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## Program Report

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### Health Economics

Michael Grossman

In the five years since my last report on the NBER's Program on Health Economics, members of the program have focused on the economics of substance use and abuse and on the determinants of pregnancy resolutions and their relation to infant and early childhood health. Studies in the former area consider the effects of prices, taxes, sanctions, and advertising on the use of such harmfully addictive substances as cigarettes, alcohol, and illegal drugs. They also consider the effects of marijuana, cocaine, and alcohol consumption on marriage and divorce, out-of-wedlock births, participation in welfare, employment and unemployment, and crime. Studies in the latter area investigate the effects of public policies on whether pregnancies result in live births or induced abortions; the effects on infant health outcomes of expansions in Medicaid income-eligibility thresholds for pregnant women and young children, and the process by which families allocate resources to the health and development of their children. All of this research takes seriously the distinction between health as an output and medical care as one of the many inputs in the promotion and maintenance of health.

### Price Sensitivity of Cigarettes, Alcohol, and Illegal Drugs

The governments of the United States and many other countries have chosen to regulate some addictive substances (for example, cigarettes and alcohol) via taxation; minimum-age purchase laws; restrictions on consumption in schools, the workplace, and public places; and stiff fines for driving under the influence of alcohol. Other substances (for example, cocaine and marijuana) are outlawed completely. The prices of these substances will rise because of taxation, other forms of regulation, and bans. Thus, measuring their responsiveness to price is important in determining the optimal level of taxation and the impacts of legalization. Contrary to conventional wisdom, our studies find that the consumption of addictive substances is quite sensitive to price.

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# NBER Reporter

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Current antismoking initiatives in the United States focus on curtailing youth smoking. This is not surprising, as numerous studies show that 90 percent of all smokers begin the habit as teenagers. Thus cigarette control policies that discourage smoking in this age group may be the most effective way to achieve long-run reductions in smoking in all segments of the population. Using nationally representative samples for the 1990s, Frank J. Chaloupka and I show that excise tax hikes, which result in higher cigarette prices, have large negative effects on teenage smoking.<sup>1</sup> Our study capitalizes on the substantial variation in cigarette prices in the U.S. states, mainly caused by the very different state tax rates on cigarettes. The proposed settlement of the Medicaid lawsuits brought against the tobacco industry by the attorneys general of most states, and rejected by the U.S. Senate in June 1998, would have raised the price of a pack of cigarettes by approximately 34 percent. Based on our estimates, this price hike would have reduced the number of teenage smokers by approximately 24 percent. This would have translated into more than 1.3 million fewer smoking-related premature deaths in the current generation of people 17 and younger.

Chaloupka and Henry Wechsler report that smoking by college students is almost as responsive to price as smoking by high school students.<sup>2</sup> Chaloupka, John A. Tauras, and I indicate that a similar finding holds for the use of smokeless tobacco by teenage males.<sup>3</sup> Chaloupka and Rosalie Liccario Pacula find that the benefits, in terms of curtailments in youth cigarette smoking, attributable to price hikes are not shared equally by all demographic groups, though.<sup>4</sup> For example, among male teenagers, a 10 percent increase in the price of cigarettes shrinks the number of whites who smoke by about 9

percent and of blacks who smoke by 16 percent. The effects are much smaller for white female teenagers and are nonexistent for black female teenagers.

Alcoholic beverage prices also vary among areas of the United States for the same reason that cigarette prices vary: states tax these beverages at very different rates. Chaloupka, Ismail Sirtalan, and I capitalize on this variation to estimate the demand among individuals between the ages of 17 and 29—the prevalence of alcohol dependence and abuse is highest in this age group—for alcohol (measured by drinks consumed in the past year).<sup>5</sup> We report statistically significant and numerically large linkages among past, present, and future consumption of alcohol for these young people. These effects support Gary S. Becker and Kevin M. Murphy's theory of rational addiction.<sup>6</sup> The long-run elasticity of alcohol consumption with respect to its price, negative 0.65, is substantial. This elasticity, which takes account of linkages in consumption over time, is 60 percent larger than the comparable short-run price elasticity (which holds past consumption constant), and is twice as large as the elasticity that ignores addiction. Thus, a tax hike designed to curtail consumption may not have a favorable cost-benefit ratio unless it is based on the long-run price elasticity.

Sara J. Markowitz and I provide direct evidence of the impact of changes in the cost of alcohol on one negative consequence of excessive alcohol consumption: domestic violence toward children.<sup>7</sup> Using the 1976 Physical Violence in American Families survey, we find that a 10 percent increase in the state excise tax on beer would reduce the probability of severe violence by 2 percent and the probability of overall violence by 1 percent. Our estimates imply that a 10 percent hike in the beer tax would have lowered the

number of severely abused children by about 132,000 in 1975. By pooling data from the 1976 and 1985 Physical Violence in American Families surveys with a set of state dummies, Markowitz and I show that the negative tax effects are not attributable to unobserved state factors.<sup>8</sup> In another study, Markowitz and I find that the incidence of four different types of violent behavior on college campuses falls as the price of beer rises in the state in which the student's college is located.<sup>9</sup>

In several studies, my colleagues and I have analyzed the issue of legalizing cocaine, marijuana, and heroin by providing estimates of the price elasticities of those substances. In addition, we have examined whether these substances are substitutes or complements for alcohol. Chaloupka and I focus on cocaine "participation" and "frequency-of-use-given-positive-participation" in a group of individuals between the ages of 17 and 29, the age range in which the prevalence of cocaine consumption is at its highest.<sup>10</sup> Our study draws on cocaine prices based on purchases made by drug enforcement agents who were apprehending drug dealers. As in the case of alcohol, we find positive linkages among past, present, and future participation or frequency. Our results suggest that a permanent 10 percent price reduction that is attributed to legalization would cause the number of young adult cocaine users to grow by approximately 10 percent in the long run; the frequency of use among users would increase by a little more than 3 percent. Further, the effects of temporary police crackdowns on drugs or a temporary federal war on drugs may have created a misleading impression about the reaction to permanent price changes. According to our estimates, a 10 percent price hike for one year would reduce total cocaine consumption (that is, participation multiplied by frequency) by

approximately 5 percent, whereas a 10 percent price hike that is permanent would lower consumption by 14 percent.

Chaloupka, Tauras, and I confirm that negative effects of cocaine price also are observed in cross-sections of high school seniors.<sup>11</sup> Moreover, we report that residents of the 11 states that decriminalized the possession of small amounts of marijuana in the 1970s are more likely to use this drug. Henry Saffer and Chaloupka estimate demand functions for cocaine, marijuana, heroin, and alcohol in a large national sample of persons of all ages.<sup>12</sup> They obtain a consistent pattern of negative own-price effects and of complementarity between alcohol and illicit drugs. In a related study, Saffer and Chaloupka report that these price effects do not differ among demographic groups.<sup>13</sup> In both a cross-sectional study and a longitudinal study of young adults, Pacula finds complementarity between alcohol and marijuana.<sup>14</sup> One important implication of these findings is that the effects of policies that curtail alcohol consumption are reinforced because the same policies also curtail drug consumption.

## Effects of Advertising on Alcohol Abuse and Cigarette Smoking

In addition to excise tax increases, restrictions on advertising can be used to reduce alcohol abuse and cigarette smoking. For these restrictions to be effective, though, it must be demonstrated that advertising stimulates consumption. Many previous studies have failed to do this because they use aggregate time-series data with little variation in advertising. In a time series of U.S. cities, Saffer addresses this deficiency by estimating the effects on highway fatality rates, more than half of which involve the use of alcohol, of spot television, spot radio, and billboard

advertising of alcoholic beverages.<sup>15</sup> The advertising measures vary considerably among places at a moment in time. Saffer's results indicate that alcohol advertising increases motor vehicle fatalities of persons of all ages and fatalities of persons between the ages of 18 and 20. The last finding is notable because young drivers account for a disproportionate share of those involved in motor vehicle collisions.

In two other studies Saffer uses international data for approximately 20 countries over a 20-year period to assess the effects of banning advertising of alcohol and cigarettes. In the alcohol study he reports that alcohol consumption, motor vehicle mortality, and liver cirrhosis mortality (a standard proxy for heavy alcohol consumption) are lower in countries that ban broadcast advertising.<sup>16</sup> In the cigarette study, he finds that per capita cigarette consumption is lower in countries that ban broadcast, magazine, billboard, and other advertising of cigarettes.<sup>17</sup>

### **Effects of Illicit Drug and Alcohol Use**

Robert Kaestner addresses the effects of marijuana and cocaine use on three outcomes: marriage and divorce rates; the probability of being a single parent; and welfare participation. In one study, he finds that nonblack drug users are more likely to be unmarried because their first marriage occurs later and their marriages do not last as long as those of nondrug users.<sup>18</sup> Thus, by causing a delay in the age of marriage, substance abuse may increase the time at risk for an unintended pregnancy. In a second study, Kaestner finds that drug use is a significant predictor of being an unwed mother and of having an out-of-wedlock birth.<sup>19</sup> In the final study from this project, Kaestner shows that past-year marijuana use is positively related to future welfare

participation (participation in the four years following use) by women.<sup>20</sup> In related research, John Mullahy and Jody L. Sindelar find that heavy consumption of alcohol by men and women results in substantial reductions in employment rates and similar increases in unemployment rates.<sup>21</sup>

H. Naci Mocan and Hope Corman study the effects of drug use on crime in New York City. They use monthly data on crime rates and drug-related deaths (a proxy for drug use) for 1970 to 1990.<sup>22</sup> Controlling for arrests, the size of the police force, and the prevalence of poverty, they find significant positive effects of drug use on the property-related crimes of robbery and burglary. Contrary to popular belief, however, they find no significant relationships between drug use and the violent crimes of felonious assault and murder.

### **Pregnancy Resolutions and Infant and Early Childhood Health Outcomes**

Theodore J. Joyce and Kaestner assess whether recent changes in two state policies—parental notification laws for minors seeking an abortion and Medicaid income-eligibility expansions—are associated with changes in pregnancy resolution. They treat changes in these policies as exogenous shifts in the cost of abortion and birth. They find that parental involvement laws have small effects on minors as a group but have relatively large effects on white teens who are 16 years of age.<sup>23</sup> They also report that expansions in Medicaid eligibility raise the probability that a pregnancy is carried to term for non-blacks but they uncover no effect for blacks.<sup>24</sup>

The estimated effects in this last study are based on data for three states and do not indicate whether the reduction in the probability of an abortion is attributable to a fall in

abortions, a rise in births, or both. Joyce, Kaestner, and Florence Kwan expand the analysis to 15 states and investigate birth rates (births to unmarried women aged 19 to 27 divided by the number of women in this age range) and abortion rates as separate outcomes.<sup>25</sup> They find that the Medicaid expansions are associated with a 5 percent increase in the birth rate among white women, but the expansions do not influence the rate among black women. Overall, there is no apparent effect on the abortion rate. They conclude that subsidized health care for low-income pregnant women may encourage white women to have more children than they would have without coverage.

The Medicaid income-eligibility expansions increased the quantity of prenatal care received by poor pregnant women in the late 1980s and in the 1990s. Joyce reports, however, that the incidence of low birth weight among infants born to these mothers did not decline in New York City.<sup>26</sup> Kaestner obtains similar results in a national sample.<sup>27</sup> While these findings raise questions about the payoffs to infant health of investments in medical care, Christopher J. Ruhm indicates that investments in parental time may produce benefits.<sup>28</sup> Using aggregate data for nine European countries over almost three decades, he shows that entitlements to parental leave are negatively correlated with postneonatal and child mortality rates, presumably because leave provides parents with more time to invest in their young children.

Joyce, Kaestner, and Sanders Korzenman take a broader approach to the production of infant and early childhood health and development by considering the effects of pregnancy intentions on the resources allocated to infants and children.<sup>29</sup> They find little evidence that unintended pregnancy is associated with low birth weight, retarded cognitive

development, or other behavioral problems, particularly in estimates that they obtain from sibling differences. These estimates compare a sibling who was unwanted to his or her wanted sibling, thus eliminating the effects of a common home environment. The authors do find that these outcomes are related to factors correlated with family resources, such as income, mother's education and cognitive development, and family structure. This suggests that policies that reduce births resulting from unwanted pregnancies may have smaller payoffs than policies that reduce the social and environmental deprivations suffered by households into which unwanted children are born.

<sup>1</sup> F. J. Chaloupka and M. Grossman, "Price, Tobacco Control Policies, and Youth Smoking," NBER Working Paper No. 5740, September 1996.

<sup>2</sup> F. J. Chaloupka and H. Wechsler, "Price, Tobacco Control Policies, and Smoking among Young Adults," *Journal of Health Economics*, 16 (3), (June 1997), pp. 359-73.

<sup>3</sup> F. J. Chaloupka, J. A. Tauras, and M. Grossman, "Public Policy and Youth Smokeless Tobacco Use," NBER Working Paper No. 5524, April 1996; published in *Southern Economic Journal*, 64 (2), (October 1997), pp. 503-16.

<sup>4</sup> F. J. Chaloupka and R. L. Pacula, "An Examination of Gender and Race Differences in Youth Smoking Responsiveness to Price and Tobacco Control Policies," NBER Working Paper No. 6541, April 1998.

<sup>5</sup> M. Grossman, F. J. Chaloupka, and I. Sirtalan, "An Empirical Analysis of Alcohol Addiction: Results from the Monitoring the Future Panels," *Economic Inquiry*, 36 (1), (January 1998), pp. 39-48.

<sup>6</sup> G. S. Becker and K. M. Murphy, "A Theory of Rational Addiction," *Journal of Political Economy*, 96 (4), (August 1988), pp. 675-700.

<sup>7</sup> S. J. Markowitz and M. Grossman, "Alcohol Regulation and Domestic Violence Towards Children," NBER Working Paper No. 6359, January 1998; published in *Contemporary Economic Policy*, 16 (3), (July 1998), pp. 309-20.

<sup>8</sup> —, "The Effects of Alcohol Regulation on Physical Child Abuse," NBER Working Paper No. 6629, July 1998.

<sup>9</sup> M. Grossman and S. J. Markowitz, "Alcohol Regulation and Violence on College Campuses," paper presented at the annual meeting of the American Economic Association, Chicago, January 1998.

<sup>10</sup> M. Grossman and F. J. Chaloupka, "The Demand for Cocaine by Young Adults: A Rational Addiction Approach," NBER Working Paper No. 5713, August 1996; published in *Journal of Health Economics*, 17 (4), (August 1998), pp. 427-74.

<sup>11</sup> F. J. Chaloupka, M. Grossman, and J. A. Tauras, "The Demand for Cocaine and Marijuana by Youth," NBER Working Paper No. 6411, February 1998.

<sup>12</sup> H. Saffer and F. J. Chaloupka, "The Demand for Illicit Drugs," NBER Working Paper No. 5238, August 1995, and *Economic Inquiry*, forthcoming.

<sup>13</sup> H. Saffer and F. J. Chaloupka, "Demographic Differentials in the Demand for Alcohol and Illicit Drugs," NBER Working Paper No. 6432, February 1998.

<sup>14</sup> R. L. Pacula, "Does Increasing the Beer Tax Reduce Marijuana Consumption?" *Journal of Health Economics*, 17 (5), (October 1998), pp. 557-86; and "Adolescent Alcohol and Marijuana Consumption: Is There Really a Gateway Effect?" NBER Working Paper No. 6348, January 1998.

<sup>15</sup> H. Saffer, "Alcohol Advertising and Motor Vehicle Fatalities," *Review of Economics and Statistics*, 79 (3), (August 1997), pp. 431-42.

<sup>16</sup> —, "Alcohol Advertising Bans and Public Health," paper presented at the annual meeting of the Western Economic Association International, San Francisco, June 1996.

<sup>17</sup> —, "The Effect of Cigarette Advertising Bans and Warning Labels on Cigarette Smoking," paper presented at the Third Pacific Rim Allied Economic Organizations Conference, Bangkok, Thailand, January 1998.

<sup>18</sup> R. Kaestner, "The Effects of Cocaine and Marijuana Use on Marriage and Marital

Stability," *Journal of Family Issues*, 18 (2), (March 1997), pp. 145-73.

<sup>19</sup> —, "Drug Use, Culture, and Welfare Incentives: Correlates of Family Structure and Out-of-Wedlock Birth," *Eastern Economic Journal*, forthcoming.

<sup>20</sup> R. Kaestner, "Drug Use and AFDC Participation: Is There a Connection?," NBER Working Paper No. 5555, May 1996; published in *Journal of Policy Analysis and Management*, 17 (3), (Summer 1998), pp. 495-520.

<sup>21</sup> J. Mullahy and J. Sindelar, "Employment, Unemployment, and Problem Drinking," *Journal of Health Economics*, 15 (4), (August 1996), pp. 409-34.

<sup>22</sup> H. N. Mocan and H. Corman, "A Time-Series Analysis of Crime, Drug Abuse, and Deterrence in New York City," NBER Working Paper No. 5463, February 1996; revised February 1998.

<sup>23</sup> T. Joyce and R. Kaestner, "State Reproductive Policies and Adolescent Pregnancy Resolution: The Case of Parental Involvement Laws," *Journal of Health Economics*, 15 (5), (October 1996), pp. 579-607.

<sup>24</sup> —, "The Effect of Expansions in Medicaid Income Eligibility on Abortion," *Demography*, 33 (2), (May 1996), pp. 181-92.

<sup>25</sup> T. Joyce, R. Kaestner, and F. Kwan, "Is Medicaid Pronatalist? The Effect of Eligibility Expansions on Abortions and Births," *Family Planning Perspectives*, 30 (3), (May/June 1998), p. 127.

<sup>26</sup> T. Joyce, "Impact of Augmented Prenatal Care on Birth Outcomes of Medicaid Recipients in New York City," NBER Working Paper No. 6029, May 1997, and *Journal of Health Economics*, forthcoming.

<sup>27</sup> R. Kaestner, "Health Insurance, the Quantity and Quality of Prenatal Care and Infant Health," paper presented at the annual meeting of the American Economic Association, Chicago, January 1998, and *Inquiry*, forthcoming.

<sup>28</sup> C. J. Ruhm, "Parental Leave and Child Health," NBER Working Paper No. 6554, May 1998.

<sup>29</sup> T. Joyce, R. Kaestner, and S. Korenman, "The Effect of Pregnancy Intention on Child Development," paper presented at the annual meeting of the Population Association of America, Washington, D.C., March 1997.

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## Research Summaries

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### Inflation Targeting

Ben S. Bernanke\*

Undoubtedly the most interesting development in monetary policy in recent years is the widespread adoption by central banks of a policy framework called "inflation targeting." As the name suggests, this approach is characterized by the announcement of official inflation targets at one or more horizons, and by the explicit acknowledgment that low and stable inflation is the overriding long-term objective of monetary policy. In practice, other important features of inflation targeting include greater "transparency" of policy—that is, increased communication and clarity about the plans and objectives of monetary policymakers—and, in some cases, increased accountability of the central bank for attaining its announced objectives.

