Understanding the link between trade, industrialization, and geographic concentration is important because globalization and the spread of digital technologies hold the potential to dramatically alter where people live and work. If lower communication costs free individuals from having to work in cities, then advanced countries could de-urbanize. Further, if globalization continues to change national patterns of industrial specialization, it could also reorient the location of economic activity inside countries.

Recent theory is based on the idea that geographic concentration results from a combination of increasing returns to scale in production and transport costs (broadly defined to include all costs of doing business in different locations). Increasing returns to scale imply that larger firms are more efficient than smaller firms, creating an incentive to concentrate production in a few plants. Transport costs imply that firms prefer to locate near large consumer markets. The interaction of these two forces creates an incentive for industrial firms to locate together, which contributes to the formation of cities.

However, empirical work on why industrial firms tend to cluster geographically has been plagued by problems of identifying the underlying causes of industry location: how can we tell whether the existence of New York City is attributable to increasing returns to scale in production or to the fact that there happens to be a natural port where the Hudson River meets the Atlantic Ocean? Both factors may be at work, which makes it difficult to distinguish the effects of increasing returns on industry location from those of region-specific characteristics, such as climate and access to coastal waterways.[9]

To identify factors that contribute to the geographic concentration of industry, we can use changes in trade policy as a natural experiment. Consider the recent liberalization of trade in Mexico. In 1985, after a 40-year experiment with protectionist trade policies, Mexico suddenly eliminated most trade barriers. According to recent theory, trade reform in Mexico will lead to two changes in the economy. First, positive transport costs imply that firms will relocate towards regions that have good access to world markets. Given its position in North America, the world market for Mexico is mainly the United States. Second, as industry relocates, not all regions with access to foreign markets will benefit. Since firms desire to be near large concentrations of other firms, some low transport-cost regions will grow but others will not.

Following trade reform in Mexico, employment has dramatically relocated from the interior of the country to regions on the Mexico-U.S. border.[10] During Mexico's period as a closed economy, Mexico City was the dominant industrial region in the country. After trade liberalization, Mexico City's position as the country's industrial heartland has diminished, while Mexican states on the U.S. border have experienced rapid economic growth, and new industry centers have formed along the border. Regional industries in Mexico have grown faster where they have access to buyers and suppliers in related industries.[11] This suggests that

as Mexico adjusts to trade reform, it is shifting from an economy based on a single diversified industry center in Mexico City to one based on a number of broadly specialized industry centers in northern Mexico.

Trade reform in Mexico also has implications for the location of economic activity in the United States. During the 1980s and 1990s, employment growth in U.S. border cities was higher where export production in the neighboring Mexican border city was also higher.[12] This suggests that the expansion of export production in Mexico raises the demand for goods made in nearby U.S. locations. In other words, trade between the United States and Mexico contributes to the relocation of industry inside the United States towards the border. The debate surrounding the North American Free Trade Agreement (NAFTA) failed to address the implications of free trade for the intra-national location of economic activity. These results imply that NAFTA will contribute to the expansion of the U.S. Southwest relative to the rest of the nation.

Trade liberalization also affects the organization of industries. Consider the case of apparel production in Mexico. Under the closed economy, the Mexican apparel industry was organized around regional production networks.[13] Firms in Mexico City specialized in high-skill tasks, such as design and marketing, while firms in outlying areas specialized in the low-skill task of assembling apparel items. This specialization pattern reflected regional-wage differences in Mexico. Wages were high in Mexico City, where skilled labor was in abundance and firms had good access to information about the national market, and wages were low in outlying regions, where less-skilled labor was in abundance and firms had relatively poor access to information about market conditions. After trade reform in Mexico, regional production networks have been recreated on a global scale.[14] The size of the market and the abundance of skilled labor in the United States make U.S. firms relatively efficient in product design and marketing. Apparel assembly firms in outlying regions of Mexico have severed their ties to Mexico City and now rely on U.S. firms for design and marketing services. This shift caused the apparel industry in Mexico City to contract and led to an expansion in apparel assembly in outlying locations, particularly those on the Mexico-U.S. border.

Future Directions

Global production networks are certainly not confined to North America. While U.S. outsourcing to Mexico began in earnest in the 1980s, foreign outsourcing in Asia has been active for more than three decades. In the 1960s and 1970s, Hong Kong was a major exporter of apparel, footwear, and other labor-intensive items, often producing under subcontract for large buyers in the United States, Europe, and Japan. Since China began to open its economy to foreign trade and investment in the late 1970s, Hong Kong has begun to specialize in business services for mainland China. Hong Kong firms have moved most of their manufacturing operations to the mainland, in particular to the neighboring province of Guandong, leaving their management offices in Hong Kong where they design and market the goods that China produces. Hong Kong now distributes about one-half of the manufacturing exports that China produces.

Hong Kong's role in intermediating China's exports is linked to information costs in international exchange.[15] Hong Kong traders appear to have an informational advantage in trade with China, which allows them to play the role of middlemen in global exchange. Important questions for future work include how outsourcing from Hong Kong to China affects labor markets and industry structure in these regions and in the rest of Asia, and how changes in transport costs and information technology affect the nature of global outsourcing networks.

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[9] *See G. H. Hanson "Scale Economies and the Geographic Concentration of Industry," NBER Working Paper No. 8013, November 2000; forthcoming in the* Journal of Economic Geography.

[10] *See G. H. Hanson, "Increasing Returns, Trade, and the Regional Structure of Wages,"* Economic Journal, *107 (1997), pp. 113–33.*

[11] *See G. H. Hanson, "Regional Adjustment to Trade Liberalization," NBER Working Paper No. 4713, April 1994, and* Regional Science and Urban Economics, *28 (1998), pp. 419–44.*

[12] *See G. H. Hanson, "Economic Integration, Intraindustry Trade, and Frontier Regions,"* European Economic Review, *40 (1996), pp. 941–50; "The Effects of Off-Shore Assembly on Industry Location: Evidence from U.S. Border Cities," NBER Working Paper No. 5400, December 1995, and in* Effects of U.S. Trade Protection and Promotion Policies, *R. C. Feenstra, ed. Chicago: University of Chicago Press, 1997; and "U.S.–Mexico Integration and Regional Economies: Evidence from Border-City Pairs," NBER Working Paper No. 5425, January 1996.*

[13] *See G. H. Hanson, "Incomplete Contracts, Risk, and Ownership,"* International Economic Review, *36 (1996), pp. 341–63, and "Agglomeration, Dispersion, and the Pioneer Firm,"* Journal of Urban Economics, *39 (1996), pp. 255–81.*

[14] *See G. H. Hanson, "Localization Economies, Vertical Organization, and Trade," NBER Working Paper No. 4744, May 1994, and* American Economic Review, *86 (1996), pp. 1266–78.*

[15] *See R. C. Feenstra and G. H. Hanson, "Intermediaries and Entrepôt Trade: Hong Kong Re-exports of Chinese Goods," NBER Working Paper No. 8088, January 2001.*

Efficiency and Equity in Education

Eric A. Hanushek*

Education is of interest to many economists because of its perceived importance for a wide variety of economic issues. But like others in society, economists also have a personal interest in education — having been students and perhaps taught themselves, having had children who are students, and often having formed strong opinions about educational policy through their own experiences. This combined professional and personal interest in education undoubtedly has heightened the interest in school research and led to stronger reactions to the policy implications of that research.

A major strand of my work concerns what determines student achievement –– what economists generally would call part of "human capital quality" — and, most importantly, what role schools and governmental policy play in this equation. The results of this research reveal a complicated picture of determining factors that have subsequent implications for other areas of research and policy undertakings.

However, overshadowing all other findings is the fact that measurable attributes of teachers and schools bear little systematic relationship to student performance. This finding is controversial, at least partly because of its policy implications.

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Some Background

The concept of human capital, while part of economics for several centuries, has only recently become central to both theoretical and empirical analyses. In the 1960s and 1970s, Theodore W. Shultz, Gary Becker, and Jacob Mincer laid the foundation of this theory. Their analyses framed the issues of investment in individual skills and provided insights into their empirical relevance. However, most early analysis concentrated on the quantity of individual human capital—not the quality or its determination—and its implications for subsequent wages or health. Specifically, the impact of schools on "quality" was not addressed. In fact, the best early study on the role of schools in skill formation was conducted outside the field of economics in the "Coleman Report."[1] This government

publication, dictated by the Civil Rights Act of 1964, suggested that schools had little to do with human capital as measured by cognitive achievement. This pioneering analysis focused on quality issues but contained a variety of fundamental analytical flaws.[2] The Coleman Report commonly has been interpreted as showing that "schools do not matter," because its analysis indicated that family background, followed by peer influence, and least of all school attributes, determined student achievement. While its methodology was problematic, the report motivated a broad inquiry into the role of schools.

Analysis of Educational Production

Economists naturally think in terms of a production model, where school and other influences go in and student achievement comes out. However, the concept has been implemented in a variety of ways.

The standard statistical analysis relates student outcomes to family profiles and observable characteristics of schools and teachers. This approach, which frequently relies on schools' administrative records, has been applied to a wide range of U.S. schools. But these studies failed to reveal that school resources influence student performance in any systematic way, a finding I've developed in a series of papers.[3] In close to 300 studies examining the influence of class size reduction on student performance, nearly equally balanced positive and negative effects were uncovered. The dearth of statistically significant results (14 percent on each side) also underscores the fact that the vast majority of these studies reveal no relationship at all. Studies on teachers' graduate education and experience, as well as on per-pupil spending, yield similar mixed results. These findings, while once surprising to many, have now become the conventional wisdom.

The most significant misinterpretation of these standard studies — the central problem with analyzing the Coleman Report — is the conclusion that schools do not matter in education. Another closely related line of research has pointed out the flaws in that interpretation. Specifically, while the commonly measured attributes of teachers do not appear to be important in any systematic way, there remain large and consistent differences among teachers and schools.

Alternative statistical studies have used a general fixed-effect approach to estimation of teacher and school quality. In this methodology, differences in the growth of student achievement during a specific grade are related to the student's teacher. These studies, which measure teacher quality implicitly by the performance of students, invariably find large and significant differences among teachers.[4] Yet differences in teacher quality still are unrelated to the measured characteristics of teachers, class size, and the like.

These estimated differences in teacher quality reveal how strongly teachers affect student achievement (and justify many parents' interest in ensuring that their children are placed with specific teachers). Variations resulting from teacher quality dwarf those that result from class size or from measurable characteristics of teachers.[5] Moreover, this research demonstrates the ability of schools to overcome deficits in family background, especially among low-income students.[6] The ability of teachers to significantly affect the performance of low achievers justifies the historic attention to compensatory policies, although the policies actually implemented have not been very successful because they have not focused on teacher quality.

Because greater resources are not systematically related to higher student performance, schools may be inefficient. Greater inputs of resources simply do not translate into higher outcomes. This conclusion has obvious implications for policy, since many people want to use inputs, or resources, to bring about desired changes. These types of policies are discussed below.

Controversies

The previous conclusions about the lack of importance of measured inputs to schools come from summarizing the results of all the underlying statistical studies (given minimal quality criteria) that are available. However, differences in the quality of the studies will affect their conclusions. Therefore some clear criteria for quality need to be established. First, studies must take into account the varying education policies of the 50 states, recognizing that the states are primarily responsible for organizing and funding schools. States differ substantially in their funding approaches, in labor laws, in teacher certification and hiring requirements, and more. Many standard studies of educational production draw data from across states, but fail to measure the differences in these states' policy environments. Such studies suffer from specification errors, and these problems are compounded if aggregate state level data are used.[7]

Second, studies should take into account the educational background of the students tested. Educational policies are cumulative, so performance of twelfth graders is the product of more than just the instruction they receive during that grade. However, many studies ignore the students' history, largely because of missing data. To circumvent these problems and to avoid some of the largest missing-data issues, a number of studies have estimated value-added models: that is, models that analyze achievement across a short time span, such as a single grade, and take into account the achievement of

students at the beginning of the analysis period.[8]

One way to understand the importance of these determinants of study quality is to exclude studies that use multistate data and to focus exclusively on those with a value-added design. When this is done, the evidence that resources minimally affect performance is even stronger.[9]

Another historical controversy, largely moot at this time, relates to the measurement of educational outcomes. A majority of the studies of student performance consider variations in test scores as the measure of outcomes. The justification for this is that tests reveal skills that are valued in the labor market, as has been shown in a variety of studies. However, an important 1992 study by David Card and Alan B. Krueger offered the possibility that the output measure (test score) affected the conclusion about the inputs (education quality). Card and Krueger found that school resources have significant effects when performance is measured by subsequent labor market earnings rather than test scores.[10] After considerable analysis and debate, though, it appears that measurement issues are not the most significant cause of differences in results.[11] Direct analyses of resources and earnings do not confirm the differences; the variation appears to result from other analytical differences.[12] In fact, the findings for different measures of outcomes seem to be qualitatively similar.[13] Parallel analysis finds similar results when macroeconomic growth is the final output; that is, measured achievement is important, but input measures are not.[14]

An entirely different approach to uncovering the impacts of varying school resources involves using random assignment experimental methodology for education studies. The benefits of this approach have been demonstrated in medical and agricultural studies. Random assignment to treatment and control groups minimizes model misspecification and bias in estimates of treatment effect. A random assignment experiment on class size reduction in Tennessee has been interpreted as providing a strong case for the approach. That experiment, Project STAR, found that kindergarten students in small classes (13–17 students) scored better than those in regular size classes (22–25 students).[15] The gains were relatively small and isolated in the first year that students were in smaller classes, though. Do these findings seem to contradict prior studies that show no systematic relationship between class size and performance? Krueger (1999) suggests that the results indeed may be consistent with prior econometric results because many of the earlier studies may not have been equipped to detect the small effects of class size differences that the STAR experiment did. Thus, in a policy sense, the results need not conflict because small gains from very expensive programs do not make such policies very attractive. Nonetheless, on the methodological side, random-assignment experiments clearly have tremendous advantages in assessing the effects of these kinds of policies.

Equity and the Financing of Education

One of the most significant policy issues of the past 30 years has been how states should fund local schools. While most states have used a compensatory aid formula to ameliorate some local governments' difficulty in raising taxes, these measures have only partially solved the problem. The issue became the subject of court action in the 1960s with the California case of *Serrano v. Priest*. Suits in many other states followed. As a result, some significant narrowing of spending variations occurred, because of both court rulings and independent legislative actions.[16] Nonetheless, increased funding is not closely related to school quality — as my research shows — then changes in spending are not likely to move us toward more equitable provision of education.[17]

Even though these court challenges have been going on for three decades, there has been surprisingly little direct analysis of their impacts. The one study of the effect of the original *Serrano* case on student achievement found no lessening of the variation in student outcomes after spending was equalized across districts.[18] A broader analysis of the distribution of earnings outcomes related to variations in district spending across the United States similarly finds no beneficial effect on the earnings distribution except perhaps for black females.[19]

Interpretations and Puzzles

My research suggests that there is inefficiency in the provision of schooling; it does not indicate that schools do not matter. Nor does it indicate that money and resources never affect achievement. The accumulated research simply says that there is no clear, systematic relationship between resources and student outcomes.

Is this surprising? Some would argue that it is not plausible because parents decide on school spending and that fact alone should provide a discipline to schools. But at the same time, there are reasons why government provision of resources may be inefficient — including lack of effective competition, bureaucratic decisionmaking, the costs of moving to a different school district, and the lack of good measures for assessing the "value-added" of schools. Clearly the political economy of educational decisionmaking needs further study.

Any such research should also include better information about the character of household decisionmaking, both in choosing school districts and in supporting alternative policies.

The main conclusion of my research is that policy decisions should not focus on school resources, because the impact of resources on student achievement is unknown at this time. The solution is to establish teacher incentives — rewards or consequences related to student outcomes — and then to permit local schools to make appropriate choices.[20] Vouchers, merit pay, contracting out, and the like may be alternative ways to establish performance incentives.

Unfortunately, not much is known about alternative incentive schemes: how to structure them and what kinds of outcomes can be expected. Schools currently have few, if any, incentives for improving performance (as measured by student outcome). In addition, there is little empirical data on the effectiveness of incentive programs. Some is beginning to be available — for example, from the Milwaukee voucher program — but it applies only to very specific kinds of programs.

A final issue is the implication of these analyses for other kinds of studies.[21] Most studies involving human capital consider its effect on other aspects of behavior. But the inefficient production of human capital introduces natural measurement problems. Direct spending is no longer a good measure of quality because it has no perceivable bearing on performance. Further, families have considerable influence on student achievement, implying that school resources are only part of the equation. Both factors suggest that measuring student achievement only by resource investment could lead to distortion.

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[1] *J. S. Coleman, et al.,* Equality of Educational Opportunity, *Washington, DC: U.S. Government Printing Office, 1966.*

[2] *E. A. Hanushek and J. F. Kain, "On the Value of 'Equality of Educational Opportunity' as a Guide to Public Policy," in* On Equality of Educational Opportunity, *F. Mosteller and D. P. Moynihan, eds., New York: Random House, 1972.*

[3] *E. A. Hanushek, "Throwing Money at Schools,"* Journal of Policy Analysis and Management, *1 (1) (Fall 1981), pp. 19–41; "The Economics of Schooling: Production and Efficiency in Public Schools,"* Journal of Economic Literature, *24 (3) (September 1986), pp. 1141–77; "The Impact of Differential Expenditures on School Performance,"* Educational Researcher, *18 (4) (May 1989), pp. 45–51; and "Assessing the Effects of School Resources on Student Performance: An Update,"* Educational Evaluation and Policy Analysis, *19 (2) (Summer 1997), pp. 141–64.*

[4] *See, for example, E. A. Hanushek, "Teacher Characteristics and Gains in Student Achievement: Estimation Using Micro Data,"* American Economic Review, *60 (2) (May 1971), pp. 280–8; and "The Trade-off Between Child Quantity and Quality,"* Journal of Political Economy, *100 (1) (February 1992), pp. 84–117; R. J. Murnane,* Impact of School Resources on the Learning of Inner City Children, *Cambridge, MA: Ballinger, 1975; and D. Armor, et al.,* Analysis of the School Preferred Reading Program in Selected Los Angeles Minority Schools, *Santa Monica, CA: Rand Corp., 1976.*

[5] *S. G. Rivkin, E. A. Hanushek, and J. F. Kain, "Teachers, Schools, and Academic Achievement," NBER Working Paper No. 6691, August 1998.*

[6] *The calculations of teacher quality are based on differences in achievement growth across classrooms. Having a teacher one standard deviation above the mean for four to five years running will overcome the average difference in performance between those on free or reduced lunch and those not.*

[7] *In order to obtain unbiased estimates of the effects of school inputs, it must be the case either that variations in state policies do not matter or that there is no correlation between policies and school inputs. The latter condition, while more plausible at the individual student level, is very unlikely at the state aggregate level. See E. A. Hanushek, S. G. Rivkin, and L. L. Taylor, "Aggregation and the Estimated Effects of School Resources," NBER Working Paper No. 5548, April 1996, and* Review of Economics and Statistics, *78 (4) (November 1996), pp. 611–27.*

[8] *For a discussion of empirical specifications, see E. A. Hanushek, "Conceptual and Empirical Issues in the Estimation of Educational Production Functions,"* Journal of Human Resources, *14 (3) (Summer 1979), pp. 351–88.*

[9] *E. A. Hanushek, "Assessing the Effects of School Resources on Student Performance: An Update"; and "The Evidence on Class Size," in* Earning and Learning: How Schools Matter, *S. E. Mayer and P. E. Peterson, eds., Washington, DC: Brookings Institution, 1999.*

[10] *D. Card and A. B. Krueger, "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States,"* Journal of Political Economy, *100 (1) (February 1992), pp. 1–40.*

[11] *See* Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success, *G. T. Burtless, ed., Washington, DC: Brookings Institution, 1996. An alternative way to reconcile Card's and Krueger's results is to note that resources might have a larger effect when the level of spending is less. Their schooling goes back to the 1930s. On the other hand, the evidence for developing countries does not appear much stronger; E. A. Hanushek, "Interpreting Recent Research on Schooling in Developing Countries,"* World Bank Research Observer, *10 (2) (August 1995), pp. 227–46.*

[12] *J. Betts, "Is There a Link Between School Inputs and Earnings? Fresh Scrutiny of an Old Literature," in* Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success, *G. T. Burtless, ed., Washington, DC: Brookings Institution, 1996; J. S. Heckman, A. Layne-Farrar, and P. E. Todd, "Does Measured School Quality Really Matter? An Examination of the Earnings-Quality Relationship," NBER Working Paper No. 5274, September 1995, and in* Does Money Matter?*; and E. A. Hanushek, S. G. Rivkin, and L. L. Taylor, "Aggregation and the Estimated Effects of School Resources."*

[13] *E. A. Hanushek, "Assessing the Effects of School Resources on Student Performance: An Update."*

[14] *E. A. Hanushek and D. D. Kimko, "Schooling, Labor Force Quality, and the*

Growth of Nations," American Economic Review, *90 (5) (December 2000), pp. 1184–1208.*

[15] *The results are described in E. Word et al.*, Student/Teacher Achievement Ratio (STAR), Tennessee's K-3 Class Size Study: Final Summary Report, 1985–1990, *Nashville, TN: Tennessee State Department of Education, 1990, and introduced to the economics literature in A. B. Krueger, "Experimental Estimates of Education Production Functions,"* Quarterly Journal of Economics, *114 (2) (May 1999), pp. 497–532. The superior design of the random assignment experiment was nonetheless compromised by a series of implementation problems: see E. A. Hanushek, "Some Findings from an Independent Investigation of the Tennessee STAR Experiment and from Other Investigations of Class Size Effects,"* Educational Evaluation and Policy Analysis, *21 (2) (Summer 1999), pp. 143–63. See also E. A. Hanushek, "The Evidence on Class Size." Unfortunately, there are no attempts to replicate the experiment.*

[16] *S. E. Murray, W. N. Evans, and R. M. Schwab, "Education Finance Reform and the Distribution of Education Resources,"* American Economic Review, *88 (4) (September 1998), pp. 789–812.*

[17] *E. A. Hanushek, "When School Finance 'Reform' May Not Be Good Policy,"* Harvard Journal on Legislation, *28 (2) (Summer 1991), pp. 423–56, has a discussion of various aspects of the common litigation.*

[18] *T. A. Downes, "Evaluating the Impact of School Finance Reform on the Provision of Public Education: The California Case,"* National Tax Journal, *45 (4) (December 1992), pp. 405-19*

[19] *E. A. Hanushek and J. A. Somers, "Schooling, Inequality, and the Impact of Government," NBER Working Paper No. 7450, December 1999, and in* The Causes and Consequences of Increasing Inequality, *F. R. Welch, ed., Chicago: University of Chicago Press, 2001.*

[20] *E. A. Hanushek, et al.,* Making Schools Work: Improving Performance and Controlling Costs, *Washington, DC: Brookings Institution, 1994.*

[21] *E. A. Hanushek, "Measuring Investment in Education,"* Journal of Economic Perspectives, *10 (4) (Fall 1996), pp. 9–30.*

NBER Profile: *Gordon H. Hanson*

Gordon H. Hanson is Associate Professor of Economics, Business Economics and Public Policy, and Corporate Strategy and International Business at the University of Michigan and a Research Associate of the National Bureau of Economic Research. He received his Ph.D. in economics from MIT in 1992 and his A.B. in economics from Occidental College in 1986.

Prior to joining the University of Michigan faculty, Hanson taught at the University of Texas in Austin from 1992 to 1998. Hanson's main research area is international economics and he teaches courses on the subject at the undergraduate, MBA, and Ph.D. levels. His current research addresses how immigration and the globalization of production affect wages, employment, and industry structure in Asia, Mexico, and the United States.

Hanson also has worked as a consultant for the World Bank, the Inter-American Development Bank, the Mexican Ministry of Trade, and the U.S. Department of Labor. He is on the Board of Editors of the *American Economic Review*, the *Journal of International Economics*, and the *Journal of Economic Geography*.

Hanson and his wife, Caty, have two daughters: Thea (3) and Carly (1). In his free time, he enjoys skiing, biking, and spending time with his family.

NBER Profile: *Eric A. Hanushek*

Eric A. Hanushek is the Paul and Jean Hanna Senior Fellow at the Hoover Institution of Stanford University and a Research Associate of the National Bureau of Economic Research. He is also a Senior Research Associate at the Green Center for the Study of Science and Society of the University of Texas at Dallas.

Born in Lakewood, Ohio, in 1943, Hanushek received his Bachelor of Science degree from the U. S. Air Force Academy in 1965 and his Ph.D in economics from MIT in 1968. He served in the air force from 1961–74.

Before joining the Hoover Institution in 2000, Hanushek was professor of economics and public policy at the University of Rochester. He joined the University of Rochester faculty in 1978, having taught at Yale University from 1975–8, and at the U.S. Air Force Academy from 1968–73. Hanushek's research concentrates on applied public finance and public policy analysis with special emphasis on education issues.

From 1983 through 1985, Hanushek was Deputy Director of the Congressional Budget Office. He was also a Senior Staff Economist at the Council of Economic Advisers (1971–2) and a Senior Economist at the Cost of Living Council (1973–4). Hanushek was president of the Association for Public Policy Analysis and Management in 1988–9, and in 1997 he was selected to be a member of the International Academy of Education.

Hanushek and his partner, Macke Raymond, enjoy skiing, squash, and looking after their large yellow dog, Reckless.

Conferences

Thirteenth Annual Inter-American Seminar on Economics

The NBER's 13th Annual Inter-American Seminar on Economics took place in Santo Domingo, Costa Rica on November 16–17. Sebastian Edwards, NBER and University of California, Los Angeles, and James J. Heckman, NBER and University of Chicago, organized this year's program around the topic "Micro-data Research in Latin America":

James J. Heckman, and **Carmen Pages,** Inter-American Development Bank, "The Cost of Job Security Regulation: Evidence from Latin American Labor Markets" (NBER Working Paper No. 7773)

Discussant: Sebastian Edwards

Jaime Saavedra and **Maximo Torero,** GRADE, "Labor Market Reforms and Their Impact over Formal Labor Demand and Job Market Turnover: The Case of Peru"

Discussant: Costas Meghir, University College London

Mauricio Cardenas, Fedesarrollo, and **Adriana D. Kugler**, Universitat Pompeu Fabra, "The Incidence of Job Security Regulations on Labor Market Flexibility and Compliance in Colombia"

Discussant: Maria Carolina Leme, IPEA, Rio de Janeiro

David H. Autor, NBER and MIT, "Outsourcing at Will: Unjust Dismissal Doctrine and the Growth of Temporary Help Employment" (NBER Working Paper No. 7557)

Discussant: Alan B. Krueger, NBER and Princeton University

Orazio P. Attanasio, NBER and University College London, and **Miguel Szekely,** Inter-American Development Bank, "A Dynamic Analysis of Household Decision Making in Latin America"

Discussant: Robert J. Willis, University of Michigan

Maria Carolina Leme and **Ricardo Paes de Barros,** IPEA, Rio de Janiero, "The Case of Brazil"

Discussant: Petra E. Todd, NBER and University of Pennsylvania
(No detail was available on this presentation at the time of publication)

Jaime Saavedra and **Martin Valdivia,** GRADE, "Household and Individual Decisionmaking over the Life Cycle: A First Look at Evidence from Peruvian Cohorts"

Discussant: David Bravo, Universidad de Chile

Derek A. Neal, NBER and University of Wisconsin, "Life Cycle Fertility and Welfare"

Discussant: Costas Meghir

Jere R. Behrman, Piyali Sengupta, and **Petra E. Todd,** University of Pennsylvania "Progressing through PROGRESA: An Impact Assessment of Mexico's School Subsidy Experiment"

Discussant: Maria Carolina Leme

Orazio P. Attanasio, Costas Meghir, and **Ana Santiago,** University College London, "Using Economics to Understand the Mexican PROGESA Program"

Discussant: Petra E. Todd
(No detail was available on this or the next presentation at the time of publication)

Cristian Aedo, ILADES, "Evaluating the Chile Joven Program"

Discussant: Jeffrey A. Smith, NBER and University of Western Ontario

David Bravo, Dante Contreras, and **Gustavo Crespi,** Universidad de Chile, "Evaluating Training Programs for Small-Scale Entrepeneurs: A Pilot Study"

Discussant: Alan B. Krueger

David Bravo and **Dante Contreras,** "The Impact of Financial Incentives to Training Providers: The Case of Chile Joven"

Discussant: Jeffrey A. Smith

Heckman and **Pages** document the high level of job security protection in Latin American labor markets and analyze its impact on employment. They show that job security policies have a substantial impact on the level and the distribution of employment in Latin America, reducing employment and promoting inequality. The institutional organization of the labor market thus affects both employment and inequality.