New Zealand and Canada were pioneers of the inflation targeting approach; although, as I discuss later, the monetary policy strategies of Germany and Switzerland were important precursors. Other countries that have officially adopted inflation targeting include Australia, Finland, Israel, Japan, Spain, Sweden, and the United Kingdom. Some developing countries, Chile being a leading example, use modified versions of this strategy. The United States has declined to adopt inflation targeting formally, although the focus of the Federal Reserve Board under Alan Greenspan on maintaining low infla-

tion (including the use of pre-emptive strikes against possible future inflation) incorporates elements of this approach. Finally, the new European Central Bank is likely to adopt a modified form of inflation targeting, although political considerations (the need to demonstrate continuity with the policies of the Bundesbank) apparently will dictate that the ECB pay attention to monetary aggregates as well.

In light of the interest in and increasing application of inflation targeting, it is important to understand its potential strengths and weaknesses. My recent research has focused on the historical record of inflation targeting and the potential pitfalls for inflation targeters that are suggested by economic theory.<sup>1</sup>

#### The Bundesbank as Inflation Targeter

One barrier to empirically assessing inflation targeting is its short historical record: New Zealand, the first formal inflation targeter, adopted the approach only in 1990. In searching for relevant experiences, the student of inflation targeting is tempted to look to the post-1975 monetary policy regimes of Germany and Switzerland. Although both the Bundesbank and the Swiss National Bank refer to their approaches as "money targeting" rather than inflation targeting, there is a widespread perception that inflation targets are central to German and Swiss monetary policymaking. For example, the Bundesbank develops its money targets by starting with an inflation objective, then working backward to determine the rate of money growth that is consistent with that objective.

Ilian Mihov and I have analyzed the role of inflation targets in the Bundesbank's policymaking.<sup>2</sup> We ask the following question: Suppose that, after setting its money targets for the year, the Bundesbank were to observe higher money growth than the target; but because of offsetting factors, there is no accompanying change in its inflation forecast. Would the Bundesbank tighten policy? If it did not, then it seems reasonable to conclude that the Bundesbank is basically an inflation targeter. If it did tighten policy, particularly if it tightened enough to return money to its target path, then the Bundesbank would be better characterized as a money targeter, albeit one for which inflation goals remain important.

Anecdotally, there appear to have been numerous episodes in which the Bundesbank ignored its money targets to try to meet more fundamental objectives of policy, notably its inflation goals. To test this proposition more formally, however, we need a quantitative indicator of what it means to tighten or loosen policy. To that end, Mihov and I apply a method that we developed in an earlier study of monetary policy in the United States.<sup>3</sup> Our approach is to estimate a model of the central bank's operating procedure. With this estimate in hand, we can infer which variables under the control of the central bank are the best indicators of policy stance at a given time. Specifically, among candidate indicators such as various short-term interest rates or measures of bank reserves, we can determine which indicators (or combinations of indicators) have the highest correlation with shocks to policy (and, accord-

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ingly, a low correlation with endogenous factors like changes in the demand for reserves). For the case of the Bundesbank, our estimates suggest that the Lombard rate (a rate analogous to the discount rate in the United States) is a marginally better indicator of policy than the call rate, a short-term rate that has been used often as a policy indicator in previous studies.

Our formal test of whether the Bundesbank targets money therefore amounts to checking whether shocks to the expected evolution of the money stock affect the setting of the Lombard rate, holding fixed the forecast of inflation. We find that, at medium-term and longer horizons, forecasted inflation explains a much greater share of the variance in the Lombard rate than does forecasted money growth (or, for that matter, than do forecasted changes in output, or in the value of the deutsche mark). In this important respect, at least, the Bundesbank seems closer to being an inflation targeter than a money targeter.

If we provisionally treat Germany (and possibly Switzerland, which follows a similar approach) as an inflation targeter, what lessons do we learn? Over the much longer period of its operation, the German approach to monetary policy has achieved results that are quite similar to what has been seen in the shorter experiences of formal inflation targeters. On the plus side, Germany has maintained low and stable inflation, and the central bank has high credibility. In particular, the public's confidence in the Bundesbank's commitment to low inflation has allowed it the flexibility to pursue short-term objectives, such as stabilization of output or the exchange rate, without increasing the inflation expectations of the public. On the other hand, there is no evidence that the use of inflation targeting has allowed Germany or any

other country to reduce significantly the output costs of disinflation.

## **Inflation Targeting in Practice: A Case Study Approach**

Inflation targeting regimes differ along many dimensions that are hard to quantify, such as details of implementation, the channels by which the central bank communicates with the public and the government, who is responsible for achieving inflation objectives, and the relevance of political and institutional factors. These qualitative issues, together with the relatively short history of most inflation targeting regimes, suggest that case studies may be a useful supplement to more conventional analysis for learning about the inflation targeting approach.

Together with Thomas Laubach, Frederic Mishkin, and Adam Posen, I have undertaken detailed case studies of the experiences of all major inflation targeting countries, to be reported in our recently published book.<sup>4</sup> My co-authors and I conducted historical studies of post-1975 monetary policy regimes in Germany and Switzerland (the precursors to inflation targeting), and of the recent policy regimes in New Zealand, Canada, the United Kingdom, Sweden, Israel, Australia, and Spain. The case studies are reported in a parallel form: each begins with an account of the adoption of inflation targeting in the country, followed by a discussion of the operational framework employed by the central bank, and then a narrative description of policymaking and economic events under the inflation-targeting regime. The case studies are supplemented by econometric analyses.

Perhaps the most important conclusion from the case studies is that it is fundamentally incorrect to characterize inflation targeting (as con-

ducted in practice) as an ironclad policy rule, in the sense of the traditional rules-versus-discretion debate. Instead, inflation targeting is better thought of as a policy framework, in which policy is "tied down" in the long run by the inflation target (which serves as a nominal anchor for the system), but in which there is also considerable leeway for policymakers to pursue other objectives in the short run. In particular, adoption of inflation targeting does not amount to abandoning output stabilization. First, inflation targeting, even in the short run, is consistent with stabilizing output against aggregate demand shocks. Second, supply shocks can be handled within the inflation targeting framework by various mechanisms, such as the exclusion of volatile components from the targeted price index or lengthening the period over which the inflation target is to be reached. Finally, as noted, inflation targeting permits a degree of policy discretion in the short run, allowing the central bank to respond to current economic developments, so long as the long-run inflation goal is not compromised.

Achieving a degree of short-run flexibility for policy requires that the public's expectations of inflation remain stable in the face of short-term fluctuations in policy and the economy. In other words, the medium- and long-term inflation goals of the central bank must be reasonably credible. In practice, inflation-targeting central banks have sought to strengthen their credibility by taking measures to increase transparency and accountability. Transparency requires that policymakers' objectives, information, and plans be communicated clearly and in a regular and timely fashion to the government and the public. All inflation targeting central banks have taken substantial steps toward openness in policymaking, for example through

regular publication of inflation reports that include detailed information on inflation prospects and likely policy responses. Accountability requires at a minimum that the central bank stake its reputation on either meeting its inflation targets or in providing clear and compelling reasons for why the target was missed. Mechanisms for increasing accountability range from New Zealand's provision (not exercised thus far) for dismissing the central bank governor if the inflation target range is breached, to the common requirement of regular reporting by the central bank to parliament.

The record of inflation targeting is good, albeit short at this point. There is strong evidence that inflation and inflation expectations have both fallen and become more stable in inflation targeting countries. In particular, it appears that inflation, once down, stays down; there is less tendency for inflation to rise during business cycle expansions. Low and stable inflation should promote growth and output stability in the long run. However, as already noted, the hope that inflation targeting might reduce the output costs of an initial disinflation does not appear to have been borne out.

## Inflation Forecasts and Monetary Policy

Some critics of inflation targeting have argued that the approach is not operational because of the time that it takes monetary policy actions to affect inflation, as well as the difficulties of forecasting inflation. These problems are cited as reasons for policy to target money, exchange rates, or some other variable that can be more directly controlled than prices.

This argument suffers from logical problems. Either intermediate targets

like money and exchange rates bear a stable relationship to long-run objectives like inflation or they do not. If they do, then they can be used, along with other information, to target long-run inflation. (Indeed, as Lars Svensson emphasized,<sup>5</sup> a policy of targeting the central bank's expectation of inflation must *a fortiori* dominate the use of a single intermediate target, as the inflation expectation in principle should incorporate all relevant information, including that embodied in the intermediate target.) If, on the other hand, intermediate targets do not bear a stable relationship to long-run objectives, then there is no rationale for targeting them.

Although intermediate targets do not seem to provide a good alternative, forecasting and controlling inflation directly is difficult in practice. The temptation exists for central banks to try to use various shortcuts to target inflation, for example, by adjusting policy automatically in response to private-sector inflation forecasts, or to the inflation forecasts implicit in certain asset prices. A theoretical analysis I have conducted with Michael Woodford<sup>6</sup> suggests that such shortcuts will not work, and might be quite dangerous.

Woodford and I study a dynamic model that incorporates sluggish price adjustment and shocks to both aggregate demand and aggregate supply. We show in this context that attempts to "target" private-sector inflation forecasts (by allowing policy to respond strongly to deviations between private-sector forecasts of inflation and the official inflation objective) are typically inconsistent with the existence of a rational expectations equilibrium; and, further, that policies approximating targeting of private-sector forecasts are likely to have undesirable properties. More

generally, we show that central bank policies that react to private-sector forecasts of any macro variable (such as output or interest rates) are particularly susceptible to indeterminacy of rational expectations equilibrium. Similar conclusions apply to policies that attempt to target the inflation forecasts implicit in asset prices (for example, in the spread between yields on real and nominal bonds).

Our work does not imply that targeting the forecast of inflation is impossible or that there is no useful information in asset prices and private-sector forecasts. However, it does suggest that inflation targeting central banks should base their policy decisions on explicit structural models of the economy, not explicit or implicit private-sector forecasts.

<sup>1</sup> For an introduction and overview of the issues raised by inflation targeting, see B. S. Bernanke and F. S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy?" NBER Working Paper No. 5893, July 1997; published in *Journal of Economic Perspectives*, 11 (Spring 1997), pp. 97-116.

<sup>2</sup> B. S. Bernanke and I. Mihov, "What Does the Bundesbank Target?" NBER Working Paper No. 5764, September 1996; published in *European Economic Review*, 41 (June 1997), pp. 1025-1054.

<sup>3</sup> B. S. Bernanke and I. Mihov, "Measuring Monetary Policy," *Quarterly Journal of Economics*, 113 (August 1998), pp. 869-902.

<sup>4</sup> B. S. Bernanke, T. Laubach, F. S. Mishkin, and A. S. Posen, *Inflation Targeting: Lessons From the International Experience*, Princeton, NJ: Princeton University Press, 1998.

<sup>5</sup> L. Svensson, "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets," NBER Working Paper No. 5797, October 1997; published in *European Economic Review*, 41 (June 1997), pp. 1111-1146.

<sup>6</sup> B. S. Bernanke and M. Woodford, "Inflation Forecasts and Monetary Policy," NBER Working Paper No. 6157, September 1997; published in *Journal of Money, Credit, and Banking*, 29 (November 1997, part 2), pp. 653-684.



# The Empirics of Currency and Banking Crises

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Currency and banking crises are potholes on the road to financial liberalization. It is relatively rare for them to cause a vehicle to break an axle—to bring the process of growth and liberalization to an utter and extended halt—but the flats they cause can result in significant losses of time and output and set back the process of policy reform. The output costs of both currency and banking crises can be a year or more of economic growth and the resolution costs of banking crises have often been the equivalent of two or more years of GNP growth. As capital becomes increasingly mobile, the severity and prevalence of these problems has grown, as amply demonstrated by recent experience in Asia, Latin America, and Europe.

There is no shortage of theoretical models of the causes and consequences of banking and financial crises.<sup>1</sup> But in comparison, systematic empirical work has been scarce. For the last several years, therefore, together and with a number of collaborators, we have attempted to reorient work on this subject in empirical directions.

In this article, we review this empirical research on currency and

banking crises and provide a critical review of related literature. In addition, we offer some suggestions—and cautions—for future research.

## Currency Crises

Contrary to the assumption of convenience made in some other recent writings, currency crises cannot be identified with changes in the exchange rate regime. Not all decisions to devalue or float the exchange rate are preceded by speculative attacks.<sup>2</sup> More importantly, a central bank may successfully defend its currency against attack by using its international reserves to intervene in the foreign exchange market. Alternatively, it may discourage speculation against the currency by raising interest rates or forcing the government to adopt other austerity policies.

An innovation of our work therefore has been to construct empirical measures of speculative attacks. We measure speculative pressure as a weighted average of changes in exchange rates, interest rates, and reserves, where all variables are measured relative to those of a center country.<sup>3</sup> Intuitively, speculative pressure can lead to a loss of reserves, be rebuffed by a rise in domestic interest rates, or be conceded by a depreciation or devaluation of the exchange rate.<sup>4</sup> Speculative attacks or currency crises (we use the terms interchangeably) are then defined as periods when this speculative pressure index reaches extreme values.

With this distinction in mind, we have analyzed of the experience of more than 20 OECD countries, using data that stretch back to the late 1950s.<sup>5</sup> We find that devaluations—as distinct from currency crises—generally have occurred after periods of overly expansionary monetary and fiscal policies. These expansionary policies lead to price and wage infla-

tion, deteriorating international competitiveness, and weak external accounts. They occur when unemployment is high, as if governments are attempting to stimulate an economy in which unemployment has political and economic costs. But that stimulus leads to a loss of reserves, which jeopardizes exchange rate stability. There are some signs that governments react by adjusting policy in more restrictive directions in an effort to stem the loss of reserves. In episodes that culminate in devaluation, however, these adjustments prove inadequate. Reserves continue to decline, eventually forcing the government to devalue the exchange rate. When devaluation finally occurs, it is accompanied by some monetary and fiscal retrenchment to reassure investors and render the new level of the exchange rate sustainable. As inflationary pressures fall, there is a sustained boost to competitiveness that helps to restore balance to the external accounts. This comes at the expense of sustained unemployment and falling employment and output growth.

It is more difficult to generalize about currency crises. Put another way, devaluations are more predictable than speculative attacks.<sup>6</sup> Although there are signs that crises, like devaluations, are preceded by loose monetary policies and inflation, there is less sign of governments attempting to rein in their expansionary policies as the threat to the exchange rate develops. The foreign exchange market intervention that occurs is sterilized (its potential effects on the domestic money supply are neutralized, and its effectiveness is therefore reduced). There are fewer signs of monetary and fiscal retrenchment in the wake of the event. The exchange rate changes that take place in response tend to be disorderly. They do not lead to the

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establishment of parities that are clearly sustainable. Indeed, the exchange rate is frequently floated rather than merely being devalued.

Thus, the failure of governments to adapt policy in a manner consistent with their exchange rate targets is at the heart of many currency crises. This points to the need for studying political incentives and constraints on economic policy formulation. One approach is to build on the theory of optimum currency areas and ask whether economic characteristics of countries that make exchange rate stability advantageous are associated with extensive and concerted foreign exchange market intervention.<sup>7</sup> Another approach is to assess political considerations directly. We have tested whether speculative attacks are more likely to occur before or after elections and whether left- or right-wing governments are more susceptible to their effects. We also ask whether changes in government and changes in finance minister help to explain speculative attacks. We find that these standard measures of political conditions are in fact only loosely linked to speculative attacks and devaluations, although there is some evidence that when a new government assumes office because of the electoral defeat of its predecessor, it feels relatively free to devalue the currency. On other occasions the finance minister is used as the sacrificial lamb and takes the blame for the unsuccessful defense. It is perhaps not surprising that the evidence on political determinants of currency crises is less than definitive, as identifying them requires pinning down a number of separate effects—the effect of politics on economic policies, the effect of economic policies on expectations, and the effect of expectations on financial market outcomes—each of which is elusive. Clearly, this is an important area for further work.

Theoretical models suggest that

speculative attacks unfold differently in situations of high and low capital mobility.<sup>8</sup> Our empirical work confirms this supposition. The presence of capital controls makes devaluations less likely and increases the likelihood that a government will be able to rebuff a speculative attack. In our empirical analysis, we have taken pains to allow for the fact that capital controls are endogenous. Indeed, we find that controls are more likely to appear after the exchange rate has been devalued and to disappear after a failed attack.

## Contagion

The Asian crisis has focused attention not just on the determinants of speculative attacks but also on contagion. We think of contagion as a tendency for a currency crisis somewhere in the world to increase the probability of a crisis in another country after controlling for the latter's fundamentals. Some continue to question whether contagion exists, arguing that when several countries are attacked simultaneously this reflects not contagion but the fact that they all exhibit a weak underlying economic and financial position. Using our measure of currency crises, we have considered this question in a series of recent papers.<sup>9</sup> We do so by adding the incidence of crises elsewhere in the world to the standard domestic determinants of currency crises. The results strongly suggest that the existence of a currency crisis elsewhere in the world (whether it leads to a devaluation or not) raises the probability of an attack on the domestic currency by about 8 percent, even after taking into account a variety of domestic political and economic factors. This evidence is strikingly robust: A variety of tests and a battery of sensitivity analyses confirm that a crisis abroad increases the probability of a speculative attack by an economi-

cally and statistically significant amount, even after controlling for economic and political fundamentals in the country concerned. This would appear to be the first systematic evidence of the existence of contagious currency crises.

How does the infection spread? One possibility is that attacks spread contagiously to other countries with which the subject country trades. In the presence of nominal rigidities, countries that devalue gain competitiveness at the expense of their trading partners. These competitors are therefore less likely to resist attacks and thus more likely to be attacked themselves. A second possibility is that attacks spread to other countries where macroeconomic and financial conditions are broadly similar, so that there is reason to suspect that the same underlying problems exist. We test these hypotheses by weighting our measure of contagion (that is, currency crises in other countries) by the importance of trade linkages, and, alternatively, by the similarity of macroeconomic policies and conditions. For our panel of 20 OECD countries, it turns out that contagion operating through trade is stronger than contagion as a result of macroeconomic similarities. When measures of both are included in the specification, trade-related contagion dominates. Moreover, our proxies for both trade-related contagion and macro-weighted contagion outperform a naive contagion measure (the simple existence of speculative attacks in other countries). We take this as confirmation that our results are picking up contagion per se and not just the effects of omitted environment factors common to the countries in question, although the latter might still be present. Admittedly, similarities in macroeconomic policies and performance across countries are more difficult to capture than the intensity of trade linkages; the stronger showing of

trade-related contagion may simply reflect our greater success in proxying this effect. But, reassuringly, our OECD panel evidence has been confirmed by other investigators using cross-sectional evidence for OECD and developing countries.<sup>10</sup>

Future work needs to pay more attention to currency crises in emerging markets. Unfortunately, attempts to construct proper measures of exchange market pressure tend to be stymied by the absence of comparable interest rate data for a large cross-section of developing countries. It may be argued that the absence of relevant interest rate data reflects the underdevelopment of the relevant financial markets, implying in turn that the authorities are not able to use the interest rate as an instrument for defending the currency. With this justification it is possible to construct a measure of currency crashes, either as a weighted average of exchange rate changes and reserve losses, or simply as large changes in the exchange rate. Analyzing the correlates of the latter measure suggests that currency crashes in developing countries are subject to many of the same determinants as those in advanced industrial countries.<sup>11</sup> Crashes tend to occur when the rate of growth of domestic credit is high and when output growth is slow, consistent with the behavior of industrial countries. In addition, emerging market crashes are most likely when global interest rates are high and rising and when the share of foreign direct investment (FDI) in total external debt is relatively low. A fall in FDI inflows by 10 percent of total debt is associated with an increase in the probability of a crash by 3 percent. Still, there is much work to be done. For example, developing countries are much more likely to threaten or impose capital controls in the face of speculative attacks; they are also much more likely to receive bailout packages led by the International

Monetary Fund. Incorporating the effects of these factors remains an important topic in the research agenda.

## Banking Crises

Compared to currency crises, far less empirical work of a systemic, cross-country, comparative nature has been done on the causes and consequences of banking crises, especially in emerging markets.<sup>12</sup> Our own work does, however, point to a number of regularities.<sup>13</sup> We find that the stage is set for banking crises by the interaction of fragilities in domestic financial structure and unpropitious global economic conditions. Our central finding is of a large, highly significant correlation between changes in industrial country interest rates and banking crises in emerging markets. We show that interest rates in the United States, Europe, and Japan tend to rise sharply and significantly in the year preceding the onset of banking crises. This result comes through strongly in univariate and multivariate analyses alike and is robust to changes in specification. There is also some evidence that the global business cycles and OECD growth in particular play important roles in the incidence of banking crises, with slowing growth in the advanced industrial countries associated with the onset of crises. These results point to the role of external conditions in heightening the vulnerability of emerging markets to banking problems. There are also signs that real overvaluation and slow growth at home help to set the stage for bank crises, but the evidence is inconsistent with the notion that domestic macroeconomic problems provide the entire explanation for emerging market banking crises. This is precisely the same result found, of course, for emerging market currency crashes.

In addition, our analysis confirms that banking crises can have quite

severe, if short-lived, macroeconomic effects. The disruptions associated with a banking crisis cause output growth to decline by 2 to 3 percent relative to the control group of non-crisis countries. That effect lasts only for a year, however; by the second year after a crisis, growth has recovered nearly to the levels typical of developing countries that are not in crisis.

## Back to Theory

These results provide some guidance as to what kind of theoretical models are likely to reward further study. The results for OECD countries suggest that models in which governments are reluctant to raise interest rates to defend the currency for fear of aggravating an already serious domestic unemployment problem are likely to have considerable relevance.<sup>14</sup> The results for emerging markets—for example, that the share of FDI in foreign debt is associated with currency and financial stability—are consistent with the many models in which the maturity structure of the debt is an important determinant of vulnerability to currency and financial crises. In turn, these conclusions point to the relevance of so-called second-generation models of currency and financial crises, in which crises cannot simply be predicted on the basis of macroeconomic fundamentals like the stance of monetary and fiscal policy. Instead, crises are possible—but not necessary—when the economy enters a zone of vulnerability in which authorities will be reluctant to use restrictive policies to defend the currency for fear of aggravating already-existing economic and financial fragilities.<sup>15</sup> In such circumstances, attacks may occur if a sufficient number of currency traders coordinate on short sales of a currency. We expect future theoretical work to continue this line of argument.

## Misleading Indicators

Concern over the disruptive effects of currency and banking crises has led to the development of a considerable industry in which econometric models like these are used in a mechanistic attempt to predict currency and banking crises.<sup>16</sup> Our work suggests that these exercises are subject to important criticisms. Devaluations and floatations are intrinsically heterogeneous from a theoretical perspective; they may be caused by the slow deterioration of macroeconomic fundamentals (as in "first-generation" models), or they may result from self-fulfilling attacks. As a result, they defy generalization empirically, complicating efforts at prediction. Theoretical models have identified the kind of variables that can sap a government's ability to defend itself, thereby rendering it vulnerable to attack; but the domestic considerations that governments weigh when contemplating a costly defense of the currency vary across time and country. High unemployment, weak economic growth, a fragile banking system, and large amounts of short-term debt may have rendered governments reluctant to hike interest rates in the past, but one could imagine in the future that a government will be concerned instead with the level of property prices, the solvency of a heavily indebted nonfinancial corporation, or some very different consideration.

These variables do not provide much guidance on when the attack will come. Whether speculators attack will depend not just on the weakness of the banking system or the level of unemployment, but on how much governments care about further aggravating these problems when deciding whether to defend the currency. The only thing more difficult to measure than governments' resolve is investors' assessment of it. Even if observers con-

clude that the currency peg is vulnerable, no one market participant is likely to be large enough to build up the short position needed to exhaust the authorities' reserves. For that to occur, multiple investors would have to coordinate their actions. Coordinating devices vary from case to case and generally elude prediction; both the French Referendum on the Maastricht Treaty and the Chiapas uprising were exceptional noneconomic events. All in all, it is easy to understand why so many speculative attacks have come as surprises, even to the speculators themselves.<sup>17</sup>

A close look at existing attempts to build early warning systems underscores these points.<sup>18</sup> These studies show that the estimated relationship between observable macroeconomic and financial indicators and the probability of large changes in exchange rates and reserves tends to be very sensitive to the sample of countries and the period for which the exercise is carried out. This belies the notion that there exist a single set of variables and a stable set of relationships on which crisis forecasting can be based. As most attacks come as surprises, models that rely on time-series data tend always to predict "no crisis."<sup>19</sup> The models that perform best, in statistical terms, tend to be cross-sectional. They ask which countries were affected most severely during episodes of speculative pressure, and they rely on variables like reversals in the direction of capital flows and sudden reserve losses. Such variables are properly regarded as concurrent rather than leading indicators of currency crises; once this information is available, the horse has left the barn. The same criticisms apply to models that rely for their predictive power on the number of crises erupting in other countries in the current or immediately preceding months.

None of this is to deny the value of statistical studies seeking to deepen our understanding of past crises.

However, the success of future papers in explaining past crises does not mean that they will necessarily succeed in predicting future crises. This creates a real danger that the policy community, if led to think otherwise, will be lulled into a false sense of complacency.

<sup>1</sup> One seminal contribution is P. Krugman, "A Model of Balance-of-Payments Crises," *Journal of Money, Credit and Banking*, 11 (1979), pp. 311-25. A good recent review is R. Flood and N. Marion, "Perspectives on the Recent Currency Crisis Literature," NBER Working Paper No. 6380, January 1998. On the causes and consequences of banking crises, see D. Diamond, "Bank Runs, Deposit Insurance and Liquidity," *Journal of Political Economy*, 91 (1983), pp. 401-19; and B. Bernanke, "Nonmonetary Effects of the Banking Crisis in the Propagation of the Great Depression," *American Economic Review*, 73 (1983), pp. 57-276.

<sup>2</sup> Recall, for example, the decision of the Taiwanese authorities in October 1997 to devalue their currency despite the absence of significant speculative pressure in the foreign exchange market, or the numerous EMS realignments undertaken in periods of tranquility before 1987.

<sup>3</sup> We typically choose Germany, as it is both a strong-currency country and has been at the core of all OECD fixed exchange rate regimes. See B. Eichengreen, A. Rose, and C. Wyplosz, "Speculative Attacks on Pegged Exchange Rates: An Empirical Exploration With Special Reference to the European Monetary System," in *The New Transatlantic Economy*, M. Canzoneri, W. Ethier, and V. Grilli, eds. New York: Cambridge University Press, 1996.

<sup>4</sup> Other empirical studies, which have failed to distinguish actual changes in exchange rates from speculative attacks, can therefore be subject to serious bias. Models like those of L. Girton and D. Roper, "A Monetary Model of Exchange Market Pressure Applied to Postwar Canadian Experience," *American Economic Review*, 67 (1977), pp. 537-48, can be used to derive the weights on the three elements of our speculative pressure index. Given the limitations of the empirical literature on exchange rate determination, we instead choose weights on the basis of data characteristics and undertake extensive sensitivity analysis.

<sup>5</sup> See also B. Eichengreen, A. Rose, and

C. Wyplosz, "Is There a Safe Passage to EMU? Evidence on Capital Controls and a Proposal," in *The Microstructure of Foreign Exchange Markets*, J. A. Frankel, G. Galli, and A. Giovannini, eds. Chicago: University of Chicago Press, 1996; and "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks," *Economic Policy*, 21 (1995), pp. 249–312.

<sup>6</sup> That currency crises are more heterogeneous than devaluations and that their timing is difficult to predict is consistent with the conclusions of Rose and Svensson, who found that macroeconomic fundamentals are of relatively little use for explaining the credibility of exchange rate parities. Eichengreen and Wyplosz also found that fundamentals did not obviously predict the timing of the 1992 attack on the EMS. A. Rose and L. Svensson, "European Exchange Rate Credibility Before the Fall," in *European Economic Review*, 38 (1994), pp. 1185–1216; B. Eichengreen and C. Wyplosz, "The Unstable EMS," *Brookings Papers on Economic Activity*, 1 (1993), pp. 51–144.

<sup>7</sup> One of us has recently reported evidence to this effect: B. Eichengreen and T. Bayoumi, "Exchange Rate Volatility and Intervention: Implications of the Theory of Optimum Currency Areas," *Journal of International Economics*, 45 (1998), pp. 191–209.

<sup>8</sup> C. Wyplosz, "Capital Controls and Balance of Payments Crises," *Journal of International Money and Finance*, 5 (1986), pp. 167–79.

<sup>9</sup> B. Eichengreen, A. Rose, and C. Wyplosz,

"Contagious Currency Crises: First Tests," *Scandinavian Journal of Economics*, 98 (1996), pp. 463–84; B. Eichengreen and A. Rose, "Contagious Currency Crises: Channels of Conveyance," in *Changes in Exchange Rates in Rapidly Developing Countries*, T. Ito and A. Krueger, eds. Chicago: University of Chicago Press, 1998; B. Eichengreen, A. Rose, and C. Wyplosz, "Contagious Currency Crises," NBER Working Paper No. 5681, August 1996.

<sup>10</sup> R. Glick and A. Rose, "Contagion and Trade: Why Are Currency Crises Regional?" *Federal Reserve Bank of San Francisco Working Paper*.

<sup>11</sup> J. Frankel and A. Rose, "Currency Crashes in Emerging Markets: An Empirical Treatment," *Journal of International Economics*, 41 (November 1996), pp. 351–66.

<sup>12</sup> An important exception is A. Demirguc-Kunt and E. Detragiache, "The Determinants of Banking Crises: Evidence From Developing and Developed Countries," *IMF Working Paper No. 97/107*, September 1997.

<sup>13</sup> B. Eichengreen and A. Rose, "Staying Afloat When the Wind Shifts: External Factors and Emerging-Market Banking Crises," NBER Working Paper No. 6370, January 1998.

<sup>14</sup> B. Eichengreen and O. Jeanne, "Currency Crises and Unemployment: Sterling in 1931," NBER Working Paper No. 6563, May 1998.

<sup>15</sup> M. Obstfeld, "Models of Currency Crises With Self-Fulfilling Features," NBER

Working Paper No. 5285, February 1997; also published in *European Economic Review*, 40 (1996), pp. 1037–47. We claim paternity (in 1994) of the first- and second-generation terminology used to distinguish alternative approaches to modeling currency crises. See B. Eichengreen, A. Rose, and C. Wyplosz, "Speculative Attacks on Pegged Exchange Rates: An Empirical Exploration With Special Reference to the European Monetary System."

<sup>16</sup> *International Monetary Fund*, "Financial Crises: Characteristics and Indicators of Vulnerability," in *World Economic Outlook, International Monetary Fund*, May 1998; G. Kaminsky, S. Lizondo, and C. Reinhart, "Leading Indicators of Currency Crises," *Policy Research Working Paper No. 1852*, The World Bank, November 1997; D. Hardy and C. Pazarbasioglu, "Leading Indicators of Banking Crises: Was Asia Different?" *IMF Working Paper No. 98/91*, June 1998.

<sup>17</sup> A. Rose and L. Svensson, "European Exchange Rate Credibility Before the Fall."

<sup>18</sup> Another study that makes these points is A. Berg and C. Pattillo, "Are Currency Crises Predictable? A Test," unpublished manuscript, *International Monetary Fund*, July 1998.

<sup>19</sup> Indeed, suppose that forecasts of a country's vulnerability trigger corrective policy actions that then prevent a crisis. In this case, the model would appear to forecast poorly, as the potential for a crisis would never be followed by an actual crisis.

## Exchange Rates and Prices

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In the early 1970s, when the industrialized countries abandoned the fixed exchange rates of the Bretton Woods system, many economists were surprised by the high volatility of exchange rates under the new regime of more flexible rates. Dornbusch provided a new paradigm,

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based on the Mundell–Fleming model of the 1960s, but granting a prominent role to expectations in the determination of exchange rates.<sup>1</sup> His model assumed that nominal goods prices adjusted sluggishly, but that exchange rates resembled asset prices more closely. In that model, expectations generated the short-run "overshooting" of exchange rates in response to monetary and other demand shocks.

The Dornbusch model dominated academic discussions of exchange rates for at least a decade, but gradually began to lose favor. There were

two reasons for the decline of the overshooting model. First was evidence that the model was not very useful in forecasting exchange rates. Meese and Rogoff showed that forecasts of the exchange rate based on the Dornbusch model could not beat the simplest forecast of no-change-in-the-exchange-rate.<sup>2</sup> Still, not all of the empirical evidence on the Dornbusch model was negative. For example, Frankel and I used the Dornbusch model to explain the famous money supply announcements puzzle of the early 1980s.<sup>3</sup> The model was successful in explaining the simultane-

ous jump in short-term interest rates and appreciation of the dollar at the moment the Federal Reserve announced money supply totals that were greater than anticipated by markets. However, many of the movements of exchange rates appeared to be completely unrelated to the economic fundamentals—money supplies and government budgets—stressed by Dornbusch. Even after dozens of variants of the model were introduced, nobody was able to tweak the model to produce consistently successful forecasts of exchange rates.

The second cause for the decline in popularity of the Dornbusch model was the movement in macroeconomics in the 1980s toward models based explicitly on utility maximization. Dornbusch developed a rational expectations version of the Mundell-Fleming model, which was based on descriptive equations for asset markets and goods markets. Although the new Keynesian theory of the 1980s established a formal basis for slow adjustment of prices by optimizing firms, the new international macroeconomics of the 1980s was based primarily on neoclassical models with flexible prices. One assumption that characterized all of these models was the law of one price: that any traded good would sell for the same price (corrected for currency of denomination) in every country.

## Law of One Price

The data clearly show that there are large fluctuations in real exchange rates (that is, the price of a consumption basket in one country relative to another). Since the neoclassical models did not allow for the failure of the law of one price, there had to be some other mechanism for explaining these movements in real exchange rates. Probably the most popular type of model assumed that there was a group of goods that were

not traded, so that the law of one price did not need to hold for these goods. Fluctuations in the prices of nontraded goods relative to traded goods explained the movements in real exchange rates. For example, services generally were nontraded. A country experiencing rapid inflation in services relative to traded manufactured goods would experience a greater increase in its price level than a country without inflation in services prices. Another class of models assumed that countries weighted goods differently in their consumption bundles. For example, wine might receive a high weight in the French consumption bundle and beer a high weight in the U.S. consumption bundle. Even though Frenchmen and Americans pay the same prices for each good, an increase in the price of wine relative to beer would drive the overall French price index up relative to the U.S. index.

Both of these neoclassical models assume that there will be large, very visible changes in relative prices within each country. In the first model, prices of services move relative to prices of manufactured goods. In the second model, there will be large changes in the price of wine relative to beer. Any model must make certain assumptions about the world. My 1993 paper<sup>4</sup> asks whether the general pattern assumed by the neoclassical models—that failures of the law of one price across countries are relatively small, and that there are significant relative price changes within countries—is true in the data. For that paper, I examined two datasets. The first collected price indexes for disaggregated categories of goods—such as energy, food, and rent—for several large OECD (Organization for Economic Cooperation and Development) countries. The second collected price indexes on even more disaggregated goods—such as bananas, televisions, and automobile

tires—for the United States and Canada. For each dataset, I calculated the variance of changes in all relative prices within each country: bananas to televisions, televisions to tires, tires to bananas, and so on. I also calculated the variance of changes in prices of the same goods across countries: bananas in Canada compared to bananas in the United States, televisions in Canada relative to televisions in the United States, and so on.

My results strongly contradict the underlying presumption of the neoclassical models. Failures of the law of one price, as measured by the variance of prices of the same good across countries, tended to be much larger than the variance of prices of different goods within countries. Indeed, the median volatility of prices of similar goods across borders was nearly an order of magnitude larger than the median volatility of prices of goods within each country. The evidence runs exactly counter to the underlying assumption of the neoclassical models of the 1980s. Modeling failures of the law of one price appear to be much more important for our understanding of real exchange rate movements than the channels examined in the neoclassical literature.

One of my recent papers presents a more complete examination of similar issues.<sup>5</sup> I decompose real exchange rates into two components: the price of traded goods in one country relative to their price in another country, and the relative price of nontraded goods to traded goods. Variation in the first term represents deviations from the law of one price, and variation in the second term comes from movements in the relative price of nontraded goods. I use five different measures of traded goods and nontraded goods for the United States. For some measures, there are data for up to 20 countries, although for others there are data available for only six or seven countries. In each

case, I calculate the variance of changes in each of the two components at every horizon—from one month, in some cases, out to 30 years. Then, I compare the variance of these two components to ask which accounts for most of the variance of real exchange rates at each horizon.

The results are startling: at almost every horizon for almost every measure and every country relative to the United States (generally with the exception of Canada), the failure of the law of one price accounts for over 90 percent of real exchange rate variation. In many cases it accounts for 98 to 99 percent of the variation.

The case of the real U.S.–Japan exchange rate is worth special mention. It is often claimed that the real value of the yen has risen precisely because of the increase in prices of nontraded goods in Japan. However, the evidence does not support this view. There has been a large increase in the relative price of nontraded to traded goods in Japan over the past 30 years, but it has been matched by the size of the relative price increase in the United States. Moreover, the U.S.–Japan real exchange rate has been marked by a high degree of short-run and medium-run volatility, but that sort of volatility is not apparent in the data on the relative price of nontraded to traded goods.