Saavedra and **Torero** analyze the effect of several aspects of labor legislation that were modified in Peru after 1991. Through the progressive elimination of job stability regulations, the introduction of temporary contracts, and changes in the severance payment structure, firing costs diminished sharply. Simultaneously, nonwage labor costs increased. Using data on 10 sectors observed bimonthly between 1987 and 1997 and data on establishments for 3 subperiods, the authors find that labor costs have a negative and significant

effect on labor demand. The coefficient of their measure of firing costs, the expected severance payments, is negative and significant, and it decreases in the post-reform period. After the reforms, the price and output elasticities are larger and there is evidence of a speedier adjustment in labor demand. Using household surveys for Lima, the authors also find that mean tenure has fallen since 1992. The fall is larger—and statistically significant—for formal salaried workers than for informal workers.

Cardenas and **Kugler** examine the reduction in firing costs on worker turnover in Colombia. Its labor market reform of 1990, which reduced severance payments substantially, affected worker flows into and out of unemployment and reduced severance payments for all workers hired after 1990 and for those covered by the legislation (formal sector workers). The Colombian Household Surveys provide information about formal and informal sector activity and allow for estimating hazard rates for formal and informal workers, before and after the reform. The results indicate that hazard rates into and out of unemployment increased after the reform for formal sector workers (covered by the legislation) relative to informal workers (uncovered). Moreover, the increase in worker turnover was greater among younger, more educated workers employed in larger firms who were likely to have been affected most by the changes in the legislation.

The U.S. temporary help services (THS) industry grew at 11 percent annually between 1979 and 1995, five times more rapidly than nonfarm employment. Contemporaneously, courts in 46 states adopted exceptions to the common law doctrine of employment at will, limiting employers' discretion to terminate workers and opening them to litigation. **Autor** assesses whether the decline of employment at will and the growth of THS are causally related. To aid the analysis, he considers a simple model of employment outsourcing that shows that firms will respond to externally imposed firing costs by outsourcing positions requiring the least firm-specific skills rather than those with the highest expected termination costs. Autor's analysis indicates that one class of exception, the implied contractual right to ongoing employment, led to 14 to 22 percent growth in excess temporary help in adopting states. Unjust dismissal doctrines did not significantly contribute to employment growth in other business service industries. The decline of employment at will explains as much as 20 percent of the growth of THS between 1973 and 1995 and accounts for 336,000 to 494,000 additional workers employed in THS on a daily basis as of 1999.

Income inequality in Latin America has increased over the past several years. **Attanasio** and **Szekely** ask whether there is a supply-side explanation for this experience. Specifically, they explore whether the dynamics of inequality relate to life cycle or to cohort effects, and they ask what underlying household decisions are behind these cohort and life-cycle patterns. They also assess the role played by labor force participation, fertility, household arrangements, household formation, investment in education, and other related family decisions, and compare these with the role played by changes in the returns to schooling.

Over the last 40 years, Peru has achieved significantly lower fertility and mortality rates, bringing population growth rates down to less than 1.2 percent per year. These improvements have led to a demographic transition with lower dependency ratios. **Saavedra** and **Valdivia** find that household size is now smaller for the younger cohorts, in all but the households with less-educated heads. To explain these differences, they argue that reductions in fertility have not yet reached the less-educated. However, family living arrangements appear to change throughout the life cycle; for example, extended families are more common for households with very young (under 25) or older (over 60) heads. The authors also show that intergenerational family arrangements over time limit the ability of the life cycle hypothesis to explain household saving behavior. Peruvian households, especially the less-educated, smooth consumption over the life cycle, not only through the typical saving-dissaving mechanism, but also by smoothing income. Net cash transfers, or living arrangements between parents and their offspring, play an important role in this income smoothing.

Neal presents an economic model that captures Wilson's general hypothesis — marriage markets matter — while simultaneously fleshing out details of the interactions between sex ratios, male income, welfare generosity, and other factors that may influence nonmarital fertility. Neal's model highlights how marriage markets and government aid programs interact to determine choices about marriage and fertility. It shows how the existence of government aid shapes the effects of changes in marriage market conditions. Neal's model also illustrates how commonly used regression models may yield inferences about the links between marriage market conditions and observed family structures.

Behrman, Sengupta, and **Todd** study the effects of a new antipoverty program in Mexico called PROGRESA that provides families with monetary transfers contingent upon their children's regular attendance at school. The benefit levels are intended to offset the opportunity costs of not sending children to school and vary with

the grade level and gender of the child. The authors show that the program effectively reduces drop-out rates and facilitates progression through the grades, particularly during the transition from primary school to secondary school. Their results also indicate that if children were to participate in the program between ages 6 and 14, the program would increase average educational attainment levels by 0.6 years and increase the share of children attending secondary school by about 19 percent.

Bravo, Contreras, and **Crespi** establish a method of evaluation tailored to training courses for small-scale entrepreneurs. They also develop measures of training success and design a questionnaire. They propose a pilot evaluation; document the selection of the samples (trained by FUNDES Chile and a control group); elaborate on the questionnaire and its application; and finally report their results.

Bravo and **Contreras** then offer empirical evidence on the impact of the introduction of a monetary incentive in the Chile Joven (youth labor training) Program. This program, initiated in 1991, focused on unemployed low-income youths between the ages of 15 and 24. Its goal was to raise the probability of employment of youths through job training and work experience. Starting in 1995, a financial incentive was added: an additional quantity of money went to training organizations for each beneficiary of the program who carried out his work experience under a labor contract in a private firm. The authors estimate that the probability that the beneficiaries will finish the work experience phase of their program is 11 percent. However, after controlling for differences in age, gender, occupational status, educational level, and geographical location of the beneficiaries, and for characteristics of the training received, and differences in the macroeconomic environment in a particular year, the impact of the monetary incentive appears closer to 8 percent. On the other hand, when the authors estimate the impact using Matching Techniques, which allows the construction of a better control group, the impact of the incentive increases to 13 percent — again, measured as the probability of the change in the labor status.

These papers will be printed in a special issue of the *Journal of Development Economics*.

Malaysia

The sixth in a series of country-specific meetings of the NBER Project on Economic and Financial Crises in Emerging Market Countries, directed by NBER President Martin Feldstein and Research Associate Jeffrey A. Frankel, both of Harvard University, took place in Cambridge on February 16. This gathering focused on Malaysia and was organized by Frankel, Dani Rodrik, NBER and Kennedy School of Goverment, and Wing Thye Woo, University of California, Davis. Like earlier NBER meetings on Mexico, Thailand, Brazil, Korea, and Indonesia, this occasion brought together academics, individuals representing the country, international bankers, and government officials in the hopes of developing an in-depth understanding of Malaysia's economic situation.

The day-long meeting was divided into four sessions. In Session 1, a panel consisting of Jomo Kwame Sundaram, University of Malaya, Dwight Perkins, Harvard University, Homi Kharas, the World Bank, and Woo discussed the exchange rate situation in Malaysia prior to mid-1997.

In Session 2, the experts discussed the currency contagion that occurred between July 1997 and August 1998. The panelists were Lin See Yan, LIN Associates, formerly of the Reserve Bank of Malaysia; Anoop Singh, International Monetary Fund; Edwin Truman, Institute for International Economics and formerly of the U.S. Treasury and the Federal Reserve System; and Takatoshi Ito, an NBER Research Associate on leave at the Ministry of Finance of Japan.

In Session 3, panelists Nor Mohd Yakop, the Malaysian Prime Minister's Department, Rodrik, Caroline Atkinson, Council on Foreign Relations and formerly of the U.S. Treasury, and Yung Chul Park, Korea University, considered the consequences of imposition of controls on capital outflows in September 1998.

In the fourth session, Yusuke Horiguchi, International Monetary Fund, Zainal Aznam, Institute of Strategic and International Studies, David Malpass, Bear Sterns Co., and Peter Garber, DeutscheBank Morgan Grenfell, discussed the aftermath of controls in 1999–2000 and the current outlook.

A summary of the other meetings appears on the NBER's web site at **http://www.nber.org/crisis/**. A summary of this meeting will also be provided at that site.

Currency Crisis Prevention

An NBER conference on Currency Crisis Prevention organized by Sebastian Edwards, NBER and University of California, Los Angeles, and Jeffrey A. Frankel, NBER and Harvard University, took place on January 11–13. This conference is part of a larger NBER project on Currency Crises in Emerging Market Countries. More information about the other parts of the project is available at the NBER website at **www.nber.org/crisis**.

The discussion focused on these papers:

Sebastian Edwards, "Does the Current Account Matter?"

Discussant: Alejandro Werner, Bank of Mexico

Luis Felipe Céspedes, New York University; **Roberto Chang,** Rutgers University; and **Andrés Velasco,** NBER and Harvard University, "Balance Sheets, Exchange Rate Regimes, and Credible Monetary Policy"

Discussant: Nouriel Roubini, NBER and New York University

Amartya Lahiri, University of California, Los Angeles, and **Carlos A. Végh,** NBER and University of California, Los Angeles, "Fighting Currency Depreciation: Intervention or Higher Interest Rates?"

Discussant: Eduardo Borensztein, International Monetary Fund

Enrique G. Mendoza, NBER and Duke University, "Credit, Prices, and Crashes: Business Cycles with a Sudden Stop" and "Sudden Stop Economics in an Equilibrium Framework"

Discussant: Joshua Aizenman, NBER and Dartmouth College

Giancarlo Corsetti, Yale University; **Paolo A. Pesenti,** Federal Reserve Bank of New York; and **Nouriel Roubini**, "The Role of Large Players in Currency Crises"

Discussant: Jaume Ventura, NBER and MIT

Linda S. Goldberg, Federal Reserve Bank of New York, "When Is U.S. Bank Lending to Emerging Markets Volatile?" (NBER Working Paper No. 8209)

Discussant: Simon Johnson, MIT

Roberto Rigobon, NBER and MIT, "Contagion: How to Measure It?" (NBER Working Paper No. 8118)

Discussant: Enrique G. Mendoza

Kristin J. Forbes, NBER and MIT, "How Important Is Trade in the International Spread of Crises?"

Discussant: Federico Sturzenegger, Universidad Torcuato Di Tella

Ethan Kaplan, Harvard University, and **Dani Rodrik,** NBER and Harvard University, "Did the Malaysian Capital Controls Work?" (NBER Working Paper No. 8142)

Discussant: Liliana Rojas-Suarez, Institute for International Economics

Rudiger Dornbusch, NBER and MIT, "Was Malaysia Different?"

Discussant: Michael P. Dooley, NBER and University of California, Santa Cruz

Shang-Jin Wei, NBER and Brookings Institution, and **Yi Wu,** Georgetown University, "Negative Alchemy? Corruption, Composition of Capital Flows, and Currency Crises" (NBER Working Paper No. 8187)

Discussant: Martin Feldstein, NBER and Harvard University

Robert Dekle, University of Southern California, and **Kenneth M. Kletzer,** University of California, Santa Cruz, "Domestic Bank Regulation and Financial Crises: Theory and Empirical Evidence from East Asia"

Discussant: Paolo A. Pesenti

Aaron Tornell, NBER and University of California, Los Angeles, "Financial and Monetary Policies in an Economy with Balance Sheet Effects"

Discussant: Charles W. Calomiris, NBER and Columbia University

Anne O. Krueger, NBER and Stanford University, and **Jungho Yoo,** Korean Development Institute, "Chaebol Capitalism and the Currency-Financial Crisis in Korea"

Discussant: Jorge Braga de Macedo, NBER and OECD

An inability to foresee the currency crises of the 1990s led to the development of "crisis early warning models." These models focused on a number of variables, including the level and currency composition of foreign debt, debt maturity, the weakness of the domestic financial sector, the country's fiscal position, its level of international reserves, political instability, and real exchange rate overvaluation. **Edwards** specifically investigates the behavior of the current account in emerging economies and its role, if any, in financial crises. He develops a dynamic model of current account sustainability and bases his empirical analysis on a massive dataset that covers over 120 countries during more than 25 years. He also analyzes important controversies related to the current account, including the extent to which current account deficits crowd out domestic savings.