## **Purchasing Power Parity**

I have argued recently that variation in the price of nontraded to traded goods could actually explain very long-run movements in the real exchange rate.<sup>6</sup> Tests of purchasing power parity (PPP) with very long datasets (100 years and more) appear to rule out permanent changes in relative prices of nontraded to traded goods between the United States and other countries, because their results suggest that PPP holds in the long

run. (Long-run PPP is the proposition that in the long run the real exchange rate converges to a constant mean.) I argue that those tests have a serious size bias; they are too likely to reject the null hypothesis that there are important long-run relative price movements between countries. This paper appears to contradict my earlier work, which downplays the importance of relative price changes, but the arguments are actually closely related. My point in the more recent paper is simply: The relative price movements are very small in the short run compared to movements in real exchange rates arising from failures of the law of one price. In tests of PPP, even with long datasets, the short-run variation from the law of one price dominates the data. The failure of the law of one price is transitory, so it appears that deviations from PPP are transitory. That is, the movements in the first component of my decomposition are so dominant that they swamp the movements in the second component which may be important for the long run.

My paper with Chang-Jin Kim can be read as a resolution of these issues.<sup>7</sup> We estimate a model for the U.S.–U.K. real exchange rate using more than 100 years of data. With Kalman filter techniques, we decompose the real exchange rate into two components: one that has permanent shocks (and, thus, a unit root), and one in which all shocks are transitory. We note that the volatility of the real exchange rates has changed from time to time over the decades. So we allow the variance of each component to follow a Markov-switching process. It turns out that a single variance is sufficient for the permanent component, but that the transitory component switches among three variance states. The transitory component is generally much more volatile than the permanent component. The switches among states of low, medium, and high volatility all

are associated with monetary events. Generally when nominal exchange rates are floating, the transitory component of the real exchange rate is highly volatile; when the exchange rate is fixed, the transitory component is very quiescent. Other significant monetary events affect the volatility of the transitory component. Based on this evidence, we note that the behavior of the transitory component is consistent with a model of real exchange rates in which consumer prices in each country adjust sluggishly, so that the nominal exchange rate dominates movements in real exchange rates. The permanent component, although not very important in short-run movements of the real exchange rates, appears to be related to fundamentals that drive relative prices as in the neoclassical literature.

## **Pricing to Market**

My research with John H. Rogers<sup>8</sup> aims to explain why the law of one price fails. We use data on disaggregated price indexes for U.S. and Canadian cities.<sup>9</sup> We ask what is responsible for variations in prices of similar goods across cities. For example, what leads to variance in the price of men's clothing in New York compared to Los Angeles or Toronto? One hypothesis is that more distant city pairs should witness greater variation, because transportation and other costs effectively segment the markets and keep economic forces from equalizing prices. Another view is that nominal prices are sticky. Under this view, there should not be too much variation of prices between pairs of U.S. cities or pairs of Canadian cities. However, there should be large fluctuations between Canadian–U.S. pairs, because in each country prices are set in their respective currencies and the nominal exchange rate has been highly volatile.

In fact, the evidence in all the

papers lends some support to both views. Distance does play a role in explaining deviations from the law of one price, but the "border" effect is much larger. Interestingly, further investigation<sup>10</sup> finds that sticky nominal prices can explain only a bit more than half of the failure of the law of one price across borders. An alternative way of comparing prices is to take the price of individual goods in each city relative to the overall price index in that city. When that ratio is compared to the similar ratio in another city, no exchange rate is involved. For example, we calculate the price of men's clothing in Toronto relative to overall prices in that city, and compare it to the same ratio in New York. As we are comparing one relative price to another, we do not need to convert any prices using nominal exchange rates. Even using this method, though, there appear to be extremely large failures of the law of one price between Canadian and U.S. cities. This suggests that other types of market segmentation may be important for explaining international price movements. We focus on formal trade barriers, but find that the implementation of the U.S.-Canada Free Trade Agreement had little effect on the price behavior among North American cities. It is more likely that informal trade barriers—marketing, transportation, and distribution services that are organized on a national basis—account for the segmentation that prevents price convergence between U.S. and Canadian cities.

Devereux and I have recently investigated the implications of this empirical evidence for the choice of fixed versus floating exchange rates.<sup>11</sup> We follow the approach of the neoclassical literature by modeling optimizing agents with long horizons facing uncertainty about the economic environment. However, we augment that literature by allowing for price stickiness. We pay spe-

cial attention to the source of price stickiness: Do producers set prices in their own currencies or do they set different prices in different national markets? The empirical evidence seems to support the latter view. From a welfare standpoint, if prices are set in the producer's currency, then there is some ambiguity about whether fixed or floating exchange rates are better. Floating exchange rates tend to insulate the economy more from foreign monetary shocks, but the average level of consumption is actually higher under fixed rates. However, if it is true that producers "price to market," then (as we show) floating rates are unambiguously better than fixed exchange rates in terms of maximizing welfare of consumers. If this is the proper description of price setting, then floating exchange rates provide a tremendous advantage over fixed exchange rates in terms of insulation from foreign monetary shocks. (I have investigated some of the same issues in a traditional Mundell-Fleming framework, also providing some new empirical evidence on the significance of failures of the law of one price for real exchange rate movements among European countries.<sup>12</sup>)

## Exchange Rates

This line of research certainly undercuts the empirical foundations of the new neoclassical models of exchange rates, but it leaves open this question: Do we have a successful empirical model of nominal exchange rates? I believe the answer to that is still negative, at least for the short-run behavior of exchange rates. Furthermore, I believe it is unlikely that we will develop a model that can identify fundamental economic causes of short-run exchange rate movements, because I believe that many short-run exchange rate movements are driven by herding behavior of speculators.

This is a difficult position to defend, because it is a large leap from the statement that we do not have a model of the fundamental determinants of short-run exchange rate movements to the statement that those movements are not driven by fundamentals. One of the seminal pieces of evidence to support this latter view is from Flood and Rose, who find that there is virtually no difference in the behavior of economic fundamentals between fixed and floating exchange rate periods.<sup>13</sup> One would think that if fundamentals were driving the exchange rate, they would behave very differently when exchange rates were fixed compared to when they were floating.

My suspicions about speculative herd behavior arise from my study of the uncovered interest parity puzzle. That parity relation says, for example, that when the short-term U.S. interest rate exceeds the short-term German interest rate, investors should expect a depreciation of the dollar. Unless one of the two assets is considered to be a riskier investment, the expected return on the assets would be equalized. Investors must require a higher interest rate in one country to compensate for the expected depreciation of the currency of that country.

The puzzle is that in the data (over an extremely wide variety of time periods and countries<sup>14</sup>) the currency of the country with the higher interest rate actually tends to appreciate rather than depreciate! There is a neoclassical literature that attempts to explain the puzzle by attributing it to a time-varying risk premium. But I have argued that those models are not capable of explaining the interest parity puzzle.<sup>15</sup> I have surveyed dozens of studies that attempt to explain the puzzle with various models of rational risk-averse behavior.<sup>16</sup> None of those models come close to explaining the perverse relationship between interest differentials and



exchange-rate changes.

Instead, I think the most convincing explanation comes from Frankel and Froot's model with a group of "chartist" speculators who do not evaluate investment opportunities rationally, but instead chase trends.<sup>17</sup> The idea is quite simple. Suppose that the Federal Reserve Board were to raise short-term interest rates. In the Dornbusch model, the dollar would appreciate, but then would immediately begin to depreciate in a gradual way. So, the higher interest rate would be associated with an instantaneous appreciation, but also with expectations of a depreciation. Frankel and Froot suggest that after that initial appreciation, there is herding behavior by speculators. The speculators see that the dollar has appreciated, and they follow the trend and plunge into dollars. There will be a further appreciation of the dollar, so that the interest rate increase is associated with an expectation of future appreciation of the dollar. Investors' sentiment is swayed by recent trends: when the interest rate rises, investors come to believe that U.S. assets are good investments. They reinforce the interest rate advantage of U.S. assets by bidding up the value of dollars. An analysis by Eichenbaum and Evans<sup>18</sup> lends support for Frankel and Froot's theory of interest rate and exchange rate dynamics. Also, the Markov-switching model estimated in my work with Hamilton fits the Frankel-Froot theory precisely.<sup>19</sup> There are long swings in the value of the dollar. Once the dollar starts appreciating (or depreciating), it continues in that direction for a long period. Furthermore, interest rates do not rationally reflect those long-term exchange rate movements.

From the modern (1990s) perspective, the shortcoming of the Frankel-

Froot model is that it allows irrational herding behavior by economic agents. Additional serious research is needed to understand whether nonfundamental speculation can really drive short-run behavior of exchange rates.

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<sup>11</sup> M. B. Devereux and C. Engel, "Fixed vs. Floating Exchange Rates: How Price Setting Affects the Optimal Choice of Exchange-Rate Regime," Working paper, 1998, available at <http://www.econ.washington.edu>; and "The Optimal Choice of Exchange-Rate Regime: Price-Setting Rules and Internationalized Production," Working paper, 1998, available at <http://www.econ.washington.edu>.

<sup>12</sup> C. Engel, "A Retrial in the Case Against the EMU," Working paper, 1998, available at <http://www.econ.washington.edu>.

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<sup>14</sup> C. Engel, "The Forward Discount Anomaly and the Risk Premium: A Survey of Recent Evidence," *Journal of Empirical Finance*, 3 (1996), pp. 123-192.

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<sup>17</sup> J. Frankel and K. Froot, "Chartists, Fundamentalists and the Demand for Dollars," in *Private Behavior and Government Policy in Interdependent Economies*, A. Courakis and M. Taylor, eds. Oxford: Clarendon Press, 1990.

<sup>18</sup> M. Eichenbaum and C. Evans, "Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates," *Quarterly Journal of Economics*, 110 (1995), pp. 975-1009.

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# Historical Perspectives on U.S. Trade Policy

Douglas A. Irwin\*

In the wake of the contentious debate over the North American Free Trade Agreement and the Clinton administration's failure to obtain fast-track negotiating authority from the Congress, there are growing fears that domestic political support for liberal U.S. trade policies may be waning. It remains to be seen, however, whether globalization will unleash forces that will further erode the postwar bipartisan consensus in favor of an open trade regime and shift policies onto a more protectionist track.

The renewed debate over the future direction of U.S. trade policy, however, provides an opportune moment to reexamine the history of those policies. In a series of recent papers, I have explored the historical evolution of U.S. trade policy to investigate the role of protectionist policies in America's past and to understand the origins of the move toward a more liberal trade policy stance since World War II.

## A Tariff Laffer Curve?

The Civil War marked the beginning of a long period of high U.S. tariffs. These tariffs served the dual purpose of raising revenue for the federal government and keeping out foreign goods, ostensibly for the protection of U.S. labor and business. After the war, tariffs (which generated roughly half of government revenue) remained high to service the enormous debt burden that resulted from the war. Yet by the mid-1880s a

curious problem had arisen: though much of the debt had been paid off, federal revenues were outstripping expenditures by as much as 50 percent.

Republican and Democratic politicians agreed that the fiscal surplus should be reduced, but they proposed exactly the opposite policies for achieving this objective. Democrats advocated cutting tariff rates in an effort to reduce revenue. Arguing that this would simply encourage imports and raise even more revenue, Republicans proposed higher tariff rates to reduce fiscal revenue. This debate over the tariff "Laffer curve" essentially hinged on whether existing tariffs were above or below the revenue-maximizing rate, which in turn depended on the height of the tariff and the price elasticity of import demand. My estimates of these parameters indicate that the average tariff was below its revenue-maximizing rate; therefore, a tariff reduction would have been an appropriate policy for reducing revenue. Evidence from the McKinley tariff of 1890 supports this finding.<sup>1</sup>

## Voting to Protect Infant Industries?

The tariff was an important, and highly partisan, political issue during the late nineteenth century. Republicans supported high protective tariffs and Democrats endorsed moderate tariffs for revenue purposes only. This partisan conflict came to a head in what became known as the Great Tariff Debate of 1888. After President Grover Cleveland devoted his entire State of the Union message to an attack on high tariffs, the presidential campaign of 1888 was contested primarily on the tariff issue. Cleveland won more popular votes than his Republican rival, Benjamin Harrison, but Harrison received more electoral

votes; as president, he signed the McKinley tariff of 1890. Although political historians stress that ethnic and religious factors determined electoral behavior during this period, I find that state voting patterns are more consistent with constituent economic interests. Because cotton accounted for one third of U.S. exports, cotton-producing states voted overwhelmingly for the Democrats. The Republicans drew their electoral support from Northern states, which were home to many import-competing manufacturers.<sup>2</sup>

The United States rapidly industrialized during this high-tariff period and for the first time became a net exporter of manufactured goods. Were high tariffs responsible for the growth of manufacturing since they protected infant industries from foreign competition? The tinplate industry often has been singled out as the best practical example of infant industry protection. Unlike most other manufacturers, tinplate producers did not receive significant protection after the Civil War, and the United States did not produce tinplate for most of this period. After receiving protection in 1890, however, the industry grew rapidly and U.S. prices soon fell below those prevailing in Britain, previously the major source of consumption.

My analysis of this proposed infant industry explicitly considers the counterfactual: What would have happened to the tinplate industry in the absence of protection? My results suggest that, without protection, the United States would have seen domestic tinplate production about a decade later anyway because of the fall in the domestic price of iron and steel inputs, which comprised almost two thirds of tinplate production costs. The earlier failure of the tinplate industry was attributable to the negative effective protection resulting

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from high tariffs on iron inputs, which severely compromised the competitive position of prospective producers. Dynamic scale economies in the form of learning by doing, by contrast, appear limited. To the extent that learning economies existed, they spilled over easily from Britain through the migration of skilled labor. A tinplate tariff would have been a fourth-best industry policy to offset the distorted domestic price of iron inputs, but the actual tariff applied was not optimally set and thus reduced economic welfare.<sup>3</sup>

## Smoot-Hawley and the Great Depression

Although Democrats introduced a brief period of lower tariffs in 1913 (along with an income tax to create a revenue alternative to the tariff), Republican protectionism reemerged after World War I when high tariffs were imposed again. The tumultuous interwar years were marked by the excesses of protectionism and a later shift toward free trade.<sup>4</sup> The Smoot-Hawley Act of 1930, perhaps the most infamous tariff in U.S. history, raised import duties to high levels on the eve of the Great Depression. Contrary to many assertions, however, Smoot-Hawley accounted for only a small part of the large decline in U.S. trade in the early 1930s. Smoot-Hawley raised the average tariff from 40.7 percent to 47 percent, roughly a 20 percent increase in rates, which translates into just a 5 to 6 percent increase in the relative price of imports. Using estimates of the price elasticity of U.S. import demand for this period, I conclude that the initial Smoot-Hawley duties were responsible for a 4 to 8 percent decline in import volume, a small part of the observed 40 percent decline.<sup>5</sup>

However, most of the Smoot-Hawley tariffs were specific, not ad valorem, duties. The steep price deflation after 1930 significantly

raised the ad valorem equivalent of the Smoot-Hawley duties, and by 1932 the average tariff on dutiable imports reached nearly 60 percent. When this deflationary effect on tariffs is taken into account, the higher effective tariff explains nearly one quarter of the observed drop in imports in the early 1930s.

In joint work with Randall S. Kroszner, I have also investigated the political factors behind the passage of Smoot-Hawley. Several previous studies examined Congressional voting patterns on the Smoot-Hawley tariff; they concluded that, because the final House and Senate votes were almost straight "party line," it was simply a partisan matter. In contrast, we examine the numerous Senate roll call votes on tariff rates for individual commodities. We find that votes for higher tariffs were not strictly the result of partisan factors, but were related to nonpartisan log-rolling (or vote trading) among different economic interests.<sup>6</sup> This supports the contention that the institutional structure of Congressional decisionmaking was biased in favor of protection-seeking interests, thus resulting in relatively high tariffs.

## From Isolationism to Internationalism

If Congress was inherently biased in favor of high tariffs, how did the United States achieve trade liberalization? U.S. trade policy began an initial shift toward a more open stance after the traditionally moderate-tariff Democrats gained control of the legislative and executive branches in 1933. In 1934, the Democrats enacted the Reciprocal Trade Agreements Act (RTAA), an important piece of legislation that set the stage for current U.S. trade policy. The RTAA allowed the president to negotiate tariff-reduction agreements with other countries without obtaining Congressional approval (although

the RTAA itself required periodic renewal). Under the authority of the RTAA, the executive reached numerous bilateral trade agreements in the late 1930s and, in the immediate postwar period, negotiated the General Agreement on Tariffs and Trade (GATT), which remains the principal framework of the world trading system today.<sup>7</sup>

Because ultimate authority over trade policy still resided with Congress, however, the shift toward trade liberalization was not secure until the traditionally protectionist Republicans could be persuaded to support the RTAA. Republicans consistently rejected the RTAA through the 1930s, but began to change their position in the mid-1940s. In joint work with Kroszner, I have investigated the reasons for the shift. We find that it came not from an ideological change in favor of a liberal trade policy, but from a new configuration of constituent economic interests and changes in institutional incentives arising from the RTAA.<sup>8</sup> After World War II had eliminated competition from many foreign producers, domestic manufacturers supported trade agreements to obtain access to foreign markets. The RTAA itself also shifted the political balance of power toward export interests at the expense of import-competing interests. By directly tying lower foreign tariffs to lower domestic tariffs, the RTAA encouraged exporters to organize politically to oppose high tariffs and support international trade agreements.

## Higher Prices, Lower Tariffs

The use of specific duties in the U.S. tariff code (referred to earlier) played an important role in bringing about the postwar tariff reductions. In the century after the Civil War, import price fluctuations had important effects on the ad valorem equivalent of those duties. Between 1865

and 1967, according to my estimates, a 10 percent increase in import prices would reduce average tariffs by about 6.5 percent. Deflation served to increase tariffs in the early 1930s, and substantial inflation during and after World War II served to erode specific duties. I find that three quarters of the decline in average tariffs between 1932 and the early 1950s—when tariffs fell from nearly 60 percent to almost 10 percent—was attributable to higher import prices.<sup>9</sup>

The lower postwar U.S. tariffs usually are attributed to cuts in tariff rates resulting from negotiations undertaken as a result of the RTAA, principally the GATT, which was formed in 1947. Yet these results suggest that only a small fraction of the tariff decrease came as a consequence of bilateral and multilateral trade negotiations. The importance of the GATT and the agreements it has fostered cannot be measured in terms of reducing U.S. tariffs, perhaps, but in strengthening the vested interests that have a stake in perpetuating open trade policies. The GATT has provided an institutional means of giving stability and credibility to such policies by making their reversal more costly.<sup>10</sup>

The postwar period has been marked by a broad, bipartisan consensus in favor of trade liberalization, which only recently has shown signs of fraying. Just as the creation of an open trading system depended on changes in underlying economic interests and the institutional framework in which those interests were played out, any unraveling of that system will depend on those same factors.

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<sup>2</sup> D. A. Irwin, "Voting for Protection? Tariff Politics and the Presidential Election of 1888," NBER Working Paper, forthcoming.

<sup>3</sup> D. A. Irwin, "Did Late Nineteenth Century U.S. Tariffs Promote Infant Industries? Evidence From the Tinplate Industry," NBER Working Paper No. 6835, December 1998.

<sup>4</sup> For an analysis of the impact of interwar preferential trade arrangements on world trade, see B. Eichengreen and D. A. Irwin, "Trade Blocs, Currency Blocs, and the Reorientation of World Trade in the 1930s," *Journal of International Economics*, 38 (February 1995), pp. 1–24.