Céspedes, Chang, and **Velasco** consider optimal interest rate policies in an open economy model, with bal-

ance sheet effects and overlapping wage contracts. They conclude that the optimal "flexible inflation targeting" policy under discretion involves a floating exchange rate and the partial reaction of home interest rates to external shocks. This policy yields higher welfare than one of strictly fixed nominal exchange rates. Other optimal inflation targeting policies under discretion also dominate fixed rates. These results hold in spite of the credibility advantage of fixing, and in spite of the presence of dollar liabilities and balance sheet effects.

Central banks typically respond to pressures on their currencies by a combination of foreign exchange market intervention and interest rate changes. **Lahiri** and **Végh** build a simple model of a small open economy in order to understand this observed policy response and to investigate the optimal mix of these two policy instruments. Their model has two crucial features. First, the presence of nominal wage rigidities provides an incentive for the policymaker to prevent nominal exchange rate fluctuations. Second, the dependence of some firms on bank finance implies that higher domestic interest rates extract an output cost. The output effect of interest rate changes implies that, in general, policymakers would choose some combination of interest rate policy and direct market intervention to insulate the economy. Moreover, in the presence of costly intervention, the optimal policy response also involves allowing some currency fluctuation.

"Sudden stops" of capital inflows during emerging-markets crises have triggered unusually large declines in private expenditures, production, asset prices, and prices of nontradeable goods relative to tradeable goods. **Mendoza** suggests that these occurrences may be features of the equilibrium dynamics of a flexible-price economy with imperfect credit markets. Sudden stops occur when real or policy-induced shocks make liquidity constraints suddenly binding. Sudden stops are not reflected in long-run business cycle co-movements, but even so, their welfare costs can be significant. Mendoza offers an asset-pricing variation of his model as one explanation of the asset-pricing implications of sudden stops.

During recent episodes of financial turmoil, both policymakers and international institutions have voiced concerns about aggressive and possibly manipulative practices by high-leveraged institutions and large traders. **Corsetti, Pesenti,** and **Roubini** address these concerns by considering the role of large players in currency crises. The presence of a large trader may increase a country's vulnerability to a crisis. As small investors become more aggressive in their trading, a large trader's impact on the market depends not only on size, but also on reputation for quality of information. The authors present new econometric evidence on the correlation between exchange rate movements and the portfolio positions of big players, and undertake a comparative analysis of several recent crisis episodes in Thailand, Hong Kong, Malaysia, Australia, and South Africa. This evidence is largely consistent with the theory and does not contradict the conventional wisdom about aggressive practices by large traders. However, the question of whether and to what extent such practices are destabilizing requires further analysis.

Using bank-specific data on U.S. bank claims on individual foreign countries since the mid-1980s, **Goldberg** characterizes the size and portfolio diversification patterns of the U.S. banks engaging in foreign lending. She also explores the determinants of fluctuations in U.S. bank claims on a broad set of countries. Goldberg finds that U.S. bank claims on Latin American and Asian emerging markets, and on industrialized countries, are sensitive to U.S. macroeconomic conditions. When the United States grows rapidly, there is substitution between claims on industrialized countries and claims on the United States. The pattern of response of claims on emerging markets to U.S. conditions differs across banks of different sizes and across emerging market regions. Moreover, Goldberg finds that unlike U.S. bank claims on industrialized countries, claims on emerging markets are not highly sensitive to local country GDP and interest rates.

The empirical literature on contagion has mainly used daily stock markets, interest rates, and exchange rates to measure the propagation of shocks across countries. **Rigobon** evaluates some of the techniques that frequently have been used to measure contagion. He argues that if the data suffer from heteroskedasticity (conditional or not), omitted variables, and simultaneous equation problems, then the conclusions drawn from most of the procedures could be biased. He therefore summarizes two new procedures developed to cope with these problems. One is aimed at testing for the stability of parameters, while the other estimates the contemporaneous relationship across countries consistently. Finally, Rigobon estimates the contemporaneous transmission mechanism between emerging stock markets and bond markets. He finds that regional variables, as well as trade linkages, provide one explanation for the strength of the propagation of shocks across bond markets, but these variables are not as important in stock markets.

Forbes examines the importance of trade in the international transmission of financial crises. She explains that trade can transmit crises via three distinct, and possibly counteracting, channels: a competitiveness effect (when changes in relative prices affect a country's ability to compete abroad); an income effect (when a crisis affects growth and the demand

for imports); and, a bargain effect (when a crisis reduces import prices and acts as a positive supply shock). She then develops a series of statistics that measure each of these trade effects for a sample of 48 countries during 16 crises between 1994 and 1999. Of particular interest is the competitiveness statistic, which calculates how each crisis affects exports from other countries. Her results suggest that countries that compete with exports from a crisis country and also export to the crisis country (that is, experience both the competitiveness and income effects) had significantly lower stock market returns than other countries. Although trade does not fully explain stock market returns during recent crises, these trade effects are economically important and have a much larger impact than other macroeconomic variables.

The Asian financial crisis of 1997–8 wreaked havoc with the economies of some of the world's most successful performers. Three of the worst affected countries (Thailand, South Korea, and Indonesia) were forced to call in the International Monetary Fund (IMF). In return for financial assistance, these countries committed to many structural reforms. Malaysia took a different path, though. Instead of going to the IMF, Malaysian authorities imposed sweeping controls on capital-account transactions, fixed the exchange rate at a rate that represented a 10 percent appreciation relative to the level at which the ringgit had been trading, cut interest rates, and embarked on a policy of reflation. **Kaplan** and **Rodrik** ask whether the Malaysian gamble paid off. While Malaysia has recovered nicely since the crisis, so have Korea and Thailand, two countries that took the orthodox path. They conclude that some of the more pessimistic prognostications about the consequences of capital controls have not been borne out, though.

In September 1998, Malaysia stepped up its restrictions on capital outflows and mandated the repatriation of offshore holdings in order to defend the currency and to free monetary policy from high offshore rates and low rates at home. **Dornbusch** asks whether Malaysia's performance was different from that of other crisis countries. Specifically, did the imposition of capital controls make for a less-hard landing? Dornbusch believes not. The controls were imposed late in the Asian crisis, when the situation in crisis countries had started to improve. Malaysia looked no different from the averages of Korea, Thailand, Indonesia, and the Philippines. However, Malaysia's balance sheet situation was so much worse than that of the other countries that perhaps, if not for the controls, the outcome would have been far worse. Dornbusch reluctantly concludes that Malaysia is not a good candidate for examining the capital controls question; there is no evidence that controls did short-term damage, nor that they generated short-term benefits. However, there is ample evidence that capital controls shifted attention away from the leadership struggle.

Crony capitalism and self-fulfilling expectations by international creditors are often suggested as two rival explanations for currency crisis. **Wei** and **Wu** examine a possible link between the two that so far has not been explored: corruption may affect a country's composition of capital inflows in a way that makes it more likely to experience a currency crisis triggered or aided by international investors' self-fulfilling expectations. Using data on bilateral foreign direct investment (FDI) and bilateral bank loans, the authors find that corrupt countries tend to have a particular composition of capital inflows that is relatively light in FDI. Earlier studies have indicated that a country with such a capital inflow structure is more likely to run into a subsequent currency crisis (in part through self-fulfilling expectations of the international creditors). Thus, the authors illustrate one particular channel through which crony capitalism can increase the chance of a currency or financial crisis.

Dekle and **Kletzer** develop a model of the domestic financial intermediation of foreign capital inflows based on agency costs. In their model, a crisis evolves endogenously as the banking system becomes increasingly vulnerable through the renegotiation of firm debts. Firm revenues are subject to idiosyncratic firm-specific technology shocks, but there are no aggregate shocks. The model generates dynamic relationships between foreign capital inflows, domestic investment, firm debt, and the value of firm and bank equity. Prior to a crisis, foreign capital inflows and bank debt rise relative to investment and domestic production. The aggregate portfolio of the banking sector deteriorates, and the total value of bank equities declines progressively in proportion to the portfolio for goods producers. The authors compare the model's implications for the behavior of the economy before and after crisis to the experience of five East Asian countries. The comparison of three crisis countries —Korea, Thailand, and Malaysia — to two near crisis countries — Taiwan and Singapore — lend support to the model.

Recent crises frequently have erupted in emerging markets without a major external shock and with seemingly strong macroeconomic fundamentals. In these episodes, a small incipient reduction in capital inflows has been followed by a significant real exchange rate depreciation. Since debt was largely denominated in foreign currency, the depreciation induced widespread bankruptcies and a collapse of new lending. **Tornell** presents a conceptual framework for evaluating some of the seemingly destructive financial and monetary policies implemented in emerging markets. He emphasizes that the policies implemented in

countries that have experienced crises reflect neither sheer incompetence nor outright corruption. Moreover, he argues that some of the policies adopted were second-best-optimal given the environment faced by emerging economies. Crises were simply bad draws that did not have to happen; they were the price that had to be paid to attain faster growth.

Krueger and **Yoo** focus on the Korean experience and trace the roles of the chaebol, the earlier history of credit rationing and the buildup of domestic credit and foreign indebtedness prior to the crisis, the opening of the capital account, and the impact of exchange rate depreciation on financial crisis. The authors stress the role of each of the key variables. For example, if exchange rate depreciation were the largest factor leading to the deterioration of the banks' portfolios, then resorting to a genuinely floating exchange rate or preventing uncovered liabilities denominated in foreign exchange would greatly reduce the likelihood of future crises. Likewise, if bank lending practices resulted in a rapidly increasing proportion of nonperforming loans in the banking system, even if the exchange rate was not a significant factor, then improving bank lending practices as a preventive measure for future crises becomes much more important. And, if rigidities in the banking or financial system resulting from failure to liberalize or regulate sufficiently were a major contributor, then the policy lessons might focus on the urgent need for liberalizing and strengthening banking and financial systems in emerging markets.

These papers will be collected in a conference volume, *Preventing Currency Crises in Emerging Markets*, forthcoming from the University of Chicago Press and edited by Edwards and Frankel. In advance of publication, some of the papers will be available at "Books in Progress" on the NBER's web site, **www.nber.org**.

Conference on E-Commerce

The NBER's first Conference on E-Commerce, organized by Research Associates Severin Borenstein, University of California, Berkeley, and Garth Saloner, Stanford University, was held in Bodega Bay, California on January 26 and 27. The following papers were discussed:

Dennis W. Carlton and **Judith A. Chevalier,** NBER and University of Chicago, "Free Riding and Sales Strategies for the Internet" (NBER Working Paper No. 8067)

Discussant: David Genesove, NBER and Hebrew University of Jerusalem

Robert H. Gertner, NBER and University of Chicago, and **Robert S. Stillman,** Lexecon, Inc., "Vertical Integration and Internet Strategies in the Apparel Industry"

Discussant: Barry J. Nalebuff, Yale University

Steven N. Kaplan, NBER and University of Chicago, and **Luis Garicano**, University of Chicago, "The Effects of Business-to-Business E-Commerce on Transaction Costs" (NBER Working Paper No. 8017)

Discussant: Frank A. Wolak, NBER and Stanford University

Paul Resnick, University of Michigan, and **Richard J. Zeckhauser,** NBER and Harvard University, "Trust among Strangers in Internet Transactions: Empirical Analysis of eBay's Reputation System"

Discussant: Garth Saloner

Rama Katkar, Northwestern University, and **David H. Lucking-Reiley,** Vanderbilt University, "Public versus Secret Reserve Prices on eBay Auctions: Results of a Pokémon Field Experiment"

Discussant: Robert H. Porter, NBER and Northwestern University

Erik Brynjolfsson and **Michael D. Smith,** MIT, "Consumer Choice Behavior at Internet Shopbot"

Discussant: Catherine D. Wolfram, NBER and University of California, Berkeley

Florian Zettelmeyer, University of California, Berkeley; **Fiona Scott Morton,** NBER and Yale University; and **Jorge Silva-Risso,** J. D. Power and Associates, "Internet Car Retailing" (NBER Working Paper No. 7961)

Discussant: Andrea Shepard, NBER and Stanford University

Karen B. Clay and **Eric D. Wolff,** Carnegie Mellon University, and **Ramayya Krishnan,** Earlham College, "Pricing Strategies on the Web: Evidence from the Online Book Industry"

Discussant: Hal R. Varian, University of California, Berkeley

Austan Goolsbee, NBER and University of Chicago, "Competition in the Computer Industry: Online versus Internet"

Discussant: Scott Stern, NBER and MIT

Carlton and **Chevalier** examine manufacturers' decisions about whether and how to offer their products for sale over the Internet, focusing on three types of products: fragrances, DVD players, and side-by-side refrigerators. Their evidence suggests that manufacturers who limit distribution in the physical world also use various mechanisms to limit distribution online. In particular, these manufacturers attempt to prevent the sale of their products by online retailers who sell at deep discounts. Furthermore, the authors show that

manufacturers who distribute their goods directly through manufacturer web sites tend to charge very high prices for the products.

Gertner and **Stillman** study how firms in the apparel industry have adapted to the Internet. They choose apparel because it is one of the leading categories of online sales and because various types of organizational form exist within the industry. For example, firms like The Gap are vertically integrated, but many other brands are owned by vendors and sold mainly through department stores and other third party retailers. Using data from 30 firms, the authors find that vertically integrated specialty retailers tended to start online sales sooner, regardless of whether the firm had pre-existing catalog operations. They also find that products of vertically integrated specialty retailers and catalog companies are more available online than the products of nonintegrated vendors.

Kaplan and **Garicano** study the changes in transaction costs related to the introduction of the Internet in transactions between firms (that is, business-to-business [B2B] e-commerce). They argue that B2B e-commerce likely reduces coordination costs and increases efficiency. The authors classify these efficiencies into three broad categories: process improvements, marketplace benefits, and indirect improvements. At the same time, B2B e-commerce affects incentive costs and possibly informational asymmetries. Using detailed data from one Internet-based firm, and less detailed data for one other firm, they find that process improvements and marketplace benefits are potentially large. There is little evidence that informational asymmetries are more important in the electronic marketplace than the existing physical ones, though.

One of the earliest and best-known Internet reputation systems is run by eBay, which gathers comments from buyers and sellers after each transaction. **Resnick** and **Zeckhauser** examine a large dataset from 1999 that reveals several interesting features of this system. For example, feedback was provided more than half the time, and it was almost always positive. Reputation profiles predicted future performance, but the net feedback scores that eBay displayed encouraged overly positive assessments of reputations and were far from the best predictor available. Further, although sellers with better reputations were more likely to sell their items, they enjoyed no boost in price, at least for the two sets of items that the authors examined. Finally, there was a high correlation between buyer and seller feedback, suggesting that the players both reciprocate and retaliate.

Sellers in eBay auctions have the opportunity to choose both a public minimum bid amount and a secret reserve price. **Katkar** and **Lucking-Reilly** ask whether the seller is made better or worse off by setting a secret reserve above a low minimum bid, as opposed to making the reserve public by using it as the minimum bid. In a field experiment, they auction 50 matched pairs of Pokémon cards on eBay, half with secret reserves and half with equally high public minimum bids. The authors find that secret reserve prices make sellers worse off by reducing the probability of the auction resulting in a sale, deterring serious bidders from entering the auction, and lowering the expected transaction price of the auction. They also show that some sellers choose to use secret reserve prices for reasons other than increasing their expected auction prices.

Internet shopbots allow consumers almost effortlessly to compare prices and service levels of dozens of competing retailers. **Brynjolfsson** and **Smith** analyze the choices of 20,227 shopbot consumers who choose among 33 competing retailer offers for books over a sample period of 69 days. They find that consumers are remarkably sensitive to how the total price for goods is allocated among the item price, the shipping cost, and tax; consumers are also quite sensitive to the ranking of retailer offerings with respect to price. Even in this setting, brand is important; in particular, consumers appear to use brand as a proxy for a retailer's credibility in terms of noncontractible aspects of the product, such as shipping time.

Zettelmeyer, Morton, and **Silva-Risso** investigate the effect of Internet car referral services on dealer pricing of automobiles in California. Using data from J. D. Power and Associates and Autobytel.com, a major online auto referral service, they compare online transaction prices to regular "street" prices. They find that the average customer of this online service pays approximately 2 percent less for a car, which corresponds to about $450 for the average car. Fifteen percent of the savings is attributable to making the purchase at a low-price dealership affiliated with the web service. The remaining 85 percent of the savings seem to be a result of the bargaining power of the referral service and the lower cost of serving an online consumer. Consumers who indicate that they are ready to buy within two days of going online pay even lower prices. Consumers who use the web do better than at least 61 percent of offline consumers, the authors conclude.

Using data collected between August 1999 and January 2000 covering 399 books, including New York Times bestsellers, **Clay**, **Krishnan**, and **Wolff** examine pricing by 32 online bookstores. Over the sample period, they find no change in either price or price dispersion. The *New York Times* bestsellers have the lowest prices as a fraction of the publisher's suggested price, and the random books have the highest prices. The authors observe differentiation (or attempted differentiation) in selec-

tion in certain categories, overall selection, and price. A few online stores, usually branches of specialty physical stores, focus on depth of offering within a particular category such as computer books, children's books, or religious books. Other full-line stores focus on overall selection, carrying 90 percent or more of the books in the sample. For those offering low prices, most stores focus on marginally undercutting Amazon, usually by 10 cents or less. As of January 2001, some of these stores have gone out of business or changed their business model, though, and the surviving ones still appear to be at risk.

Using a new data source on computer purchases of almost 30,000 people, **Goolsbee** estimates the relative price sensitivity of individuals' choice of whether to buy a computer online or in a retail store. Goolsbee finds that the decision to buy online is sensitive to the relative price of computers in retail stores. Conditional on buying a computer, the elasticity of buying online with respect to retail store prices is about 1.5.

Health and Labor Force Participation over the Life Cycle: Evidence from the Past

The NBER held a conference on "Health and Labor Force Participation over the Life Cycle: Evidence from the Past" in Cambridge on February 2 and 3. Dora L. Costa, NBER and MIT, was the organizer and chose the following papers for discussion:

Joseph P. Ferrie, NBER and Northwestern University, "The Poor and the Dead: Socioeconomic Status and Mortality in the United States, 1850–60"

Discussant: Richard H. Steckel, NBER and Ohio State University
Medical Discussant: Irwin Rosenburg, Tufts University

Chulhee Lee, Seoul National University, "Exposure to Disease, and Later Health and Mortality: Evidence from Civil War Medical Records"

Discussant: Ann McCants, MIT
Medical Discussant: Nevin Scrimshaw, NBER and United Nations University

Sven E. Wilson, Brigham Young University, and **Clayne L. Pope**, NBER and Brigham Young University, "The Height of Union Army Recruits: Family and Community Influences"

Discussant: Claudia Goldin, NBER and Harvard University
Medical Discussant: Irwin Rosenburg

Daniel Scott Smith, University of Illinois, Chicago, "Seasoning, Disease Environment, and Conditions of Exposure: New York Union Army Regiments and Soldiers"

Discussant: Michael R. Haines, NBER and Colgate University
Medical Discussant: Charles Holmes, Partners HealthCare System

Werner Troesken and **Patricia Beeson**, University of Pittsburgh, "The Significance of Lead Water Mains in American Cities: Some Historical Evidence"

Discussant: Rebecca Menes, NBER and George Mason University
Medical Discussant: Nevin Scrimshaw

Sven E. Wilson, "The Prevalence of Chronic Respiratory Disease in the Industrial Era: The United States, 1895–1910"

Discussant: John Brown, Clark University
Medical Discussant: Charles Holmes

Mario Sanchez, University of Chicago, "Geographical Mobility and the Effect of Migration on the Life Expectancy of Union Army Veterans"

Discussant: Robert Margo, NBER and Vanderbilt University

Chen Song, University of Chicago, and **Louis Nguyen**, Washington University, St. Louis, "The Effect of Hernias on the Labor Participation of Civil War Veterans"

Discussant: Peter Blanck, University of Iowa

Tayatat Kanjanapipatkul, University of Chicago, "The Pensions and Labor Force Participation of Civil War Veterans and Nonveterans"

Discussant: William J. Collins, NBER and Vanderbilt University

Ferrie describes a new project that links individuals from the Mortality Schedules to the 1850 and 1860 Population Schedules of the federal censuses. This makes it possible to assess the link between individual and household characteristics and the probability of dying. The results reveal a strong and negative relationship between household wealth and mortality in 1860 and a somewhat weaker negative relationship between occupational status and mortality in 1850. The findings suggest that even when the U.S. population was largely rural and agricultural, changes in the distribution of income and wealth would have had a large impact on mortality rates and life expectancies.

Lee examines the effects of socio-

economic factors and local disease environments on the medical experiences of Union army recruits while in service. The results suggest that prior exposure to unfavorable epidemiological environments reduced the chances of contracting and dying from disease while in service. Farmers and rural residents, who were healthier on average prior to enlistment because of their greater isolation from other people, were more likely to succumb to illness and to die from disease than nonfarmers and urban dwellers. Native recruits were subject to a greater risk of suffering illness than were foreigners, who were exposed to more infectious diseases during the course of immigration. More significantly, recruits from a county with a higher child death rate were less likely to contract disease than those from a low-mortality county. A closer examination of cause-specific mortality suggests that the most important link between the extent of prior exposure to disease and later health is the different degree of immunity against pathogens. An alternative explanation is that people who lived in an unhealthy environment were better aware of how to avoid contracting disease than those with little experience of disease. The relationship between the extent of exposure to disease prior to enlistment and health while in service was stronger for the regiments organized from the Midwest and mid-Atlantic states and weaker for the regiments from New England and the South, presumably reflecting the regional differences in the severity of military missions, the extent of urbanization, and climate.

Wilson and **Pope** explore the early-life determinants of adult stature using a sample of 5,692 Union army recruits who were successfully linked to the U.S. Census of 1850 and were still children at that date. Potential early-life correlates of height include family-level factors (father's wealth, occupation, migration history, maternal literacy, and family size) and community-level factors (population, percent foreign born, school attendance rate, literacy rate, mortality rate, and level of manufacturing). The authors use county-level aggregate data to proxy the effect of community-level forces; they find particularly strong negative effects of population and the level of manufacturing. They also confirm previous work that shows the advantages of children growing up on farms, but they find that parental wealth has only a very modest effect. Somewhat surprisingly, the effect of county population is particularly strong within the farming class; this suggests the importance of exposure to disease rather than access to high-quality food that comes with population density. The results also reveal significant catch-up growth between ages 16 and 20, with growth in this sample occurring at twice the rate that it occurs today. Thus, children in the antebellum North not only attained a smaller stature than modern populations, but also grew at a much slower average rate.

Smith analyzes a variety of individual and collective influences on disease mortality for 7,409 New York State soldiers and 258 regiments or other military organizations during the Civil War. He finds that individual soldiers and units shared the mortality experience associated with common place of origin, region of service during the war, and regiment. For example, soldiers from rural areas and men whose regiments served in the lower Mississippi Valley or along the Gulf of Mexico had elevated death rates from disease. Men who became Confederate prisoners of war suffered extremely high disease mortality. Smith argues that a seasoning process — that is, moving from one location to another enhancing the risk of death during the first period of residence in a new environment — was at work, because death rates declined with duration of service in the military. Background characteristics had the greatest influence on mortality during the initial year in the army. Finally, "disease environments" could be quite small. Enlisted men died from disease at three times the rate of officers. Since officers lived apart from the men, this differential is consistent with an emphasis on shared circumstances, rather than on individual factors.

Troesken and **Beeson** explore how many U.S. cities used lead water delivery services during the late nineteenth and early twentieth centuries and what factors influenced that choice. Their results indicate that 70 percent of all cities with populations greater than 30,000 in 1900 used lead service mains exclusively or in combination with some other type of main. The probability of using lead water mains was positively correlated with city size, a Midwestern location, and public ownership (publicly owned water companies used lead more often than did private water companies). The authors also explore how the use of lead service mains affected morbidity around the turn of the twentieth century. After deriving data from a large sample of Union Army veterans whose health was assessed when they applied for pensions, Troesken and Beeson find that Union army recruits living in cities that used lead service mains experienced more ailments associated with low levels of lead exposure, such as increased dizziness and hearing problems. They did not suffer from more serious ailments associated with high levels of lead exposure, such as kidney problems, though.

In the late nineteenth and early twentieth centuries, several trends — including very rapid urbanization and industrialization and a tenfold increase in cigarette production

between 1880 and 1910 — may have significantly affected the epidemiology of chronic respiratory diseases. **Wilson** uses actual physician diagnoses from 1895–1910 to characterize the prevalence of chronic conditions in both the upper and lower respiratory system, including asthma and chronic obstructive pulmonary disease (COPD), which is indicated as either emphysema or chronic bronchitis. Taking data from the medical exams performed on over 17,000 Union army veterans as they entered the pension system and applied for increases in support, he finds that the age-specific prevalence of respiratory disease (as measured by the percent of the sample ever diagnosed) among the Civil War veterans increased sharply between 1895 and 1910. Prevalence of both upper and lower respiratory conditions in the Civil War veterans generally increased with the size of the veterans' city. Farmers had higher rates of illness, probably because of lower mortality, but also because they were exposed to a variety of organic agents that may have caused respiratory disease. There were strong regional differences in the prevalence of upper respiratory disease (as in modern times), with a lower prevalence in the New England and the mid-Atlantic states. Other than the high rates among farmers, occupational differences in disease were not pronounced, although laborers had consistently lower rates of COPD and asthma than artisans or professionals did.

Sanchez discusses the Union Army Migration Data set, a panel dataset of postbellum residential histories for 17,017 Union army veterans. The data, obtained from information that the recruit or his family provided to the Pension Bureau, are fairly representative of northern white males of military age during the Civil War. To learn how mobile postbellum Americans were, Sanchez estimates a rate of mobility across the life cycle. Integrating this rate over a ten-year interval, his results compare to those found using samples linked across censuses of population. Sanchez then tests the hypothesis that the migration experience influenced the life expectancy of those who moved by exposing migrants to a stressful environment. He confirms that, after controlling by age, occupation, and urban-rural status of the location of origin, the hazard risk of dying was 28 percent higher for migrants.

Song and **Nguyen** study workers' decisions to retire when confronted with health problems. Using the Union Army Census Data by linking the 1900 Census to the 1910 Census, and then using a groin hernia as a proxy for poor health, the authors find only weak evidence of the influence of hernias on the labor force decisions of the Civil War veterans. Age and monthly pension awards were both significantly positive predictors for retirement, though. Strong regional effects on retirement for veterans in the West and the Midwest relative to those residing in the Northeast were estimated, but there seemed to be no difference in the propensity to retire between veterans in the less versus more manually demanding occupations. These findings suggest that the presence of a groin hernia did not influence labor force decisions as much as age, wealth, and regional factors.

Kanjanapipatkul examines the impact of Civil War pensions on the labor force participation of the war's veterans and nonveterans. There is a substantial difference in the participation rate among the pensioners, closely corresponding to the variation in pension income. Pensions account for as much as a 15 percent reduction in the participation rate. The author also finds a significant impact of health and occupation, which supports previous findings about the declining elasticity of retirement with respect to pensions. Furthermore, a comparison of the participation rate between veterans and nonveterans reveals a strong regional difference in retirement behavior. The lower participation rate of Union veterans who received the pensions was not caused only by the pensions, but also by the lower participation rates in the northern states.