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<sup>6</sup> D. A. Irwin and R. S. Kroszner, "Logrolling and Economic Interests in the Passage of the Smoot–Hawley Tariff," NBER Working Paper No. 5510, March 1996; published in *Carnegie Rochester Conference Series on Public Policy*, 45 (December 1996), pp. 176–200.

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## Equity Flows, Banks, and Asia

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After World War II, capital markets in different countries were almost completely segmented from each other. Individual investors generally could not buy securities in other countries because they could not acquire the correct currency. Since

then, dramatic changes have occurred. Currencies typically are convertible and most major obstacles to capital flows among developed countries have been removed. This evolution has allowed equity investors to invest in most countries in the world.

Unfortunately, throughout history, periods with limited barriers to international investment were followed by periods with stronger restrictions. Since the devaluation of the Thai baht last year, many countries have faced economic difficulties; many

economists and policymakers have argued that the so-called "Asian flu" has spread too far and too decisively. Led by fears of contagion and encouraged by some prominent economists, some countries, for example Malaysia, have taken measures recently to restrict capital flows. Though fixed exchange rates can breed speculative attacks and contagion, we should not forget that countries benefit from open equity markets. There is little evidence that the presence of foreign equity investors will lead to irrational move-

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ments in equity markets.

In a recent paper,<sup>1</sup> I discuss the costs and benefits of opening equity markets to foreign investors. With closed equity markets, investors within a country have to bear all the risks of that country. Therefore, they charge a higher risk premium to bear risk, which translates into a higher cost of capital. The cost of capital determines which investments are worthwhile. An increase in the risk premium means that riskier investments with a greater expected return are replaced by safer investments with a lower expected return. Consequently, a country whose investors cannot diversify risks internationally has an economy that invests in safer projects with lower risk. This practice hampers economic growth. When the investors in a country become able to share risks with foreign investors, the cost of capital falls, and the economy invests in riskier projects that contribute more to growth because the cost of bearing risk is lower.

As countries have progressively liberalized, we have seen the emergence of a world capital market, which for a number of years included most developed countries. Eventually, it was joined by emerging markets. The theory predicts that, as the world capital market grows with the addition of new countries, the risk premium for bearing risk falls. As a country joins this world capital market, its cost of capital also falls. However, the evidence shows that the decrease in a country's cost of capital when it opens its capital market has been smaller than predicted. Recent papers by Geert Bekaert and Campbell R. Harvey<sup>2</sup> and P. B. Henry<sup>3</sup> indicate that the fall in the cost of capital when an emerging market opens its capital market might be on the order of two hundred basis points when theory predicts a much larger drop.

## The Home Bias and Portfolios of Foreign Investors

Part of the reason that the cost of capital does not fall as much as predicted is that when markets open up, foreign investors do not acquire as much equity as expected. In general, investors have a strong preference for their own country's equity. This phenomenon is called the home bias in equity holdings. Though the home bias has been studied for more than 20 years, it has recently become more of a puzzle, because some of the reasons for its existence seem to have disappeared. For instance, earlier research emphasized differences in transaction costs and taxes as an explanation for the home bias,<sup>4</sup> but these differences have diminished over time. As Linda L. Tesar and Ingrid M. Werner point out,<sup>5</sup> in some cases foreign investors trade more than domestic investors; thus higher transaction costs cannot explain why their holdings of foreign equity are so limited.

Because of the home bias, investors do not take as much advantage of international diversification as would be expected. Jun-Koo Kang and I<sup>6</sup> examine the apparent home bias in holdings of equity by foreign investors in Japan. For that study, we had data on holdings of equity by foreign investors for each firm on the Tokyo Stock Exchange from 1975 to 1991. Strikingly, despite all the liberalization of capital flows, foreign holdings of Japanese securities were quite small over the entire sample period. In 1975, foreign investors held 4.64 percent of the market capitalization of the Tokyo Stock Exchange. In 1991, they held 5.59 percent. Their holdings reached a peak of 11.31 percent in 1984. Expressed as a fraction of the world equity market capitalization, the holdings of Japanese stocks by for-

ign investors were always small relative to the importance of the Japanese equity market. Even in 1991, the Japanese equity market was more than 30 percent of the capitalization of the Morgan Stanley Capital International World Index.

Why have investors been so slow to take advantage of the benefits of international diversification? Our paper on the behavior of foreign investors in Japan offers some clues. We find that foreign investors have an extremely strong preference for holding shares of large firms. On average during our sample period, foreign investors held 7.12 percent of a firm in the top quintile of Japanese firms in equity capitalization, but only 1.4 percent of a firm in the bottom quintile. Hyuk Choe, Bong-Chan Kho, and I<sup>7</sup> demonstrate that this large firm bias is not restricted to Japan. We show a similar bias for foreign investors in Korea in 1997. Kang and I<sup>8</sup> also show that, for a given firm size, foreign investors invest more in the more liquid stocks. This evidence is consistent with a model where foreign investors are better informed, or less at an informational disadvantage relative to domestic investors, for large firms. Choe, Kho, and I<sup>9</sup> show that institutional investors account for almost all of the holdings of equity by foreign investors in Korea. Institutional investors generally exhibit a bias toward large stocks, and institutional investors who invest abroad are no different.

## Globalization and the Relationships Among Equity Markets

As barriers to international investment fall, equity markets everywhere are affected by changes in the risk premium on equity. Stock prices can fall because investors expect future economic activity to become less favorable, because of an increase in

real interest rates, or because investors require a higher compensation for risk. With free markets, the fact that an increase in the risk premium that investors require on equity causes stock prices throughout the world to fall is a sign of efficiency rather than a reason for concern. In simple models, the risk premium on the world market portfolio depends on the volatility of the return on that portfolio. An unexpected increase in volatility increases the risk premium and causes stock prices to decrease. Everything else being equal, an increase in the volatility of a foreign market increases the volatility of the world market portfolio. Consequently, an increase in volatility abroad causes stock prices to drop in the United States.

K. C. Chan, G. Andrew Karolyi, and I<sup>10</sup> examine this relationship between the volatility of a foreign market and the risk premium on U.S. stocks. We find that the risk premium on U.S. stocks, for example, depends on the volatility of the Japanese market. An increase in the volatility of Japanese stock returns leads to an increase in the risk premium on U.S. stocks and a fall in the price of these stocks. Opening an equity market to foreign investors increases the dependence of that market on events outside it. If this were not the case, there would be no benefit from opening the market. However, factors that affect the risk premium on stocks now affect the stocks in the newly opened market. As a result, the return on equity in that market is likely to be more correlated than before with the return on equity in the rest of the world. I have found some evidence of such an increase.<sup>11</sup> Further, when Karolyi and I<sup>12</sup> examine the determinants of the correlation between U.S. stocks and Japanese stocks, we show that the U.S. market and the Japanese market move more closely together when volatility in either market is high.

Though the evidence just described relates to the rational links between markets that result from the removal of barriers to international investment, there has also been much concern about the existence of links that are attributable to panic and confusion of foreign investors. When I examine the evidence available before the most recent events, though, it does not seem that there is irrational contagion among equity markets.<sup>13</sup>

### **Do Countries Still Matter?**

Globalization makes markets move together more than they did before. This has led some to believe that the focus of equity analysis should be on industries across frontiers rather than on countries. Some investment management firms are now reorganizing, so that instead of having analysts whose work stops at the border of a country, they have analysts who look at an industry across countries. This raises the question of whether globalization has gone so far that we can ignore countries. Both Karolyi and I<sup>14</sup> and John M. Griffin and I<sup>15</sup> find that we cannot. Industry effects are of surprisingly little importance in explaining the correlation of stock returns across countries, we find. Griffin and I<sup>16</sup> also show that exchange rates explain very little of the difference in performance across industries. Even though there have been many analyses of how yen depreciation makes American car producers more competitive at the expense of Japanese car producers, in fact the impact of an unexpected change in the yen-dollar exchange rate on the equity of American car producers is economically trivial.

### **Are Foreign Equity Investors Dangerous?**

Chan, Karolyi, and I<sup>17</sup> demonstrate the existence of a completely rational

relationship between the volatility of foreign markets and the equity premium on U.S. stocks. But recently, many observers and policymakers have been concerned about the ability of foreign investors to destabilize markets. Choe, Kho, and I<sup>18</sup> investigate the role of foreign equity investors in Korea using a database that includes all trades made on the Korea Stock Exchange in 1997. This database makes it possible to identify trades made by foreign investors. We first explore the dynamics of foreign holdings of shares in Korea, because policymakers are concerned that foreign equity investors buy when markets are going up and sell when markets are going down. Such investment strategies are called positive feedback strategies. They can be destabilizing because investors can lead prices away from fundamentals. This is especially the case if different investors pursue similar strategies, so that they end up forming a herd. We find strong evidence that foreign investors engaged in positive feedback strategies in Korea. In particular, foreign investors were more likely to buy when Korea's market was up the previous day and to sell when it was down. We also find that foreign investors tended to act as a group, in that they were likely to buy together and sell together. Our evidence, therefore, supports those who are concerned that foreign investors engage in positive feedback trading and herding.

Next we ask whether the practices of foreign investors are destabilizing. We look in great detail at the last three months of 1997 and show that the practices of foreign investors that have caused concern diminished during that time, when Korea's economic crisis developed. In particular, we find that positive feedback trading dropped dramatically and perhaps disappeared during the last three months of 1997. Further, herding fell significantly during that

period. Based on our evidence, it seems implausible that short-term destabilizing positive feedback trading on the part of foreign equity investors played a role in the Korean crisis. Perhaps the most telling evidence that positive feedback trading cannot have been important is that the fraction of the total capitalization of Korea's stock market held by foreign investors was higher at the end of 1997 than at the beginning.

Further investigating the impact of trading by foreign investors, we consider whether foreign investors might have started runs on stocks. In other words, we ask if stock prices start to increase following purchases by foreign investors and start to fall following sales by foreign investors. We first look at five-minute intervals: as one would expect, if foreign investors make a large purchase of a stock during a five-minute interval, the stock price increases. This is true both before and during the crisis period. Once the purchase is made, however, the market adjusts within five minutes. Therefore, there is no evidence that purchases by foreign investors have a destabilizing effect. The market also adjusts quickly to sales and the small negative impact of a large sale (on the order of 1 percent) gets reversed in part. When we examine daily returns, we again find that the actions of foreign investors do not lead to runs. Thus, no case can be made that foreign equity investors were disruptive.

## What About Banks?

If the actions of foreign investors seem unlikely to explain dramatic falls in stock markets, we must look elsewhere to understand such episodes. The drop in the Japanese stock market in the early 1990s offers fertile ground for researchers. Kang and I<sup>19</sup> try to understand the contribution of the difficulties in the banking sector to the collapse of equity

prices. We show that those Japanese firms that relied more heavily on banks for their financing at the end of the 1980s experienced a sharper loss of equity value during the early 1990s.

We then explore possible explanations for this result. We find that the impact of bank reliance on equity performance cannot be explained by other firm characteristics. Rather, the explanation for the poor performance of firms that relied more on banks seems to be that these firms had to cut back their investment relative to firms that did not rely on banks as much. Everything else being equal, the firms that relied more on bank financing at the end of the 1980s invested less at the beginning of the 1990s. Shocks to banks' ability to finance investment thus have a significant economic impact on those firms that depend on them. We further confirm the importance of bank health on bank-dependent firms by examining the performance of Japanese firms on days when important announcements about the Basle Accord on capital requirements for banks were made. On days when Japanese bank stocks fell because of announcements about the Basle Accord, the firms that relied more on bank debt performed poorly, we find.

Our evidence does not imply that firms should not rely on banks. Rather, it shows that finance provided by banks is fundamentally different from finance provided by equity investors. If foreign investors want to reallocate their holdings away from a country, they have to worry about the price impact of their trades. If a bank has to reduce the exposure of its loan portfolio to firms in one country, it benefits from being the first to do so. This is because the borrower is likely to run out of liquid assets to pay back loans and the firm that had obtained bank finance no longer has it once the bank has called the loan. As a result, when too many firms in a country rely exces-

sively on bank debt, it does not take much of an economic shock to force them to shrink investment and to put some of them into default.

<sup>1</sup> R. M. Stulz, "International Portfolio Flows and Security Markets," *Dice Center Working Paper*, Ohio State University, 1997, pp. 97-112.

<sup>2</sup> G. Bekaert and C. R. Harvey, "Foreign Speculators and Emerging Equity Markets," *unpublished working paper*, Duke University, 1998.

<sup>3</sup> P. B. Henry, "Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices," *unpublished working paper*, Graduate School of Business, Stanford University, 1998.

<sup>4</sup> R. M. Stulz, "On the Effects of Barriers to International Investment," *Journal of Finance*, 36, (1981), pp. 459-68.

<sup>5</sup> L. L. Tesar and I. M. Werner, "Home Bias and High Turnover," *Journal of International Money and Finance*, 14, (1995), pp. 467-93.

<sup>6</sup> J. Kang and R. M. Stulz, "Why Is There a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan," *Journal of Financial Economics*, 46, (1997), pp. 3-28.

<sup>7</sup> H. Choe, B. Kho, and R. M. Stulz, "Do Foreign Investors Destabilize Stock Markets? The Korean Experience in 1997," *NBER Working Paper No. 6661*, July 1998.

<sup>8</sup> J. Kang and R. M. Stulz, "Why Is There a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan."

<sup>9</sup> H. Choe, B. Kho, and R. M. Stulz, "Do Foreign Investors Destabilize Stock Markets? The Korean Experience in 1997."

<sup>10</sup> K. C. Chan, G. A. Karolyi, and R. M. Stulz, "Global Financial Markets and the Risk Premium on U.S. Equity," *Journal of Financial Economics*, 32, (1992), pp. 137-68.

<sup>11</sup> R. M. Stulz, "International Portfolio Flows and Security Markets."

<sup>12</sup> G. A. Karolyi and R. M. Stulz, "Why Do Markets Move Together? An Investigation of U.S.-Japan Stock Return Comovements," *Journal of Finance*, 51, (1996), pp. 951-86.

<sup>13</sup> R. M. Stulz, "International Portfolio Flows and Security Markets."

<sup>14</sup> A. Karolyi and R. M. Stulz, "Why Do Markets Move Together? An Investigation of U.S.-Japan Stock Return Comovements."

<sup>15</sup> J. M. Griffin and R. M. Stulz, "International Competition and Exchange Rate

*Shocks: A Cross-Country Industry Analysis of Stock Returns," NBER Working Paper No. 6243, October 1997.*

<sup>16</sup> *Ibid.*

<sup>17</sup> K. C. Chan, A. Karolyi, and R. M. Stulz, "Global Financial Markets and the Risk

*Premium on U.S. Equity."*

<sup>18</sup> H. Choe, B. Kho, and R. M. Stulz, "Do Foreign Investors Destabilize Stock Markets? The Korean Experience in 1997."

<sup>19</sup> J. Kang and R. M. Stulz, "Is Bank-Centered Corporate Governance Worth It?

*A Cross-Sectional Analysis of the Performance of Japanese Firms During the Asset Price Deflation," NBER Working Paper No. 6238, October 1997.*



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## **NBER Profile: Elizabeth E. Bailey**

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Elizabeth E. Bailey, the John C. Hower Professor of Public Policy and Management at the Wharton School of the University of Pennsylvania, has been a member of the NBER's Board of Directors since 1995. She holds a B.A. in economics from Radcliffe College, an M.S. in mathematics and computer science from the Stevens Institute, and a Ph.D. in economics from Princeton University.

Bailey is a former dean of Car-

negie Mellon University's Graduate School of Industrial Administration and a former commissioner of the Civil Aeronautics Board. Her publications and lectures focus on economic and social regulation, market structure, and corporate governance. She is the author of *Economic Theory of Regulatory Constraint* and *Deregulating the Airlines*, with David Graham and Daniel Kaplan, as well as numerous articles in technical and professional journals.

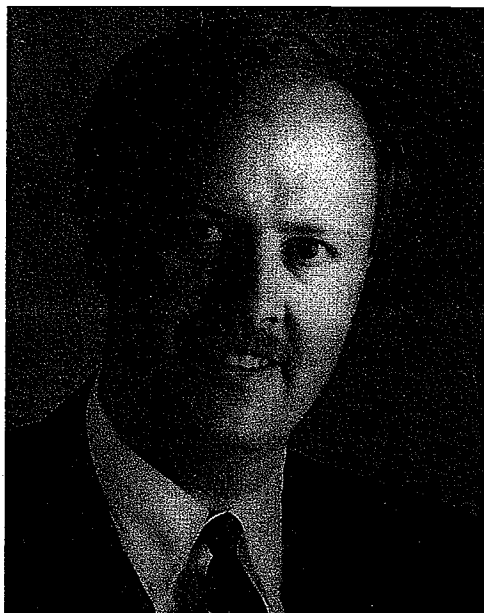




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## NBER Profile: *Mark Drabenstott*

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Mark Drabenstott, a vice president and economist at the Federal Reserve Bank of Kansas City, has been a member of the NBER's Board of Directors since 1995. A native of Markle, Indiana, he received a B.A. in economics from Earlham College in 1977, and a Ph.D. in economics from Iowa State University in 1981.

Drabenstott joined the Kansas City Fed in 1981 as an agricultural economist, was promoted to senior economist in 1983, assistant vice presi-

dent in 1987, and vice president in 1990. In October 1998, he was named Director of the newly established Center for the Study of Rural America, which will serve as the Fed's focal point for research on rural and agricultural issues.

Drabenstott's wife, Peggy, is a supervisor in the computer systems department of the Kansas City Fed. They have three children, ages 11, 9, and 7. His hobbies are playing the piano and fishing.

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## NBER Profile: *Charles M. Engel*

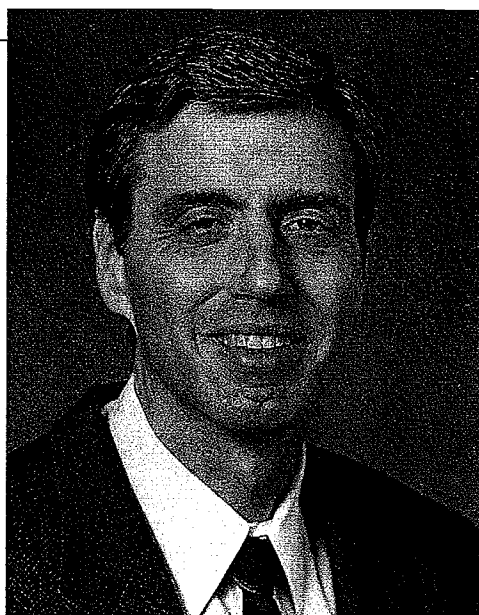
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Charles M. Engel is an NBER Research Associate in the Program on International Finance and Macroeconomics and a professor of economics at the University of Washington. He received an A.B. from the University of North Carolina, Chapel Hill in 1977 and a Ph.D. from the University of California, Berkeley in 1983.