These papers and discussions will be published by the University of Chicago Press in an NBER Conference Volume. Its availability will be announced in a future issue of the NBER *Reporter*.

Bureau News

NBER Researchers Head to Washington

NBER Research Associate R. Glenn Hubbard, a professor of economics and finance at Columbia University and its Graduate School of Business, was nominated by President Bush to chair the Council of Economic Advisers. Hubbard received his Ph. D. in Economics from Harvard University in 1983, taught at Northwestern University until 1988, and then joined the Columbia economics faculty. He also served as deputy assistant secretary of the U.S.Treasury Department in 1990–1.

Lawrence Lindsey, President Bush's chief adviser on economic issues during the campaign, was also an NBER researcher after receiving his doctorate in economics from Harvard. He now heads the National Economic Council.

President Bush has announced his intention to nominate NBER Research Associate John B. Taylor, currently the Mary and Robert Raymond Professor of Economics at Stanford University, as Under Secretary of Treasury for International Affairs. Taylor was a member of the Council of Economic Advisers in 1989–91.

The President also has announced his intention to nominate NBER Research Associate Mark B. McClellan, a professor of economics at Stanford University, as a member of the Council of Economic Advisers and an adviser to the National Economic Council for health care policy.

Other NBER researchers are expected to be appointed to economic posts in the Bush Administration in the coming months.

TIAA-CREF Awards Go to NBER Researchers

The TIAA-CREF Institute's fifth annual Paul A. Samuelson Award for Outstanding Scholarly Writing on Lifelong Financial Security has been given to NBER Faculty Research Associate Nicholas Barberis of the University of Chicago's Graduate School of Business for a study cautioning investors that the long-term performance of the stock market and the expected returns from equities are more uncertain than is generally believed. His paper, "Investing for the Long Run When Returns Are Predictable," was published in the *Journal of Finance* in February 2000.

The Samuelson Award is determined by an independent panel of judges and is administered by the TIAA-CREF Institute, the research and educational arm of TIAA-CREF. The Institute's fields of interest include pensions and retirement; corporate governance; investment products and strategy; higher education financing and trends; health, life, and long-term care insurance; and financial literacy. The award was named after Nobel Prize winner Paul Samuelson in honor of his achievements in the field of economics, as well as for his service as a CREF trustee from 1974–85. It carries a $20,000 prize.

The judges also awarded Certificates of Excellence to the authors of two books: NBER Research Associates Price V. Fishback and Shawn E. Kantor, University of Arizona, for *A Prelude to the Welfare State: The Origins of Workers' Compensation*, published by the University of Chicago Press; and NBER Research Associate John B. Shoven, Stanford University, and coauthor Sylvester J. Schieber, Watson Wyatt Worldwide, for *The Real Deal: The History and Future of Social Security*, published by the Yale University Press. Each of these authors received a $1,000 prize.

The awards were presented by John H. Biggs, TIAA-CREF chairman, president, and CEO, at a January 5, 2001, reception held at the Allied Social Science Association's annual meeting in New Orleans.

Economic Fluctuations and Growth

The NBER's Program on Economic Fluctuations and Growth, which is directed by Robert E. Hall of Stanford University, met on February 3 at the Federal Reserve Bank of San Francisco. Ricardo Caballero, NBER and MIT, and John Cochrane, NBER and University of Chicago, organized the meeting and chose these papers for discussion:

Aart Kraay, Norman Loayza, and **Luis Serven,** World Bank, and **Jaume Ventura,** NBER and MIT, "Country Portfolios" (NBER Working Paper No. 7795)

Discussant: Fernando E. Alvarez, NBER and University of Chicago

Douglas W. Diamond and **Raghuram G. Rajan,** NBER and University of Chicago, "Liquidity Shortages and Banking Crises"

Discussant: Nobuhiro Kiyotaki, NBER and London School of Economics

Jeremy Greenwood and **Mehmet Yorukoglu,** University of Rochester, and **Anath Seshadri,** University of Wisconsin, "Engines of Liberation"

Discussant: Robert J. Gordon, NBER and Northwestern University

Tobias J. Moskowitz and **Annette Vissing-Jorgensen,** University of Chicago, "The Private Equity Puzzle"

Discussant: Deborah J. Lucas, NBER and Northwestern University

Harold L. Cole and **Lee E. Ohanian,** University of California, Los Angeles, "New Deal Policies and the Persistence of the Great Depression: A General Equilibrium Analysis"

Discussant: Alan C. Stockman, NBER and University of Rochester

Ellen R. McGrattan and **Edward C. Prescott,** Federal Reserve Bank of Minneapolis, "Taxes, Regulations, and Asset Prices"

Discussant: Robert E. Hall

Kraay, Loayza, Serven, and **Ventura** ask how countries hold their financial wealth. They construct a database of 68 countries' claims on foreign and domestic capital and international borrowing and lending from 1966 to 1997. The authors find that a small amount of capital will flow from rich countries to poor countries. Further, countries' foreign asset positions are remarkably persistent and generally take the form of foreign loans rather than foreign equity. In the presence of reasonable diminishing returns and production risk, the authors show that the probability that international crises will occur twice a century is enough to generate a set of country portfolios that are roughly consistent with the data.

Diamond and **Rajan** examine the effects of shortages of liquid assets on a banking system. They characterize the kinds of problems that can arise and the types of interventions that might be appropriate. They also point out the dangers of the wrong kind of intervention, such as infusing capital when the need is for liquidity, as well as the practical difficulty of telling what is needed in some situations.

Greenwood, Yorukoglu, and **Seshadri** examine the impact of the consumer durable goods revolution that began at the dawn of the last century. They argue that this revolution liberated women from the home. After developing a model of household production in which households must decide whether to adopt the new technologies and whether a married woman should work, they conclude that this model explains the rise in married female labor-force participation that occurred in the last century.

Moskowitz and **Vissing-Jorgensen** document that investment in private equity is extremely concentrated. Yet despite the very poor diversification of entrepreneurs' portfolios, the authors find that the returns to private equity are similar to the returns on public equity. Given the large premium required by investors in public equity, why do households willingly invest substantial amounts in a single privately-held firm with a worse risk-return tradeoff? The authors conclude that private nonpecuniary benefits of control must be large or entrepreneurs must greatly overestimate their probability of success.

There are two striking aspects of the recovery from the Great Depression in the United States: the recovery was very weak and real wages in several sectors rose significantly above trend. **Cole** and **Ohanian** evaluate whether New Deal cartelization policies designed to limit competition among firms and increase labor bargaining power can explain the persistence of the Depression. They develop a model of the intra-industry bargaining process between labor and firms that occurred with these policies. They conclude that New Deal cartelization policies are an important factor in accounting for the post-1933 Depression. Further, the key depressing element of New Deal policies was not collusion per se, but rather the link between paying high wages and collusion.

U.S. stock prices have risen much faster than GNP during the postwar period. Between 1960 and 2000, the value of equity relative to GNP more than doubled. **McGrattan** and **Prescott** use a standard growth model to show that economic theory predicts this rise in equity prices. Changes in taxes, primarily in taxes on dividends, account for the large change in equity prices. Theory also can account for the fact that stock returns have been much higher than bond returns over the postwar period.

Industrial Organization

The NBER's Project on Industrial Organization, directed by Nancy L. Rose of Stanford University, met at the Bureau's California office on February 10. Rose and her co-organizer, Susan Athey of NBER and MIT, chose the following papers for discussion:

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

Discussant: Robert Porter, NBER and Northwestern University

Philip Leslie, University of California, Los Angeles, and **Ginger Jin**, University of Maryland, "The Effects of Disclosure Regulation: Evidence from Restaurants"

Discussant: Daniel Kessler, NBER and Stanford University

Brian Viard, Stanford University, "Do Switching Costs Make Markets More or Less Competitive? The Case of 800-Number Portability"

Discussant: Chris Knittel, Boston University

Alan T. Sorensen, University of California, San Diego, "Price Dispersion and Heterogeneous Consumer Search for Retail Prescription Drugs"

Discussant: Florian Zettelmeyer, University of California, Berkeley

Margaret Slade, University of British Columbia, "Assessing Market Power in U.K. Brewing"

Discussant: Steven T. Berry, NBER and Yale University

Chevalier and her coauthors examine the retail and wholesale prices of a large supermarket chain in Chicago over seven and a half years. They show that prices tend to fall during the seasonal demand peak for a product and that changes in retail margins explain most of those price changes. In other word, markups are counter cyclical. The pattern observed in this data is consistent with "loss leader" models of retailer pricing and advertising competition. Manufacturer behavior plays a more limited role in the counter-cyclicality of prices.

Jin and **Leslie** examine the effect on firm behavior of increased product information to consumers. They show that mandatory disclosure of hygiene grades – required by Los Angeles County in 1998 – causes restaurants to increase hygiene quality by an average of 5.3 percent. They find little difference between these results and those obtained with voluntary but verifiable disclosure. Economic incentives drive these results: average restaurant revenue is higher because of the introduction of grade cards, and the increase in revenue is higher for restaurants with better hygiene quality grades.

Before portability of 800, or toll free, phone numbers, a customer had to change numbers to change service providers. This imposed significant switching costs on users, who generally invested heavily to publicize these numbers. In May 1993, a new database made 800-numbers portable. **Viard** uses contracts for virtual private network (VPN) services to test how AT&T adjusted its prices for toll-free services in response to portability. He finds that AT&T reduced margins for toll-free calls (both switched and dedicated) under VPN contracts as the portability date approached, implying that the switching costs under non-portability made the market less competitive. Portability also lowered margins for toll services because of cross-subsidization across services within contracts. Viard's results suggest that, despite toll-free services growing rapidly during this time period, AT&T's incentive to charge a higher price to "locked-in" consumers exceeded its incentive to capture new consumers in the high switching costs era of non-portability.

Sorensen uses detailed data on retail pharmacy transactions to make inferences about the nature and intensity of consumer search for prescription drugs. He estimates that for a typical prescription, approximately 10 percent of consumers price shop. However, variation in this estimated search intensity across drugs is substantial and appears to be consistent with explanations based on rational search. For example, price shopping is more prevalent for maintenance medications than for one-time purchases, presumably because the benefits of finding a low price are magnified for prescriptions that are purchased repeatedly. The cost of conducting an exhaustive price search is about $15 for the average consumer, and search costs are substantially lower among females than males.

Slade examines market power in U.K. brewing, an industry that has witnessed a number of recent mergers and has been scrutinized by both U.K. and EU authorities. She estimates two classes of demand equations and approximates marginal costs in three different ways. Finally, she compares various notions of industry equilibrium. It turns out that the most important decision from the point of view of market-power assessment is the choice of demand model. Different classes of demand equations yield

very different predictions concerning elasticities and markups; within a demand-model class, all methods of assessing market power result in similar predictions concerning industry performance. Both differentiation among firms in the brewing industry and their small number endow the industry with the power to charge prices in excess of marginal costs, but Slade finds no evidence of collusion.

Insurance

The NBER's Insurance Research Group met in Cambridge on February 16. Kenneth A. Froot, NBER and Harvard University and Howard C. Kunreuther, NBER and University of Pennsylvania, organized this program:

Martin F. Grace and **Richard D. Phillips**, Georgia State University, "The Allocation of Governmental Regulatory Authority: Federalism and the Case of Insurance Regulation"

Discussants: Dwight Jaffee, University of California, Berkeley, and John Major, Guy Carpenter & Co.

Karen Epermanis, University of Hartford, and **Scott E. Harrington**, University of South Carolina, "Financial Rating Changes and Market Discipline in Property Liability Insurance"

Discussants: James Ament, State Farm Fire & Casualty Co., and Paul R. Kleindorfer, University of Pennsylvania

Jeffrey R. Brown, NBER and Harvard University, Olivia S. Mitchell, NBER and University of Pennsylvania, and James M. Poterba, NBER and MIT, "The Role of Real Annuities and Indexed Bonds in an Individual Accounts Retirement Program"

Discussants: James Garven, Baylor University, and Richard Meyer, Harvard University

J. David Cummins, University of Pennsylvania, and **Olivier Mahul**, INRA, "Managing Catastrophic Risk with Insurance Contracts Subject to Default Risk"

Discussant: Richard Derrig, Automobile Insurers Bureau of Massachusetts

Gordon Woo, Risk Management Solutions, "Territorial Diversification of Catastrophe Bonds"

Discussants: Paul Freeman, The World Bank, and Kenneth A. Froot

Howard C. Kunreuther and **Mark Pauly**, University of Pennsylvania, "Ignoring Disaster: Don't Sweat the Big Stuff"

Discussants: Steve Goldberg, USAA Property & Casualty Insurance Group, and Sendhil Mullainathan, NBER and MIT

Robert J. Willis and **Lee A. Lillard**, University of Michigan, "Cognition and Wealth: The Importance of Probabilistic Thinking"

Discussants: Olivia Mitchell, and Thomas Russell, Santa Clara University

Grace and **Phillips** investigate the states' incentives for providing insurance regulation in an efficient manner. Regulation of the U.S. insurance industry is unique because it is conducted primarily at the state level while the majority of insurance sales are interstate. Consistent with predictions from the federalism literature, the authors find evidence of transstate externalities: states with small domestic insurance markets are less efficient producers of insurance regulation and appear to allow states that choose to expend the greatest resources to regulate for them. In addition, states with more profitable domestic insurers export greater levels of regulation, suggesting that extraterritorial regulation may erect barriers to entry. The authors find increasing economies of scale in the production of insurance regulation after they control for these regulatory externalities. Taken together, their results suggest that aggregating the production of regulation to a multistate or federal level may resolve a number of inefficiencies in the current system.