Engel, a former Olin Fellow at the NBER, has also taught at the University of Virginia and has been a visiting professor at the Graduate Institute for International Studies in Geneva and at Yale University. He

has held positions as a visiting scholar at the Federal Reserve Banks of Kansas City, New York, and San Francisco, as well as at the Federal Reserve Board of Governors and the International Monetary Fund. He is the co-editor of the *Journal of International Economics*.

Engel's wife, Rochelle, supervises the Current Population Survey for the U.S. Census Bureau in the Northwest region. Their son, Alex, was born in May. They spend their brief leisure time playing with blocks, reading picture books, and trying to invent an automatic diaper changer.



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## NBER Profile: *Karen N. Horn*

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Karen N. Horn, a member of the NBER Board of Directors since 1994, is a Managing Director and the Head of International Private Banking at Bankers Trust Company. She holds a B.A. in mathematics from Pomona College and a Ph.D. in economics from the Johns Hopkins University.

Prior to joining Bankers Trust,

Horn was Chairman of Bank One, Cleveland, President of the Federal Reserve Bank of Cleveland, and Treasurer of the Bell Telephone Company of Pennsylvania.

Horn and her husband, John, have one son. Her hobbies and interests include music, theater, and dressage.

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## NBER Profile: *Douglas A. Irwin*

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Douglas A. Irwin is a Research Associate in the NBER's Programs on International Trade and Investment and Development of the American Economy and a professor of economics at Dartmouth College. He received his B.A. from the University of New Hampshire in 1984 and his Ph.D. from Columbia University in 1988.

Prior to joining the Dartmouth faculty, Irwin taught at the University of Chicago's Graduate School of Business. He was also an international economist at the Board of Governors of the Federal Reserve System, and he worked on trade policy issues as a Junior Staff Economist for the Council of Economic Advisors during 1986-7.

Irwin's research focuses on con-

temporary and historical international trade and commercial policy issues. He is author of *Against the Tide: An Intellectual History of Free Trade* (Princeton University Press, 1996), which is being translated into several foreign languages, and *Managed Trade: The Case Against Import Targets* (AEI Press, 1994).

A native of New Hampshire, Irwin lives in Hanover with his wife Marjorie B. Rose and their daughters, Ellen (7) and Katie (3). Marjorie, who is currently on leave from her position as a Senior Economist at the International Monetary Fund, also teaches economics at Dartmouth. They enjoy sledding with their girls in the winter and spending time at a family lake house in the summer.



## NBER Profile: René M. Stulz



René M. Stulz is the Everett D. Reese Chair of Banking and Monetary Economics at the Ohio State University, the Director of the Dice Center for Research in Financial Economics at the Ohio State University, and a Research Associate in the NBER's Asset Pricing and Corporate Finance Programs.

Born in Switzerland, where he completed undergraduate studies, Stulz received his Ph.D. from MIT in 1980. He previously taught at the University of Rochester and has held visiting appointments at MIT and the University of Chicago. He was also a Marvin Bower Fellow at the Harvard Business School.

Stulz is currently the editor of the *Journal of Finance* and was formerly an editor of the *Journal of Financial Economics*. He has published more than 50 papers in finance and eco-

nomics journals; his research addresses issues in international finance, corporate finance, and investments. He is currently working on a textbook titled *Financial Engineering, Risk Management, and Derivatives*, as well as conducting research on Japanese corporate finance, the benefits and costs of firm diversification, the recent evolution of the market for corporate control in the United States, the determinants of cash holdings by firms, and international equity flows.

Patricia Reagan, Stulz's wife, is a faculty member in the economics department at Ohio State University. They have two children, Phoebe, a freshman at the Interlochen Arts Academy, and Jack, a fifth grader. Stulz enjoys classical music, studying history, hiking, and walking his golden retriever, Truffles.

## Conferences

### Tax Policy and the Economy

The NBER's thirteenth Annual Conference on Tax Policy and the Economy took place on October 20 in Washington, DC. Organizer James M. Poterba, of NBER and MIT, introduced the following program:

**William N. Evans**, NBER and University of Maryland; **Jeanne S. Ringel**, Louisiana State University; and **Diana Stech**, University of Maryland, "Tobacco Taxes and Public Policy to Discourage Smoking"

**James R. Hines, Jr.**, NBER and University of Michigan, "Nonprofit Business Activity and the Unrelated Business Income Tax"

**Julie Lec**, Nexus Associates, Inc.; **Mark McClellan**, U.S. Department of the Treasury; and **Jonathan S. Skinner**, NBER and Dartmouth College, "The Distributional Effects of the Medicare Program"

**Jagadeesh Gokhale**, Federal Reserve Bank of Cleveland; **Steven Caldwell**, **Melissa Favreault**,

and **Thomas Johnson**, Cornell University; **Alla Gantman**, Boston University; and **Laurence J. Kotlikoff**, NBER and Boston University, "Social Security's Treatment of Postwar Americans"; **Julia Lynn Coronado**, Federal Reserve System; **Don Fullerton**, NBER and University of Texas; and **Thomas Glass**, University of Texas at Austin, "Distributional Impacts of Proposed Changes to the Social Security System"

**Evans, Ringel, and Stech** study the impact of cigarette tax increases

on consumers, governments, and producers. They show that 100 per-

cent of a tax hike is passed on to consumers in the form of higher

prices. Given their ability to shift tax increases on to consumers, tobacco companies bear little of the burden of a tax. For every \$1 raised in tax revenues, cigarette companies lose only an estimated 8 cents in before-tax profits. Further, for tobacco producers, events that increased the plaintiffs' chances in state Medicaid cases had a statistically significant negative impact on firm value, while movement toward settlement greatly increased stock prices. Finally, although some argue that current tax revenues exceed the external costs of smoking, these estimates typically exclude the costs of maternal smoking (such as increased health care costs for infants born to women who smoke). These costs range from 42 cents to 72 cents per pack, and thus should be considered in any cost-benefit analysis of smoking.

U.S. nonprofit organizations generally are exempt from federal income taxes. But profits earned from activities unrelated to the exempt purposes are subject to the Unrelated Business Income Tax (UBIT). **Hines** observes that U.S. nonprofit organizations in the aggregate undertake only a limited amount of unrelated business activity, and owe less than \$200 million of UBIT annually. Individual information returns show that large nonprofit organizations and those with pressing financial needs attributable to large program expenses and small contribution and grant receipts are the most likely to have unrelated business income. Nonprofit organizations prefer not to undertake unrelated business operations, doing so generally when driven by financial

need. This has implications for the efficiency of the UBIT as a source of tax revenue and for the need to tax the business income of nonprofit organizations to prevent unfair competition.

The Medicare program is now an important source of transfers to elderly and disabled beneficiaries and will continue to grow rapidly in the future. **Lee, McClellan, and Skinner** measure the flow of Medicare benefits to high-income versus low-income neighborhoods in 1990 and 1995. They find that Medicare spending per capita for the lowest income groups grew much more rapidly than Medicare spending in either high-income or middle-income neighborhoods. Home health care spending played an important role in this increased spending. Recent cutbacks in home health care benefits may undo some of this change. Still, this example illustrates how specific technical changes in Medicare policy can have redistributive effects comparable to major and much more visible expenditure and tax policies.

**Ghokale, Caldwell, Favreault, Gantman, Johnson, and Kotlikoff** find that under current law, baby boomers will lose roughly 5 cents of every dollar they earn to the Social Security program in taxes-net-of-benefits. For today's children, the figure is 7 cents per dollar earned. Measured as a proportion of their lifetime labor incomes, the middle class are the biggest losers; measured in absolute dollars, the rich lose the most. Out of every dollar that postwar Americans contribute to the Social Security system, 74 cents represents a pure tax. The system treats women

better than men, whites better than nonwhites, and the college educated better than those without a college education. The system has been partially effective in pooling risk across households, but it offers postwar generations internal rates of return on their contributions that are quite low. Those born right after World War II will earn, on average, a 2.4 percent real rate of return. Those born in the early 1970s will average about a 1 percent real rate of return, and those born at the end of this decade will average essentially a zero rate of return.

**Coronado, Fullerton, and Glass** estimate the impact of various proposed changes to Social Security on the overall redistributive effect of the system. Their analysis assumes that participants work their entire lives and retire under a given system. Redistribution is measured on a lifetime basis using estimated earnings profiles. Differential mortality is accounted for by gender, race, and lifetime income. Their results indicate that the current Social Security system redistributes less than is generally perceived, mainly because people with higher lifetime incomes live longer and therefore draw benefits longer. Many of the proposed changes to Social Security have surprisingly little effect on the redistribution inherent in the system.

These papers will be published by the MIT Press as *Tax Policy and the Economy*, Volume 13. The volume will be available in the spring for \$30.00 (cloth) and \$15.00 (paper).



## Capital Account Convertibility and Capital Controls in Emerging Market Countries

On November 6, 1998, a group of leading researchers and practitioners in international finance gathered in Cambridge to discuss capital controls in emerging markets. The backdrop to the meeting, chaired by NBER President Martin Feldstein, is of course the international financial crisis that has spread from Asia to Russia and continues to threaten Latin America. The conference considered the role that controls might play in managing the crisis, and in preventing similar disruptions in the future. The format was a series of short presentations by researchers who have written extensively on the topic,<sup>1</sup> interspersed with a free ranging and lively discussion with a number of invited participants.<sup>2</sup>

Do controls on capital outflows have a role to play in the management of the kind of financial crises that followed Mexico's devaluation in 1994 or Thailand's devaluation less than three years later? The discussion on this question revolved around **Paul Krugman's** organizing device of the "eternal triangle" (which he also referred to as the "irreconcilable trilogy"). The idea of the triangle is that there are three desirable capacities: the capacity to use stabilization instruments; the capacity to defend the exchange rate; and the capacity to have free capital movement. The dilemma is that only two of the three are achievable. If you demand free capital movement and a defense of the currency, then stabilization must be sacrificed. If you demand free capital movement and freedom in the use of monetary and fiscal policy to attempt stabilization, then you will not be able to defend the exchange rate. Since both macroeconomic policy austerity and a collapsing exchange rate are likely to lead to deep recessions, capital controls—how-

ever undesirable in themselves—may be the only way out.

The Krugman depiction of the policy constraints did not go unchallenged. One challenge that was raised in various ways by numerous participants was to the Krugman presentation of the nature of the crisis as one involving self-fulfilling expectations (or multiple equilibria) as distinct from flawed fundamentals. The strongest challenge to the multiple equilibria view came in **Michael Dooley's** presentation. Dooley questioned the claim that the fickleness of financial markets is the source of the problem, rather than "governments' participation in financial markets." This participation comes in the form of implicit government guarantees, which lead money borrowed abroad to be misused, say by hiding the proceeds offshore (as in Indonesia) or through investments in unproductive capital (as in Korea). When the crisis hits, the previous misuse of resources will be a serious impediment to recovery, since the "very large real loss in the financial system must be eventually allocated to taxpayers." In Dooley's view, however, controls on capital outflows will not be of any help. He concludes: "Residents and non-residents 'stuck' in a financial market populated by insolvent banks and firms are not going to invest in productive capital."

In the context of crisis prevention, the multiple equilibria view was most strongly advanced by **Jagdish Bhagwati**. Bhagwati stressed the differences between the case for free capital movements and the case for free trade. He expressed agreement with Charles Kindleberger's view of financial markets as being prone to cycles of manias, panics and crashes. On the benefit side, he finds little evidence that the gains from non-FDI

capital inflows are large in non-crisis situations. Moreover, he argued that there is a reasonably high probability a crisis will occur when there is free capital movement, and that the costs of the crisis tend to be amplified by bad IMF-imposed policies when they do occur. His conclusion is that countries need to move cautiously in removing controls. He also expressed the belief that countries that have already liberalized should "stay the course" during a crisis.

In their presentation, **Barry Eichengreen** and **Michael Mussa** argued that "all or nothing" is not the right way to think about capital controls, but instead put the issue in terms of multiple lines of defense. The first line of defense is prudent risk management on the part of banks and other financial institutions. This, in turn, should be backstopped by domestic regulatory supervision that sets limits on exposures, concentrated lending, and so on. Only when the first two lines of defense are inadequate should capital controls be considered. Even then, it must be recognized that not all controls are created equal, with some more market friendly (for example, Chilean controls) than others (for example, Malaysian controls). Eichengreen and Mussa also referred to the fact that emerging market economies get treated differently from more established market economies when they have to devalue. In an economy without central bank independence and with a history of weak discipline in fiscal policymaking, a devaluation sends a quite different signal than it would send in an economy with better institutions.

For most of the day, participants discussed capital controls in broad terms, passing over fine distinctions among controls of different types. An

important theme in **Jeffrey Frankel's** presentation, however, was that controls come in very different types and we need to be clear about the type we are discussing. Moreover, to determine which controls might be helpful, we need to consider the aims of controls.

Although most of Frankel's presentation focused on different aims for inflow controls, he began by discussing outflow controls as a way of managing a crisis. These, he argued, have the least support, although he agreed with Paul Krugman that one must ask what the alternatives are. The main objections he raised were: they are typically easy to evade; they reduce the pressure of the international financial markets to pursue good policy; and they can lead to contagion (for example, Russia's unilateral rescheduling and Malaysia's controls hurt investor confidence in other countries as well).

What are the different aims for inflow controls? And which of these aims are likely to be met? First, there is the aim of discouraging the volume of inflows. These do seem to be effective, if only because of their signalling effect to foreign investors. Second, there is the aim of changing the composition of inflows. Frankel reported evidence that short-term flows do increase the *probability* of a crisis, so that restricting flows at the short end them could make an economy less crisis prone. He agreed with Larrain and Reinhart that controls that discriminate among flows of different types can be effective in changing the composition of flows. Third, there is the aim of reducing exchange rate volatility with a small Tobin tax on all types of capital transactions. Here he agreed with Dooley that small taxes of this type are *not* effective in avoiding currency crises. Finally, there is aim of retaining or regaining monetary control and decoupling domestic from foreign interest rates. This can be achieved by limiting both inflows

and outflows. Can this be effective without completely turning your back on international capital markets? Here he finds that the verdict is mixed. A number of the Asian economies now in crisis (for example, Thailand and Korea) thought they had achieved this, but obviously this did not turn out to be the case. On the other hand, a country like China seems to be weathering the crisis reasonably well. The waters are muddied even more, however, in that Hong Kong and Singapore with quite open capital markets have also weathered the crisis reasonably well. So again there is no clear conclusion about the best capital regime for insulating an economy from financial market disruptions.

In separate presentations, **Felipe Larrain** and **Carmen Reinhart** reported on empirical and theoretical evidence on the effectiveness of capital inflow and outflow controls. Larrain's discussion focused on Chile, a country that actually *liberalized* outflows during the 1990s while simultaneously increasing controls on inflows. Somewhat surprisingly, the liberalization of outflows led to larger net inflows—a finding that is consistent with a number of other episodes. A possible theoretical explanation explored by Larrain is that liberalizing outflows reduces the irreversibility of investments, and thereby reduces the option value of waiting to invest. For the debate about restricting outflows in the midst of a crisis, he puts his finding in reverse and concludes that such controls might actually cause net capital inflows to fall. Reinhart also reported on some preliminary research related to impositions of controls in such countries as Venezuela, Argentina, and Mexico. She emphasized that these were harsh controls involving such measures as suspension of convertibility and forced conversions of foreign exchange. She pointed out that the measures were supposed to be tem-

porary but tended to persist. Her evidence indicates that the controls were effective in limiting reserve losses, but there was also evidence of considerable evasion. Overall, however, taking into account the "signalling element," she shares Larrain's belief that controls on outflows are probably not effective in increasing the net inflow position.

The empirical evidence on the impact of *controls on inflows* reported by Larrain and Reinhart presented a consistent picture: controls have little effect on the overall volume of capital flows, but they do alter the composition in favor of longer term flows. Reinhart also found that efforts to sterilize the effects of inflows on the domestic money supply and interest rates did increase the volume and composition of flows, in this case towards the short end. Such sterilization efforts were common in Asia leading up to the crisis in an attempt to stop their economies overheating, keeping rates of return relatively high, encouraging significant flows of "hot money" and making the region vulnerable to the kind of sudden reversal that ultimately took place. Reinhart also stressed the importance of *counter-cyclical* controls on inflows, where controls are tightened during an inflow cycle and loosened during an outflow cycle (Chile and Brazil have used this flexible approach). On this point, Larrain reported that Chile has reduced its non-renumerated deposit requirement to zero to attract inflows during the current difficult period, but the instrument remains in place for future use. Reinhart emphasized that, given Paul Krugman's description of how little scope there was for engaging in counter-cyclical policy by other means, counter-cyclical controls on inflows could be a valuable instrument.

<sup>1</sup> The presentations were given by: Jagdish Bhagwati (Columbia University) by video-



tape, Paul Krugman (MIT and NBER), Michael Dooley (Federal Reserve System on leave from NBER), Jeffrey Frankel (Council of Economic Advisers on leave from NBER), Barry Eichengreen (UC, Berkeley and NBER) and Michael Mussa (International Monetary Fund on leave from NBER), Felipe Larrain (Harvard University); Carmen Reinhart (University of Maryland).

<sup>2</sup> In addition to the presenters, the other participants were: Andrew Berg (International Monetary Fund), John Campbell (Harvard University and NBER), Richard

Cooper (Harvard University), Kathryn M.E. Dominguez (University of Michigan and NBER), Martin Feldstein (Harvard University and NBER), Peter Garber (Deutsche Morgan Grenfell), Linda Goldberg (Federal Reserve Bank of New York on leave from NBER), Simon Johnson (MIT), Barry Johnson (International Monetary Fund), Anne O. Krueger (Stanford University and NBER), David Lipton (Carnegie Endowment for International Peace), N. Gregory Mankiw (Harvard University and NBER), Don Mathieson (International Monetary Fund), John McHale (Harvard

University), Jean Pisani-Ferry (Ministere de l'Economie, des Finances et de l'Industrie, France), Steve Radelet (Harvard University), Dani Rodrik (Harvard University and NBER), Nouriel Roubini (Council of Economic Advisers on leave from NBER), Jeffrey Shafer (Salomon, Smith Barney), Hal Scott (Harvard University), Aaron Tornell (Harvard University and NBER), Andres Velasco (New York University and NBER), Shang-jin Wei (Harvard University and NBER).

## Formulation of Monetary Policy

An NBER Universities Research Conference on "Formulation of Monetary Policy" organized by Mark Gertler of NBER and New York University and Frederic S. Mishkin of NBER and Columbia University, was held in Cambridge on December 4-5. The program was:

**Athanasios Orphanides**, Federal Reserve Board, "Monetary Policy Rules Based on Real-Time Data"

Discussants: Marvin Goodfriend, Federal Reserve Bank of Richmond, and Kenneth Kutner, Federal Reserve Bank of New York

**Glenn D. Rudebusch**, Federal Reserve Bank of San Francisco, "Is the Fed Too Timid? Monetary Policy in an Uncertain World"

Discussants: Kenneth D. West, NBER and University of Wisconsin, and John Williams, Federal Reserve Board

**Volker Wieland**, Federal Reserve Board, "Monetary Policy and Uncertainty About the Natural Unemployment Rate"

Discussants: John V. Leahy, NBER and Boston University, and James H. Stock, NBER and Harvard University

**Soyoung Kim**, University of Illinois, "International Transmission of the U.S. Monetary Policy Shocks: Evidence From VARs"

Discussants: Richard H. Clarida, NBER and Columbia University, and Pierre-Olivier Gourinchas, NBER and Princeton University

**Peter N. Ireland**, Boston College, "Does the Time-Consistency Problem Explain the Behavior of Inflation in the United States?"