Epermanis and **Harrington** analyze growth in premiums surrounding ratings changes by the A. M. Best Co. during 1992–6 for a large panel of property liability insurers. Their analysis generally provides evidence of significantly lower revenue growth in the year of and the year after downgrades for insurers whose ratings were downgraded. The evidence of revenue declines is strongest for firms that had relatively low ratings (below A-) prior to being downgraded. The authors also find that rating upgrades were accompanied by increased

growth in premiums. Overall, material market discipline appears to exist for rated insurers despite guaranty fund protection and other factors that dull consumer incentives to seek safe insurers, and despite insurer incentives for efficient risk management.

Brown, **Mitchell**, and **Poterba** explore four issues concerning annuitization options that retirees might use in the decumulation phase of an individual accounts retirement saving system. First, they investigate the operation of both real and nominal individual annuity markets in the United Kingdom. The widespread availability of real annuities in the United Kingdom dispels the argument that private insurance markets could not provide real annuities to retirees. Second, they consider the current structure of two inflation-linked insurance products available in the United States, only one of which proves to be a real annuity. Third, the authors evaluate the potential of assets such as stocks, bonds, and bills to provide retiree protection from inflation. Because real equity returns have been high over the last seven decades, a retiree who received income linked to equity returns would have fared very well on average. Nevertheless, the authors cast doubt on the "inflation insurance" aspect of equities, since it is mainly attributable to stocks' high average return and not to stock returns moving in tandem with inflation. Finally, they assess potential retiree willingness to pay for real, nominal, and variable payout equity-linked annuities. They conclude that people would value a variable payout equity-linked annuity more highly than a real annuity because the additional real returns associated with common stocks more than compensate for the volatility of prospective payouts.

Cummins and **Mahul** develop a model of optimal contracting for financing large, infrequent events in which the payoffs are subject to both default risk and basis risk. Full insurance above a deductible is optimal when both parties have the same perception of the seller's default risk. When this perception differs, the optimal insurance design depends on behavioral concepts that are standard in the literature of insurance economics, such as risk tolerance, and on actuarial-science concepts, such as hazard rates. Under some specific behavioral and actuarial assumptions, the first-best indemnity schedule should increase and be concave with loss. This could help to explain why in real-world reinsurance markets the proportion of the loss reinsured decreases with the size of the loss.

Woo analyzes the expanding territorial coverage of catastrophe bonds. With catastrophe bonds being under investment management as a distinct asset class, the addition of bonds that are geographically uncorrelated (or weakly correlated) with others comes as a welcome source of portfolio diversification. Apart from the most acute concentrations of earthquake risk in California and Tokyo, bonds have been issued to cover aggregations of earthquake risk in less active seismic zones, such as Monaco. Severe windstorms in Europe also have been covered, along with tropical cyclones in the United States and Japan. Although catastrophe bonds initially focused on a single peril and territory, they now have been structured with independent multiple event triggers, differing according to peril and territory. Woo reviews the territorial development of catastrophe bonds and explores the geographical horizon for new issues.

Individuals have difficulty in dealing with low-probability, high-loss events. Frequently they fail to obtain insurance against such losses, even when the insurance terms are very favorable. **Kunreuther** and **Pauly** suggest that one reason that many people do not purchase insurance is that the transaction costs and attention time of obtaining and processing information on protection is so high as to not justify this effort. While some rare events surely can cause enormous losses when they occur, the ex ante expected value of such losses may be small. But there is more to the problem than just comparing gains and losses. What individuals will choose to do depends on the assumptions they make about the functioning of insurance markets, as well as on their perceptions of the risk and their decisionmaking processes.

Willis and **Lillard** use a large set of subjective probability questions from the Health and Retirement Survey to construct an index measuring the precision of probabilistic beliefs. They then relate this index to household choices about the riskiness of their portfolios and the rate of growth of their net worth. The authors propose a theory of uncertainty aversion based on repeated sampling that resolves the Ellsberg Paradox within a conventional expected utility model; in this theory, uncertainty aversion is implied by risk aversion. They then propose a link between an individual's degree of uncertainty and his propensity to give "focal" or "exact" answers to survey questions. After constructing an index of the precision of probabilistic thinking, they show that it has a statistically and economically significant positive effect on the fraction of risky assets in household portfolios and on the rate of longitudinal growth of these assets. These results suggest that there is systematic variation in the competence of individuals to manage investment accounts; that variation should be considered in designing policies to create individual retirement accounts in the Social Security system.

Development of the American Economy

The NBER's Program on the Development of the American Economy, directed by Claudia Goldin of Harvard University, met in Cambridge on March 10. The following papers were discussed:

Joshua Rosenbloom, NBER and University of Kansas, and **William Sundstrom**, Santa Clara University, "Long-Run Patterns of Interstate Migration in the United States: Evidence from the IPUMS, 1850–1990"

Jeremy Atack and **Robert A. Margo**, NBER and Vanderbilt University, and **Fred Bateman**, University of Georgia, "Productivity in Manufacturing and the Length of the Working Day: Evidence from the 1880 Census of Manufactures"

John J. Wallis, University of Maryland and NBER, "What Caused the Crisis of 1839?"

William J. Collins, NBER and Vanderbilt University, "The Labor Market Impact of State-Level Anti-Discrimination Laws, 1940–1960"

Michael R. Haines, NBER and Colgate University, "The Urban Mortality Transition in the United States, 1800–1940"

Rosenbloom and **Sundstrom** explore several ways of using individual-level data drawn from the Integrated Public Use Microdata Samples of the U.S. Population Censuses (IPUMS) to trace the evolution of migration behavior. They construct two measures of interstate migration over the past 150 years. The first measure considers an individual to have moved if he or she is residing in a state different from his or her state of birth. The second measure considers a family to have moved if it is residing in a state different from the state of birth of one of its young children. They use these measures to follow interstate migration patterns for successive synthetic birth cohorts of individuals from 1850 through 1990. These allow the authors to describe life-cycle patterns of migration and how they have changed over time. Migration was always most common among the young, but this relationship has grown stronger over time. Comparing migration behavior across cohorts, the authors find that migration propensities have followed a U-shaped pattern since 1850, falling until around 1900 and then rising until around 1970. They also find evidence of substantial differences by race, sex, and region in migration behavior.

Margo, **Atack**, and **Bateman** use data from the manuscript census of manufacturing to estimate the effects of the length of the working day on output and wages. They find that the elasticity of output with respect to daily hours worked was positive but less than one, implying diminishing returns to increases in working hours. When the annual number of days worked is held constant, the average annual wage is related positively to daily hours worked, but again the elasticity is less than one. At ten hours per day, the marginal benefits to employers of a shorter working day — lower wage bills — were approximately offset by the marginal cost — lower output.

The American economy experienced financial crisis in May of 1837 and October of 1839. The Panic of 1837 has been studied in detail, but the Crisis of 1839 brought on four years of deflation and recession. **Wallis** examines the role of state government investment in canals, railroads, and banks and the large debts created to finance those investments, in the swift economic recovery in 1838, and the long decline that set in after 1839.

By the time Congress passed the 1964 Civil Rights Act, 98 percent of non-Southern blacks were already covered by state-level "fair employment" laws which prohibited labor market discrimination. **Collins** assesses the impact of fair employment legislation on black workers' income, unemployment, labor force participation, and occupational and industrial distributions relative to whites. He finds that in general the fair employment laws had small or negligible effects on the labor market outcomes of black men but somewhat stronger positive effects on the labor market outcomes of black women.

Haines explains that in the United States as in many other nations in the 19th and early 20th centuries, there was a substantial mortality "penalty" to living in urban places. By around 1940, this penalty had been largely eliminated, and in many cases it was healthier to reside in the city than in the countryside. Despite the lack of systematic national data before 1933, it is possible to describe the phenomenon of the urban mortality transition. Early in the 19th century, the United States was not particularly urban (only 6.1 percent in 1800), a circumstance which led to a relatively favorable mortality situation. A national crude death rate of 20-25 per thousand per year would have been likely. Some early data indicate that mortality was substantially higher in cities, was higher in larger relative to smaller cities, and was higher in the South relative to the North. By 1900, the nation had become about 40 percent urban (and 56 percent by 1940). It appears that death rates actually rose (or at least did not decline) over the middle of the 19th century.

Increased urbanization, as well as developments in transport and commercialization and increased movements of people into and throughout the nation, contributed to this. The sustained mortality transition only began about the 1870s. Thereafter the decline of urban mortality proceeded faster than in rural places, assisted by significant public works improvements and advances in public health and eventually medical science. Much of the process had been completed by the 1940s. The urban penalty had been largely eliminated and mortality continued to decline despite the continued growth in the urban share of the population.

Productivity

The NBER's Program on Productivity held its spring meeting in Cambridge on March 16. Organizers C. Lanier Benkard, NBER and Stanford University, and Iain M. Cockburn, NBER and Boston University, put together this program:

Sangin Park, State University of New York, Stony Brook, "Innovation-Adjusted Price Indexes for Pharmaceuticals"

Discussant: Scott Stern, NBER and MIT

Laura Blow and **Ian Crawford**, Institute for Fiscal Studies, "Valuing a New Good"

Discussant: Peter Davis, MIT

Ariel Pakes, NBER and Harvard University, "Notes on Hedonic Price Indexes with an Application to PCs"

Discussant: W. Erwin Diewert, NBER and University of British Columbia

Igal Hendel, NBER and University of Wisconsin, and **Aviv Nevo**, NBER and University of California, Berkeley, "Sales and Consumer Inventory"

Discussant: Victor Aguirregeburia, Boston University

Kevin Stiroh, Federal Reserve Bank of New York, "Information Technology and the U.S. Productivity Revival: What Do the Industry Data Say?"

Discussant: Martin Baily, former Chairman of the President's Council of Economic Advisers

Jinyoung Kim, State University of New York, Buffalo, and **Gerald Marschke**, State University of New York, Albany, "The Labor Market for Scientists and the Recent Rise in Patenting"

Discussant: Samuel S. Kortum, NBER and Boston University

Pharmaceuticals are a special case of goods with some unobservable quality prior to consumption, which is called an "experience characteristic." Consumers learn about these experience characteristics from consumption and from advertising. **Park** proposes price indexes for pharmaceuticals that are innovation-adjusted and applies these indexes to the data for antidepressant drugs during 1980–95. He finds that the key source of innovation is the entry of new products, but that the effects of learning about experience characteristics also are significant. He finds too that the average annual growth rate of the focal price index declines by almost 9.5 percent, which suggests that the existing price indexes for pharmaceuticals may seriously overstate the rate of inflation in a rapidly growing market with the entry of innovative products.

Blow and **Crawford** suggest a method of valuing a new good that does not depend on the relationship between a household's economic welfare and the goods and services it consumes—only on the existence of such a relationship. They illustrate their technique with U.K. household budget survey data and calculate the welfare effects of the launch of the National Lottery in the United Kingdom in November 1994. The authors show that the increase in economic welfare associated with the arrival of the Lottery was greater for better-off households. They also show how measures of inflation over this period are affected by the inclusion of the new good, and they describe how the distributional effects of inflation are more strongly pro-rich when they allow for the new good.

Pakes considers the use of hedonic techniques to ameliorate new goods biases in price indexes. He provides a conceptual comparison of the hedonic to the traditional matched-model index, stressing the selection bias in the latter that arises from the fact that it does not make price comparisons for discontinued goods, and that the prices of discontinued goods tend to fall more than the average. He then provides a hedonic price index for desktop PCs and compares it to a traditional matched-model index calculated on the same data (the time period is 1995 to 1999). The hedonic price index is always negative, with an average rate of decline of about 15 percent, while the matched-model index is slightly positive and negatively correlated with the hedonic index. This negative correlation is expected because the selection bias in the traditional matched-model index is particularly large in years when many new products entered and made existing products obsolete. Those were precisely the periods when the hedonic index tells us that many product improvements were made.

Hendel and **Nevo** study intertemporal price discrimination in markets for nondurable but storable goods, such as groceries, with highly frequent sales. They consider a consumer's dynamic problem of being able to store a consumption good and facing uncertain future prices. To test the model, they use weekly store-level price and quantity scanner data on laundry detergents, as well as a household-level dataset. Their preliminary results suggest that duration from previous sale has a positive effect on the aggregate quantity purchased. Two indirect measures of storage are positively correlated with a household's tendency to buy on sale. One measure of inventory is negatively correlated with the quantity purchased (conditional on a purchase) and with the probability of buying, conditional on being in a store.

Stiroh examines the link between information technology (IT) and the U.S. productivity revival in the late 1990s. Industry-level data show a broad productivity resurgence that reflects both the production and the use of IT. The most IT-intensive industries experienced significantly larger productivity gains than other industries. A wide variety of econometric tests show a strong correlation between IT capital accumulation and labor productivity. To quantify the aggregate impact of IT use and IT production, Stiroh presents a novel decomposition of aggregate labor productivity. He shows that virtually all of the aggregate productivity acceleration can be traced to the industries that either produce IT or use IT most intensively, with essentially no contribution from the remaining industries that are less involved in the IT revolution.

Kim and **Marschke** develop and test a model of the patenting and R and D decisions of a firm whose researcher–employees sometimes move to a competitor. In their model, a firm facing the prospect of a scientist leaving risks losing its innovations to the scientist's future employer. But a firm can mitigate this risk by moving quickly to patent its scientists' innovations. Thus, a firm's propensity to patent an innovation rises with the likelihood of a researcher's departure. Their model also shows that an increase in the probability of a scientist leaving is likely to reduce research expenditures, and therefore to raise the patent–R and D expenditures ratio. Using firm-level panel data on patenting and R and D and industry estimates of labor mobility, the authors show that firms in industries with higher job turnover rates generate more patents, consistent with firms using patenting to prevent employee misappropriation of intellectual property. Also consistent with their theory are the authors' findings that job turnover rates are negatively correlated with firm-level R and D outlays and positively correlated with the patent–R and D ratio. The evidence indicates that the increasing mobility of scientists may be driving part of the rapid rise in patenting since the mid-1980s.

International Finance and Macroeconomics

The NBER's Program on International Finance and Economics held its spring meeting in Cambridge on March 23. Organizers Richard Lyons and Andrew Rose, NBER and University of California, Berkeley, organized this program:

Kathryn Dominguez and **Linda Tesar**, NBER and University of Michigan, "Exchange Rate Exposure"

Discussants: Bernard Dumas, NBER and INSEAD, and Kristin Forbes, NBER and MIT

Eric Parrado, New York University, and **Andrès Velasco**, NBER and Harvard University, "Optimal Interest Rate Policy in a Small Open Economy: The Case for a Clean Float"

Discussants: Paolo Pesenti, Federal Reserve Bank of New York, and Jaume Ventura, NBER and MIT

Pierre-Olivier Gourinchas, NBER and Princeton University, **Rodrigo Valdés**, Chilean Ministry of Finance, and **Oscar Landerretche,** MIT, "Lending Booms: Latin America and the World"

Discussants: Michael Dooley, NBER and University of California, Santa Cruz, and Carmen Reinhart, NBER and University of Maryland

Menzie Chinn, NBER and University of California at Santa Cruz, and **Guy Meredith**, International Monetary Fund, "Testing Uncovered Interest Parity at Short and Long Horizons"

Discussants: Geert Bekaert, NBER and Columbia University, and Karen Lewis, NBER and University of Pennsylvania

Margarida Duarte, Federal Reserve Bank of Richmond, and **Alan Stockman,** NBER and University of Rochester, "Rational Speculation and Exchange Rates"

Discussants: Kenneth Rogoff, NBER and Harvard University, and Olivier Jeanne, International Monetary Fund

Finance theory suggests that, in a world with integrated capital markets, exposure to foreign markets should have little influence on asset prices. **Dominguez** and **Tesar** find that in a pooled sample of eight (non-US) industrialized and emerging markets, between 12 and 23 percent of firms are exposed to exchange rate movements. They also find that: the choice of exchange rate matters; using the trade-weighted exchange rate is likely to understate the extent of exposure. The extent of exposure is not a result of a spurious correlation between random variables with high variances, though; exposure increases with the return horizon and within a country and an industry, exposure coefficients are roughly evenly split between positive and negative values. Averaging across the (absolute value of the) significant exposure coefficients in their sample of countries, the authors estimate the exposure coefficient to be about 0.5. The extent of exposure is not sensitive to the sample period, but the set of firms that is exposed does vary over time. The sign of the exposure coefficients changes across subperiods for about half of the firms in the sample. Thus exposure does not appear to be related to firm size, industry affiliation, multinational status, foreign sales, international assets, or industry-level trade.

Parrado and **Velasco** derive the optimal monetary and exchange rate policy for a small stochastic open economy with imperfect competition and short-run price rigidity. They conclude that the optimal policy depends crucially on the source of stochastic disturbances affecting the economy, much as in the literature pioneered by Poole (1970). Optimal monetary policy reacts to domestic disturbances but does not respond at all to foreign shocks. Consequently, under the optimal policy the exchange rate floats cleanly, and monetary policy is aimed exclusively at stabilizing the home economy.

Recent theories of crisis put lending booms at the root of financial collapses. Yet lending booms may be a natural consequence of economic development and fluctuations. **Gourinchas, Valdés,** and **Landerretche** investigate whether lending booms are indeed dangerous, based on a sample of episodes spanning 40 years, especially in Latin America. They find that lending booms often are associated with domestic investment booms, increases in domestic interest rates, a worsening of the current account, declines in reserves, real appreciation, and declines in output growth. The "typical" lending boom does not substantially increase the vulnerability of the banking sector or the balance of payments. Comparing countries, the authors find that lending booms in Latin America make the economy considerably more volatile and vulnerable to financial and balance-of-payment crises.

The hypothesis that interest rate differentials are unbiased predictors of future exchange rate movements has been rejected almost universally in empirical studies using short-horizon data; **Chinn** and **Meredith** test this hypothesis using interest rates on longer-maturity bonds for the G-7 countries. They find that the coefficients on interest differentials are of the correct sign, and almost all are closer to the predicted value of one than to zero. These results are robust to changes in data type and to base currency (Deutschemark versus U.S. dollar).

Models of exchange rates typically have failed to produce results consistent with the key fact that real and nominal exchange rates move in ways *not* closely connected to current (or past) macroeconomic or trade variables. Models that rely on the same shocks to drive fluctuations in macro variables and exchange rates typically predict counterfactually strong co-movements between them. **Duarte** and **Stockman** propose a new approach to exchange rates and implement it with a new-open-economy macro model. The approach focuses on the effects of speculation and the resulting changes in risk premiums on foreign-exchange markets. Exchange rates follow a forward-looking, first-order stochastic difference equation that includes terms involving risk premiums. Changes in risk premiums can affect the current exchange rate without necessarily creating large changes in current macroeconomic variables. Consequently, the approach has the potential to explain the Flood-Rose exchange-rate "disconnect" puzzle. However, the baseline model does not yet generate a sufficient degree of rational speculation to explain observed variation of risk premiums and exchange rates.

Asset Pricing

The NBER's Program on Asset Pricing met on March 24 on the campus of the University of California, Los Angeles. Program Director **John H. Cochrane** of the University of California, Los Angeles, and **Monika Piazzesi,** NBER and University of California, Los Angeles, organized the meeting and chose the following papers for discussion:

Darrell Duffie, NBER and Stanford University, and **B. Nicolae Garleanu** and **Lasse H. Pedersen,** Stanford University, "Valuation in Dynamic Bargaining Markets"

Discussant: Tano Santos, University of Chicago

Pietro Veronesi, NBER and University of Chicago, "Belief-Dependent Utilities, Aversion to State-Uncertainty, and Asset Prices"

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

Jun Liu and **Francis A. Longstaff,** University of California, Los Angeles, "Losing Money on Arbitrage: Optimal Dynamic Portfolio Choice in Markets with Arbitrage Opportunities"

Discussant: Ming Huang, Stanford University

Owen A. Lamont and **Richard H. Thaler,** NBER and University of Chicago, "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs"

Mark Mitchell and **Erik Stafford,** Harvard University, and **Todd C. Pulvino,** Northwestern University, "Limited Arbitrage in Equity Markets"

Discussant for both papers: Bradford Cornell, University of California, Los Angeles

Jessica A. Wachter, New York University, "Habit Formation and Returns on Bonds and Stocks"

Discussant: Christopher I. Telmer, Carnegie Mellon University

Peter L. Bossaerts, California Institute of Technology and CEPR; **Charles R. Plott,** California Institute of Technology; and **William R. Zame,** University of California, Los Angeles, "Structural Econometric Tests of General Equilibrium Theory on Data from Large-Scale Experimental Financial Markets"

Discussant: Wayne E. Ferson, NBER and University of Washington

Duffie, Garleanu, and **Pedersen** study the impact on asset prices of illiquidity associated with search and bargaining in an economy in which agents can interact only when they find each other. Even when market makers are present, investors' abilities to meet directly are important. Prices are higher and bid-ask spreads lower if investors can find each other more easily. Prices approach the Walrasian price if investors' search intensity increases or if market makers, who do not have all the bargaining power, search more intensely. Endogenizing search intensities yields natural implications. Finally, the authors show that information can fail to be revealed through prices when searching is difficult.

Veronesi reinterprets standard axioms in choice theory to introduce the concepts of "belief dependent" utility functions and aversion to "state uncertainty." Within a standard pure-exchange economy in which investors ignore the long-run drift of consumption growth ("the state"), such preferences help explain the various stylized facts of stock returns, including a high-equity risk premium, a low risk-free rate, high return volatility, stock return predictability, and volatility clustering. Since the long-run drift of consumption determines the (average) path of future consumption, aversion to state uncertainty suggests aversion to the dispersion of long-run consumption paths. This differs from the standard notion of (local) risk aversion in its temporal dimension. When the

model is calibrated to real consumption, it generates unconditional moments for asset returns that confirm the empirical observations. In addition, when it is estimated using consumption data, the fitted model produces posterior distributions on the drift rate of consumption that are relatively dispersed, further motivating the notion of aversion to long-run risk. In theory, an investor can make infinite profits by taking unlimited positions in an arbitrage. In reality, investors must satisfy margin requirements that completely change the economics of arbitrage.

Liu and **Longstaff** derive the optimal investment policy for a risk-averse investor in a market in which arbitrage opportunities exist. They show that it is often optimal to underinvest in the arbitrage by taking a smaller position than margin constraints allow. In some cases, it is actually optimal to walk away from a pure arbitrage opportunity. Even when the optimal policy is followed, the arbitrage strategy may underperform the riskless asset or have an unimpressive Sharpe ratio. Furthermore, the arbitrage portfolio typically experiences losses at some point before the final convergence date. These results have important implications for the role of arbitrageurs in financial markets.

Recent equity carve-outs in U.S. technology stocks appear to violate a basic premise of financial theory: identical assets have identical prices. **Lamont** and **Thaler** explore a sample of company shareholders who expect to receive shares of another company. A prominent example involves 3Com and Palm. The authors find that arbitrage does not eliminate blatant mispricings resulting from short sale constraints, so that one stock is overpriced but expensive or impossible to sell short. Evidence from options prices shows that shorting costs are extremely high, eliminating exploitable arbitrage opportunities.

Mitchell, Stafford, and **Pulvino** examine the impediments to arbitrage in 82 situations between 1985 and 2000, where the market value of a company is less than the sum of its publicly traded parts. These situations, often referred to as "negative stub values," suggest clear arbitrage opportunities and provide an ideal setting in which to study the risks and market frictions that prevent arbitrageurs from forcing prices to fundamental values. The authors find that 30 percent of negative stub deals terminate without converging. In addition, they estimate that the returns to a specialized arbitrageur would be 50 percent larger if the path to convergence was smooth rather than volatile, but the marginal investor in negative stub values is not likely to be so specialized. Short-selling frictions do not appear to be a major impediment to arbitrage in their sample. Information transaction costs appear to be the most serious limit to arbitrage.

Wachter proposes a model that captures the ability of the yield spread to predict excess returns on bonds as documented in empirical studies. The model, a generalization of Campbell and Cochrane (1999), also captures the predictability of stock returns by the price-dividend ratio, a high equity premium, excess volatility, positive excess returns on bonds, and an upward-sloping average yield curve. The model implies a joint process for interest rates and consumption. Controlling for contemporaneous consumption growth, long lags of consumption predict the interest rate. Thus the success of the model is based on a more realistic process for consumption and the interest rate, rather than on additional degrees of freedom in the utility function.

Bossaerts, Plott, and **Zame** develop structural tests of asset pricing theory to apply to data from experimental financial markets. The tests differ from those used with field data because they verify the consistency between prices and allocations, rather than merely testing whether only prices satisfy equilibrium restrictions. The authors test two large-scale financial market experiments in order to resolve an apparent price-allocation paradox in the experiments: namely, why asset prices can satisfy theoretical restrictions (CAPM) when allocations deviate substantially. They find that allocations seem not to be any closer to CAPM predictions than when prices grossly violate CAPM restrictions. Their theory explains the paradox in both sets of experiments; that is, when end-of-period prices are such that the market portfolio is close to mean-variance efficient (the CAPM pricing prediction), the allocations and their theory explain why. When end-of-period prices make the market portfolio far from mean-variance optimal, their tests reject.

Bureau Books

Risky Behavior among Youths: An Economic Analysis

Risky Behavior among Youths: An Economic Analysis, edited by Jonathan Gruber, is available from the University of Chicago Press for $75.00.

Young people routinely engage in risky behaviors that affect not only their immediate well being but also their long-term health and safety. In this NBER conference volume, the authors use economic analysis to study a wide range of unsafe activities, including teen drinking and driving, smoking, drug use, unprotected sex, and criminal activity. They also consider mental health and performance issues such as teenage depression, suicide, nutritional disorders, and high school dropout rates. This important volume provides both a key data source for public policy makers and a clear affirmation of the usefulness of economic analysis to our understanding of risky behavior.

Gruber is a professor of economics at MIT and a Research Associate and Director of the NBER's Program on Children.

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

NBER Macroeconomics Annual 2000

NBER Macroeconomics Annual 2000, edited by Ben S. Bernanke and Kenneth Rogoff, is available from the MIT Press this spring. The goals of this annual conference are to present, extend, and apply frontier work in macroeconomics and to stimulate research on policy issues. The topics covered in the 2000 conference volume are human capital externalities from compulsory schooling laws; the political business cycle; rethinking macroeconomic modeling; how money and banking shocks contributed to the Great Depression; trade policy and economic growth; and the six major puzzles in international macroeconomics.

Both editors are NBER Research Associates in the Programs on Economic Fluctuations and Growth and Monetary Economics. Bernanke is also the Howard Harrison and Gabrielle Snyder Beck Professor of Economics and Public Affairs at Princeton University. Kenneth Rogoff is Professor of Economics at Harvard University.

The volume is priced at $60.00 for the clothbound and $30.00 for the paperback edition. It may be ordered directly from the MIT Press at 5 Cambridge Center, Cambridge, MA 02142; or, by phone to 617-625-8569 or 1-800-356-0343; or, by email to mitpress-orders@mit.edu. The MIT Press also has a web site: **http://mitpress.mit.edu/journals.tcl**.

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