Discussants: Laurence M. Ball, NBER and Johns Hopkins Univer-

sity, and Lawrence Christiano, NBER and Northwestern University

**Alexander J. Wolman**, Federal Reserve Bank of Richmond, "Real Implications of the Zero Bound on Nominal Interest Rates"

Discussants: Jess Benhabib, New York University, and Donald Kohn, Federal Reserve Board

**Arturo Estrella**, Federal Reserve Bank of New York, and **Jeffrey C. Fuhrer**, Federal Reserve Bank of Boston, "Dynamic Inconsistencies: Counterfactual Implications of a Class of Rational Expectations Models"

Discussants: Julio J. Rotemberg, NBER and Harvard University, and Christopher A. Sims, NBER and Yale University

**Orphanides** constructs a database of current-quarter estimates of the quantities of money required by the Taylor rule of monetary policy based only on information available in real time. Then he uses the data to reconstruct the policy recommendations that would have been obtained in real time. He demonstrates that the real-time policy recommendations

differ considerably from those obtained with the ex post revised data. Within-year revisions in the policy recommendations are also quite large, with a standard deviation exceeding the quarterly change in the federal funds rate. Further, estimated policy reaction functions obtained using the ex post revised data can yield misleading descrip-

tions of historical policy. Using Federal Reserve staff forecasts Orphanides shows that in 1987-92, simple forward-looking specifications describe policy better than comparable Taylor-type specifications, a fact largely obscured when analysis is based on the ex post revised data.

Estimates of the Taylor rule using historical data from the past decade

or more suggest that monetary policy in the United States reacted in a moderate, fairly cautious way to output and inflation gaps. In contrast, the parameters of optimal Taylor rules derived using empirical models of the economy often recommend much more vigorous policy responses. **Rudebusch** attempts to match the historical policy rule with an optimal policy rule by incorporating uncertainty into the derivation of the latter.

Using a simple macroeconomic model, **Wieland** studies the optimal monetary policy in the presence of uncertainty about the natural rate of unemployment and the short-run inflation-unemployment tradeoff. Two conflicting motives drive the optimal policy. In the static version of the model, uncertainty provides a motive for policymakers to move more cautiously than they would if they knew the true parameters. In the dynamic version, uncertainty motivates an element of experimentation in policy. Wieland finds that the optimal policy, balancing cautionary and activist motives, typically exhibits gradualism; that is, it is less aggressive than a policy that disregards parameter uncertainty. Exceptions occur when uncertainty is very high and inflation is close to target.

**Kim** examines the international transmission of U.S. monetary policy shocks during the flexible exchange rate regime period. He finds that U.S. expansionary monetary policy shocks worsen the U.S. trade balance and

the U.S. balance on goods and services for about a year, but improve those balances in the long run. The short-run worsening of the trade balance seems to result from an increase in U.S. aggregate demand. U.S. expansionary monetary policy shocks also lead to booms in the non-U.S. G-7 countries, which seem to be the result of an increase in world aggregate demand. The dynamic responses are consistent with some type of sticky price or wage model based on forward-looking intertemporal saving and investment decisions.

**Ireland** derives the restrictions imposed by Barro and Gordon's theory of time-consistent monetary policy on a bivariate time-series model for inflation and unemployment; he tests those restrictions using quarterly U.S. data from 1960 through 1997. He shows that the data are consistent with the theory's implications for the long-run behavior of the two variables; the theory thus can explain inflation's initial rise and subsequent fall over the past four decades. However, the theory must be extended to account more fully for the short-run dynamics that appear in the data.

**Wolman** reports that when price setting is staggered and firms choose their prices optimally, low inflation regimes (in which the nominal interest rate is occasionally zero) do not entail significant distortions to the real economy. By targeting the price level, the monetary authority can generate temporary expected inflation when nominal rates are zero,

pushing real rates down. In contrast, when firms choose their prices according to the Fuhrer-Moore rule, the zero bound causes real distortions. By targeting the price level of inflation, however, the monetary authority can lessen those distortions.

**Estrella** and **Fuhrer** explain that the dynamic implications of many specifications in macroeconomic models that assume both rational expectations and optimizing behavior can be seriously at odds with the data for both inflation and real-side variables. The models imply that inflation or real spending will "jump" in response to shocks, contrary to the empirical evidence which shows that both price and real-side variables exhibit gradual and "hump-shaped" responses to real and monetary shocks. For models that are intended for monetary policy analysis, these dynamic shortcomings are quite serious. When monetary policy has only short-run effects on real variables, the inability to appropriately capture the short-run responses of inflation or real variables to policy shocks makes a model unsuitable for policy analysis. The authors identify a simple feature common to many dynamic specifications for prices and real variables that causes the problem. They also discuss potential solutions to the problem, including alterations to the expectations assumption, the order of differencing implicit in the model, and the underlying behavioral assumptions.





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## Bureau News

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### Bulow to Direct FTC's Bureau of Economics

NBER Research Associate Jeremy Bulow has been named head of the Federal Trade Commission's Bureau of Economics. He will oversee the bureau's role in providing economic analysis of the FTC's consumer pro-

tection and antitrust activities and in advising the FTC and other government entities about the impact on consumers and competition of various regulatory reforms.

Bulow is the Richard Stepp Profes-

sor of Economics at Stanford University's Graduate School of Business, where he has taught since 1979. He received his Ph.D. from MIT in 1979, and his B.A. and M.A. degrees from Yale University.

### Dora L. Costa Wins TIAA-CREF's Samuelson Award

NBER Faculty Research Fellow Dora L. Costa, an associate professor of economics at MIT, won TIAA-CREF's 1998 Paul A. Samuelson Award for Outstanding Scholarly Writing on Lifelong Financial Security. Her book, *The Evolution of Retirement: An American Economic History, 1880-1990* (University of Chicago Press, 1998), explores the reasons for and implications of the increasing trend of earlier retirement among Americans. The book was written in part while Costa spent a year at the NBER's Cambridge office as an Aging Fellow. Some of the research was conducted as part of an NBER project on "Early Indicators of Later Work Levels, Disease, and Death."

"Costa has produced the definitive work on why and how we retired

and learned to enjoy our older years," says Claudia Goldin, Director of the NBER Program on Development of the American Economy and a professor of economics at Harvard University. The book explains that increased income is only one of many factors behind Americans retiring earlier. Others include better health and greater interest in and access to leisure activities; all of which appear to have made retirement increasingly attractive.

TIAA-CREF named this award after Dr. Samuelson in honor of his achievement of becoming the first American to win the Nobel Prize in economics and in recognition of his lifelong contributions to the field, as well as his service as a CREF trustee from 1974-1985. The award carries a

\$20,000 cash prize.

The authors of three other publications were selected as 1998 Certificate of Excellence recipients. They are: NBER Faculty Research Fellow Christopher D. Carroll, John Hopkins University, for "Buffer Stock Saving and the Life-Cycle/Permanent Income Hypothesis" (originally NBER Working Paper No. 5788); NBER Research Associate Peter A. Diamond, MIT, for "Macroeconomic Aspects of Social Security Reform" (originally NBER Working Paper No. 6719); and NBER Faculty Research Fellow David I. Laibson and Jeremy Tabocman, Harvard University, and Andrea Repetto, University of Chile, for "Self Control and Saving for Retirement." All recipients receive \$1,000.

### Four National Fellows Named

The NBER recently created a new fellowship for NBER Faculty Research Fellows, and chose four recipients for the academic year 1999/2000. These NBER National Fellows will spend one academic year at the Bureau's office in Cambridge, and will devote their time to research and writing in the area of their program affiliation.

The 1999/2000 NBER National Fellows are: Simon Gilchrist, Boston University, working in Monetary Economics; Pierre-Olivier Gourinchas,

Princeton University, working in International Finance and Macroeconomics; Samuel Kortum, Boston University, working in Productivity; and Rebecca Menes, University of California, Los Angeles, working in Development of the American Economy.

Gilchrist holds a B.S. from Iowa State University and a Ph.D. from the University of Wisconsin. Prior to joining the Boston University faculty, he spent four years as a staff econo-

mist with the Board of Governors of the Federal Reserve System. His research interests include investment, monetary policy, and business cycle dynamics.

Gourinchas received his undergraduate degrees in France and his Ph.D. from MIT. He has been an assistant professor at Stanford University's Graduate School of Business since 1996. His recent research measures the effect of exchange rate variations on U.S. manufacturing

firms' employment decisions.

Kortum has a B.A. from Wesleyan University and a Ph.D. from Yale University. He has been an assistant professor at Boston University since 1991. His research during the year at NBER will focus on two questions:

whether the United States is experiencing a wave of technological innovation; and, how R and D and location determine comparative advantage in international trade.

Menes received an A.B., A.M., and Ph.D. from Harvard University. She

has taught at the University of California at Los Angeles since 1996. She will use her year at the NBER to complete a book, tentatively titled *Political Machines and the Performance of City Government, 1900-1920*.

## Economic Fluctuations and Growth

The NBER's Program on Economic Fluctuations and Growth met on October 23 in Chicago. Organizers Lawrence Christiano of NBER and Northwestern University and Marjorie Flavin of NBER and the University of California, San Diego, put together this program.

**Valerie A. Ramey**, NBER and University of California, San Diego, and **Matthew D. Shapiro**, NBER and University of Michigan, "Displaced Capital" (NBER Working Paper No. 6775)

Discussant: Janice C. Eberly, NBER and Northwestern University

**Andrew B. Abel**, NBER and University of Pennsylvania, "The Aggregate Effects of Including Equities in the Social Security Trust Fund"

Discussant: Robert F. Hall, NBER and Stanford University

**Fernando Alvarez**, University of Chicago, **Andrew Atkeson**, NBER and University of Minnesota, and **Patrick Kehoe**, Federal Reserve Bank of Minneapolis, "Money and Interest Rates with Endogenously Segmented Markets"

Discussant: Robert Lucas, NBER and University of Chicago

**Craig Burnside**, Stanford University, and **Martin Eichenbaum** and **Sergio Rebelo**, NBER and Northwestern University,

"Prospective Deficits and the Asian Currency Crisis" (NBER Working Paper No. 6758)

Discussant: Jaume Ventura, MIT, **Ricardo J. Caballero**, NBER and MIT, and **Arvind Krishnamurthy**, Northwestern University, "Emerging Markets Crises: An Asset Markets Perspective" (NBER Working Paper No. 6843)

Discussant: V.V. Chari, University of Minnesota

**Ramey and Shapiro** study how efficiently physical capital can be reallocated across sectors. Based on equipment-level data from aerospace industry auctions, tracking the flow of used capital across industries and the discounts at which the capital sells, they show that there is substantial sectoral specificity of capital. For example, capital that flows out of the aerospace sector sells for only one-third of its estimated replacement cost.

**Abel** explains that if participation in the stock market has fixed costs, then high-income consumers will participate, but low-income consumers will not. If a fully-funded social security system tries to exploit the equity premium by selling a dollar of bonds per capita and buying a dollar of equity per capita, consumers who do not participate in the stock market will increase their current consump-

tion, thereby reducing savings and capital accumulation. Abel's estimates indicate that this policy will reduce the aggregate capital stock substantially, by 50 cents per capita or more.

**Alvarez, Atkeson, and Kehoe** analyze the effects of open market operations on interest rates in a model in which agents must pay a fixed cost to exchange assets and cash. Asset markets are segmented; some agents choose to pay the fixed cost and some do not. When the fixed cost is zero, persistent money injections increase interest rates, flatten the yield curve, and lead to a downward sloping yield curve on average. In contrast, if markets are sufficiently segmented, then persistent money injections will decrease nominal interest rates, steepen or even twist the yield curve, and lead to an upward sloping yield curve on average.

**Burnside, Eichenbaum, and**

**Rebelo** argue that the recent Southeast Asian currency crisis was caused by large prospective deficits associated with implicit bailout guarantees to failing banking systems. They present empirical evidence in support of the three key assumptions in their model: 1) foreign reserves did not play a special role in the timing of the attack; 2) large losses in the banking sector were associated with large increases in government's prospective deficits; and 3) the public knew that banks were in trouble before the currency crisis.

What is a country's international collateral in a modern decentralized economy in which the private sector carries the lion's share of international borrowing? Beginning with microeconomic corporate governance problems, **Caballero and Krishnamurthy** discuss many of the intricacies of international collateral forma-

tion and highlight the basic ingredients of an asset markets perspective of crises. Lowering domestic interest rates may be the appropriate response for mild recessions, but under extreme "fire sale" (stock prices below fundamentals) circumstances, the

opposite is true, provided that additional measures are taken to channel resources back to distressed firms and banks. The same incentive problems that are behind systemic crises lead countries to underinvest in international collateral, further raising the

likelihood of these crises. Unregulated capital inflows may exacerbate or dampen this problem, depending on the nature of the binding collateral constraint and the depth of crises.

## Health Care

The NBER's Program on Health Care met on October 23 in Cambridge. The day's program, organized by Daniel Kessler and Frank A. Wolak of NBER and Stanford University, was

**Elliot Fisher** and **Elaine Silverman**, Dartmouth College, and **Jonathan S. Skinner**, NBER and Dartmouth College, "The Influence of For-Profit and Not-for-Profit Hospital Ownership on Medicare Spending"

**Sean Ennis**, U.S. Department of

Justice, **Michael Schoenbaum**, RAND, and **Theodore Keeler**, University of California, Berkeley, "Optimal Prices and Costs for Hospitals With Excess Capacity"

**Jean Abraham**, Carnegie Mellon University, and **Martin Gaynor** and **William B. Vogt**, NBER and Carnegie Mellon University, "Entry and Competition in Hospital Markets"

**Frank A. Sloan**, NBER and Duke University, **Gabriel Picone**,

University of South Florida, and **Donald Taylor** and **Shin-Yi Chou**, Duke University, "Hospital Ownership and Cost and Quality of Care: Is There a Dime's Worth of Difference?" (NBER Working Paper No. 6706)

**Paul J. Gertler**, NBER and University of California, Berkeley, and **Orville Solon**, University of the Philippines, "Who Benefits From Social Health Insurance in Low-Income Countries?"

**Fisher, Silverman, and Skinner** compare per-capita Medicare spending in areas served by for-profit and not-for-profit hospitals. Using data from the American Hospital Association's Annual Survey of Hospitals, the authors categorize Hospital Service Areas (HSAs) as for-profit or not-for-profit in both 1989 and 1995. They then use data from the Continuous Medicare History Sample to calculate 1989 and 1995 reimbursement rates in each HSA. For-profit HSAs were most concentrated in the Southeastern and Pacific United States and were more likely to have a multi-hospital system affiliation and less likely to be affiliated with a medical school than the not-for-profit HSAs. Total per-capita Medicare spending in the for-profit HSAs that did not change status was higher than in the not-for-profits in both 1989 and 1995; it also grew at a faster rate, largely because of growth in spending on hospital and home health care services. HSAs converting to for-profit

status also experienced higher growth rates than the not-for-profit HSAs that did not convert. Per-capita Medicare spending in HSAs served by for-profit hospitals was higher and grew faster than that in areas served by not-for-profit hospitals.

**Ennis, Schoenbaum, and Keeler** analyze issues of optimal hospital pricing in the presence of excess capacity, and then apply their analysis to whether Medicare and Medicaid payments cover the costs of treating patients. When the issue of excess capacity is ignored, the estimated long-run marginal costs of Medicare and Medicaid patients are higher than the reimbursement. By this measure, Medicare reimbursements would need to be increased by 8 percent to cover costs. However, the authors develop the concept of what long-run marginal costs would be if excess capacity were eliminated. This is the most theoretically appropriate measure of optimum long-run reimbursement. Using this

measure, Medicare hospital spending could be reduced by an estimated 26 percent and still cover costs. The extent to which Medicare reimbursement covers costs thus depends crucially on whether capacity is assumed to be fixed or variable.

**Abraham, Gaynor, and Vogt** examine the relationship among the number of hospitals in a market, market size, and competition. They identify 350 isolated hospital markets in the United States using selection criteria based on city population and distance from other population centers. They specify the number of short-term general hospitals in the market to be a function of market size (population), factors that shift demand (income, insurance, demographics, health status), factors that shift firms' costs (labor wage rates and rent), and factors that influence the regulatory environment of hospitals. There appear to be very low population thresholds for entry of the first hospital into a market and much

higher entry thresholds for entry of the second hospital. Subsequent entry by firms leads to rapid increases in competition, but in markets with as many as four hospitals, competitive conditions have not been reached. Additionally, the findings suggest that the proportion of the population 65 years of age and older is associated positively with the number of hospitals in a market, and the number of health maintenance organizations is associated negatively with the number of firms. Finally, the authors find a negative relationship between the presence of certificate-of-need regulation and the number of hospitals.

**Sloan, Picone, Taylor, and Chou** compare program cost and quality of care for Medicare patients hospitalized in for-profit hospitals with those in nonprofit and government hospi-

tals after admission for hip fracture, stroke, coronary heart disease, or congestive heart failure. Payments made on behalf of Medicare patients admitted to for-profit hospitals turn out to be higher than for those admitted to nonprofit or government hospitals. When quality is measured in terms of survival, the nonprofits are slightly better than the for-profits. However, conditional on surviving, the for-profit patients did slightly better in terms of cognitive and functional status after major health shocks. Thus, to Medicare there is a difference in the type of hospital to which a patient is admitted after a common health shock. However, the picture on quality is mixed.

A popular approach to health care reform in many low-income countries is to introduce or expand com-

pulsory social health insurance (SI). SI is seen as a way to shift to the private sector a portion of the public burden of delivering and financing health care. **Gertler** and **Solon** argue that SI fails to effectively finance care because private medical care providers are able to capture the SI benefits as "rent" by raising price-cost margins to insured patients. The increase in prices means that expanding SI is not likely to reduce the public's financial burden for health care. The authors' results from the Philippines indicate that private hospitals extract 100 percent of SI benefits through increased price-cost margins and that public hospitals extract 70 percent. Thus expanding SI actually increases the burden on the public sector rather than relieving it.

## Japan Project Meeting

Members and guests of the NBER's Japan Project gathered in Tokyo on October 29-30. Organizers Fumio Hayashi of NBER and Tokyo University, Takatoshi Ito of NBER and Hitotsubashi University, and Anil K. Kashyap of NBER and the University of Chicago, chose these papers for discussion.

**Tamim Bayoumi**, International Monetary Fund, "The Morning After: Explaining the Slowdown in Japanese Growth in the 1990s"

Discussant: Valerie A. Ramey, NBER and University of California, San Diego

**Peter Jarrett**, OECD, "The Japanese Recession: What Caused It and What to Do About It"

Discussant: Hugh Patrick, Columbia University

**Takako Idée**, Seikei University;  
**Kiyohiko Nishimura**, University

of Tokyo; **Toshiaki Watanabe**, Tokyo Metropolitan University; and **Fukuju Yamazaki**, Sophia University, "The Myth of Land in the Land of Many Myths: What Brought Japanese Land Prices Up So High in the 1980s and Made Them Nosedive in the 1990s?"

Discussant: John V. Leahy, NBER and Boston University

**Joe Peck**, Boston College, and **Eric Rosengren**, Federal Reserve Bank of Boston, "Determinants of the Japan Premium: Actions Speak Louder Than Words"

Discussant: Takeo Hoshi, University of California, San Diego

**Michael Hutchison** and **Kathleen McDill**, University of California, Santa Cruz, "Determinants, Costs, and Duration of Banking Sector Distress: The Japanese Experience in International Comparison"

Discussant: Robert Aliber, University of Chicago

**Albert Ando**, NBER and University of Pennsylvania, "Demographic Dynamics and Causes of the Japanese Recession"

Discussant: Masaru Yoshitomi, ITCB Research Institute

**Taizo Motonishi** and **Hiroshi Yoshikawa**, University of Tokyo, "Causes of the Long Stagnation of Japan During the 1990s: Financial or Real?"

Discussant: Paul Beaudry, NBER and University of British Columbia

**Katsunori Watanabe**, **Takayuki Watanabe**, and **Tsutomu Watanabe**, Bank of Japan, "Tax Policy and Consumer Spending: Evidence from Japanese Fiscal Experiments"

Discussant: Alan J. Auerbach, NBER and University of California, Berkeley

**Bayoumi** investigates four possible explanations for the extended

slump in Japanese economic activity in the 1990s: the absence of bold and

consistent fiscal stimulus; the limited room for expansionary monetary pol-



icy because of a liquidity trap; asset price deflation reflecting the long-term problems caused by overinvestment, inadequate returns on saving, and debt overhang; and disruption of financial intermediation. His results indicate that all of these factors played a role, but that the major explanation was disruption in financial intermediation, largely operating through the impact of changes in domestic asset prices on bank lending.

**Jarrett** argues that there are three basic reasons for Japan's current recession. First, fiscal tightening, which began in the middle of 1996, lowered the level of output by about 2.25 percent by 1998. Second, the economic downturn in neighboring countries in Asia cut exports sharply from mid-1997, bringing about a further reduction in real GDP of around 1.75 percent in 1998. Finally, the various failures of several financial institutions in the autumn of 1997 was contractionary because of credit crunch effects, widened risk premiums facing borrowers, and a heightened sense of job insecurity among workers. Because of these multiple origins, it is likely that no single policy lever will be sufficient to cure the economy's ills. Rather, a comprehensive, three-pronged approach that directly addresses banking sector problems, provides continued macroeconomic support, and steps up the pace of structural reforms is necessary.

Japan has experienced turbulent behavior in land prices after World War II, especially since 1985. **Idee, Nishimura, Watanabe, and Yamazaki** suggest that distortionary taxation—in the inheritance and capital gains tax systems—is a major explanation of high residential land prices since 1975. Excess price sensitivity magnifies the effect of underlying change in the land market fundamentals after 1985.

**Hutchison and McDill** examine episodes of banking sector distress for a large sample of countries, highlighting the experience of Japan. Their model predicts a high probability of banking sector distress in Japan in the early 1990s, matching actual developments closely, and suggests that the Japanese episode fits a well-established pattern characterizing banking sector problems elsewhere. They also show that output loss is smaller if banking sector problems are resolved more quickly and exchange rate stability is maintained. Explicit deposit insurance also appears to lessen the output cost of banking sector distress. The real output loss to Japan of not resolving its banking sector problems is estimated at almost 1 percent of GDP annually.

**Ando** explains that the basic cause of the prolonged economic recession suffered by Japan since 1992 is that its private saving rate is too high, given the country's potential growth rate (defined by the growth rate of the labor force and productivity growth), for any reasonable level of the capital-output ratio. The net worth of households (other than the value of land) has been much smaller than past savings should have generated under normal circumstances, and Japanese households appear to save more and more to bring their net worth up to a level consistent with their income. Business firms in turn continue to follow their overinvestment strategy, although not enough to achieve full employment. To restore balance, the Japanese economy would require a higher ratio of consumption-income, perhaps as much as 5 percent above the current level, and a reconsideration of the structure of corporate governance.

**Motonishi and Yoshikawa** state that the most important factor in explaining the long stagnation of the

Japanese economy during the 1990s is extremely weak investment. Many economists argue that weak investment is, in turn, explained by a credit crunch. The authors find that financing constraints do exist for small firms, but not for large firms. They find that the credit crunch does not really explain the stagnation of investment throughout the 1990s, but that it has had a major negative effect on aggregate investment, and thus on GDP. They estimate that the credit crunch lowers the growth rate of real GDP by 1.2 percent for 1998.

The Japanese government regards individual income tax reductions as a major policy tool for stimulating the economy. Total tax reductions between 1993 and 1998 amounted to 28 trillion yen. **Watanabe, Watanabe, and Watanabe** investigate consumers' responses to these unprecedented fiscal experiments. They are interested in how the impact of tax policy differs for permanent versus temporary and anticipated versus unanticipated changes in taxes. Using a dataset including institutional information for 43 changes in taxes and social security contributions in Japan between 1975 and 1998, the authors find that about 76 percent of the Japanese are forward-looking consumers who distinguish between temporary and permanent tax changes. A permanent tax reduction of 10,000 yen per month will increase the monthly spending of the average household by about 10,000 yen, they estimate, while a one-time tax reduction of the same size increases spending by only 3,000 yen. Also, about 90 percent of Japanese consumers respond not at the time of the policy announcement, but at the time of implementation.

## Behavioral Finance

Members of the NBER's Behavioral Finance Project Meeting met in Chicago on October 29. Robert J. Shiller, NBER and Yale University, and Richard H. Thaler, NBER and the University of Chicago, organized this program.

**Josef Lakonishok**, NBER and University of Illinois, and **Louis Chan** and **Theodore Sougiannis**, University of Illinois, "The Stock Market Valuation of Research and Development Expenditures"

Discussant: Werner De Bondt, University of Wisconsin

**Jeremy C. Stein**, NBER and MIT, **Harrison Hong**, Stanford University, and **Terence Lim**, MIT, "Bad News Travels Slowly,

Size, Analyst Coverage, and the Profitability of Momentum Strategies" (NBER Working Paper No. 653)

Discussant: Narasimhan Jegadeesh, University of Illinois

**David Genesove**, NBER and Hebrew University, and **Christopher J. Mayer**, Columbia University, "Nominal Loss Aversion and Seller Behavior: Evidence from the Housing Market"

Discussant: Terence Odean, University of California, Davis

**Charles M. Lee** and **Bhaskaran Swaminathan**, Cornell University, "Price Momentum and Trading Volume"

Discussant: Andrei Shleifer, NBER

and Harvard University

**Brad Barber**, University of California, Davis, **Reuven Lehavy**, University of California, Berkeley,

**Maureen McNichols**, Stanford University, and **Brett Trueman**, University of California, Berkeley, "Can Investors Profit from the Prophets? Consensus Analyst Recommendations and Stock Returns"

Discussant: Kent Womack, Dartmouth University

**Shlomo Benartzi**, University of California, Los Angeles, and

**Richard H. Thaler**, "Nave Diversification Strategies in Defined Contribution Saving Plans"

Discussant: John Y. Campbell, NBER and MIT

**Lakonishok, Chan, and Sougiannis** find that there is no tendency for R and D-intensive firms systematically to underperform or outperform other firms. Thus the stock market does not systematically under- or overvalue R and D expenditures. However, within the population of past losers—stocks that have underperformed the market—R and D intensive firms do tend to outperform other firms. The authors attribute this to superior managerial information about the future prospects of the firm, which is revealed through R and D decisions but is not valued properly by the market.

**Stein, Hong, and Lim** postulate that momentum effects in individual stock returns—that is, the tendency for past winners to outperform past losers—are attributable to the gradual diffusion of private information about firms' profitability. Several facts in their data are consistent with this explanation. First, except in the very smallest firms that may be subject to offsetting liquidity effects, momentum is stronger in small firms in

which information is likely to spread more slowly. Second, momentum is stronger in firms that are covered by relatively few analysts. Third, the effect of analyst coverage is stronger among firms that are past losers than among firms that are past winners. Because firms' managers have strong incentives to disseminate positive information about their companies, it is plausible that analysts play a more important role when information is unfavorable.

**Genesove and Mayer** use a unique dataset on condominium transactions in downtown Boston to show that sellers who originally purchased their properties at higher prices tend to put them on the market at higher asking prices. These sellers also tend to receive higher prices, but have to wait longer before concluding the sale. The authors argue that this behavior is consistent with the Kahneman-Tversky theory of loss aversion, according to which people use a reference point to judge outcomes and are more sensitive to losses than to gains relative to this

reference point. They argue that the original purchase price serves as a reference point for condominium owners.

**Lee and Swaminathan** find that momentum is stronger in stocks with high trading volume. Among stocks with low trading volume, there is actually a tendency for past losses to reverse themselves. The authors propose a "momentum life cycle hypothesis" to explain these results. Low trading volume, they argue, is an indication that a losing stock has declined so much in value that it has become a "neglected" value stock with a predictably high future return.

**Barber, Lehavy, McNichols, and Trueman** find that security analysts have significant ability to pick stocks that subsequently outperform the market. Between 1986 and 1996, a portfolio of stocks with the highest consensus ranking by analysts outperformed a portfolio of stocks with the lowest consensus ranking by over 100 basis points per month. The out-performance is fairly short-lived but remains significant when there is a

lapse of up to 15 days before acting on the analysts' recommendations.

**Benartzi** and **Thaler** argue that the menu of options offered to participants in defined contribution (DC) savings plans affects their choices. They support this claim using both experimental survey data and data on

plan participants' actual investment decisions. For example, participants in a plan with five stock funds and one bond fund allocate far more of their retirement savings to stocks than participants in a plan with four bond funds and one stock fund. They argue that this is the result of

"naive diversification," the tendency to spread money evenly across available options regardless of their fundamental characteristics. Such behavior raises serious questions about the best way to design DC savings plans and privatized social security systems.

## Asset Pricing

The NBER's Program on Asset Pricing, directed by John Y. Campbell, held its fall meeting in Chicago on October 30. George M. Constantinides, NBER and the University of Chicago, organized the meeting at which the following papers were discussed:

**Tobias J. Moskowitz**, University of Chicago, and **Mark Grinblatt**, University of California, Los Angeles, "Momentum Investing, Industry Effects, Methodological Issues, and Profit Opportunities." Discussant: Jacob Boudoukh, NBER and New York University.

**David Hirshleifer**, University of Michigan; **Kent D. Daniel**, NBER and Northwestern University; and **Avanidhar Subrahmanyam**,

University of California, Los Angeles, "Investor Overconfidence, Covariance Risk, and Predictors of Securities Returns."

Discussant: Jonathan B. Berk, NBER and University of California, Berkeley; **Dimitri DeMarzo**, NBER and MIT; **Peter M. DeMarzo**, University of California, Berkeley; and **Jeffrey Zwiebel**, Stanford University, "A Near-Rational Model of Persuasion with Implications for Financial Markets."

Discussant: Pietro Veronesi, University of Chicago.

**David A. Hsieh**, Duke University, and **William Fung**, Paradigm Financial Products, "A Risk-Neutral Approach to Valuing Trend-Following Strategies."

Discussant: Deborah J. Lucas, NBER and Northwestern University.

**Timothy Cogley**, Federal Reserve Bank of San Francisco,

"Idiosyncratic Risk and the Equity Premium: Evidence from the Consumer Expenditure Survey."

Discussant: Annette Vissing-Jorgensen, University of Chicago.

**Rene M. Stulz**, NBER and Ohio State University, with **Hyuk Choe**

and **Bong Chang Kho**, Seoul National University, "Do Foreign Investors Destabilize Stock Markets? The Korean Experience in 1997." (NBER Working Paper No. 6661)

Discussant: Robert J. Shiller, NBER and Yale University.

**Moskowitz** and **Grinblatt** argue that the much-discussed momentum effect—the tendency for stocks that have performed well over the previous 6 to 12 months to outperform again over the following 6 to 12 months—is primarily a phenomenon of industries rather than individual stocks. The authors examine the profitability of momentum strategies that buy past winners and sell past losers. These strategies appear highly profitable when they work with winning and losing industries, but less so when they work with individual stocks while maintaining a constant industry composition. Furthermore, *industry momentum* profits are

derived both from long and short positions and *individual momentum* profits are predominantly derived from short positions that may be hard to implement in practice.

**Hirshleifer**, **Daniel**, and **Subrahmanyam** propose a behavioral model in which investors are overconfident of the accuracy of their private information about security values. This overconfidence leads to mispricing. The model can explain the success of value-based investment strategies that buy stocks with low valuation ratios (low market values relative to book values, earnings, or dividends). It can also explain the tendency of these valuation ratios to

drive out traditional measures of security risk such as beta in explaining the cross-section of stock returns.

**Vayanos**, **DeMarzo**, and **Zwiebel** ask how security prices are affected by a subtle bias in investors' learning behavior. Investors act as if all information they receive is new, rather than something they may already have heard elsewhere. Thus investors overweight "influential" information sources that are widely followed. These influential sources can move prices, and it may be profitable to trade on early knowledge of their opinions.

**Hsieh** and **Fung** analyze the performance of commodity trading ad-

visers (CTAs). They argue that CTAs tend to follow option-based strategies that pay off when markets make large moves in either direction. An appropriate performance benchmark for such investors is therefore the return on a "lookback straddle," an option that pays the maximum range of a market over a fixed time interval. The authors use data on exchange-traded options to construct implied lookback straddle returns, and show that they have considerable power to explain the reported returns of CTAs.

Economists have struggled to understand why individual investors do not more aggressively participate in the stock market, given the high historical average returns of stocks.

One suggested explanation is that investors are concerned about idiosyncratic risks to their labor income, such as the risk of a layoff, and are reluctant to hold assets that do poorly at times when idiosyncratic risks increase. **Cogley** uses microeconomic survey data to show that the variation over time in idiosyncratic risk, as measured by the reported cross-sectional variability of consumption expenditure, is modest and not strongly related to the stock market. His results suggest that economists will have to look elsewhere for an explanation of the equity premium puzzle.

**Stulz, Choe, and Kho** use a unique dataset that allows them to identify participants in each Korean

stock trade as Korean individuals, Korean institutions, or foreigners. They study the patterns of foreign trading and find that before the crisis of 1997 foreigners tended to trade in a coordinated manner, buying after price increases and selling after price declines. Such "positive feedback trading" has the potential to destabilize market prices. This pattern disappeared, however, during the crisis period. Furthermore, periods of heavy foreign selling are not systematically followed by further declines in prices. The authors conclude that foreign investors did not destabilize the Korean stock market during the crisis of 1997.

## Labor Studies

Program Director Richard B. Freeman and Lawrence F. Katz, both of NBER and Harvard University, organized a meeting of the NBER's Program on Labor Studies which took place in Cambridge on November 6. The following papers were presented:

**Alan B. Krueger**, NBER and Princeton University, and **Stacy Dale**, Mellon Foundation, "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables"; **V. Joseph Hotz** and **Guido W.**

**Imbens**, NBER and University of California, Los Angeles, and **Julie Mortimer**, University of California, Los Angeles, "Predicting the Efficacy of Future Training Programs Using Past Experiences"; **Anne Preston**, State University of New York, Stony Brook, "Sex, Kids, and Commitment to the Workplace: Employers, Employees, and the Mommy Track"; **Steven J. Davis**, NBER and University of Chicago, and **Paul Willen**, Princeton University, "Using Financial Assets to Hedge

Labor Income Risks: Estimating the Benefits

**George J. Borjas**, NBER and Harvard University, "Does Immigration Grease the Wheels of the Labor Market?"

**David G. Blanchflower**, NBER and Dartmouth College; **Phillip B. Levine**, NBER and Wellesley College; and **David Zimmerman**, Williams College, "Discrimination in the Small-Business Credit Market" (NBER Working Paper No. 6840)

Using the newly collected College and Beyond (C&B) dataset, **Krueger** and **Dale** match students who were admitted to and rejected from a similar set of institutions in order to estimate the effect of college quality on students' subsequent earnings. They control for the average Scholastic Assessment Test (SAT) score of the schools to which students applied; they find that students who attended colleges with higher average SAT

scores do not earn more than other students who were accepted and rejected by comparable schools but attended a college with a lower average SAT score. However, the *Barron's* rating of school selectivity and the tuition charged by the school are related significantly to the students' subsequent earnings. The authors find a substantial internal rate of return from attending a more costly college. Further, the payoff to attending

an elite college appears to be greater for students from more disadvantaged family backgrounds.

**Hotz, Imbens, and Mortimer** describe the problem of predicting the effect of a new training program based on experiences with previous implementations. There are two principal difficulties: first, the population for the new program may differ from the population of the old program. Second, the two programs may have



a different mix of components. The authors then compare four job training programs implemented in the mid-1980s in different parts of the country. Adjusting for pretraining earnings and individual characteristics removes most of the differences between control units, they find. But even after such adjustments, post-training earnings for trainees are not comparable. Differences across training programs are the likely cause, and more details on the specific services provided by these programs are necessary to predict the effect of future programs.

**Preston** analyzes the career income profiles of a group of men and women with degrees in science from a public university. She finds that male-female earnings differentials on the order of 12 percent to 18 percent for childless workers fall to zero for parents when their share of child care responsibility is included in the analysis. She also estimates that the largest income increase is for women who have a child but take on no child care responsibilities; the largest income decline is for men who have a child and take on the full share of child care.

**Davis** and **Willen** use U.S. data to estimate the welfare consequences of using new and existing financial assets to share group-level labor income risk. The gains from using the S&P 500 index to hedge labor income shocks are small in the aggregate

and for each sex and education group. Introducing a new financial asset with payoffs tied to the gross rate of job destruction in the manufacturing sector delivers much larger welfare gains. Assuming an annual discount rate of 4.5 percent, the authors estimate that the introduction of the job destruction asset would increase the present value of consumer surplus in 1998 dollars by \$1,150 per person or \$105 billion in aggregate. These gains are concentrated among less educated men and are negative for college-educated men. Under the same assumptions, they estimate that aggregate gains from fully sharing labor income risks among sex, education, and age groups amount to \$2.25 trillion.

**Borjas** argues that immigration injects into the economy a group of people who are very responsive to differences in economic opportunities across states. His analysis reveals that new immigrant arrivals are much more likely to be clustered in those states that offer the highest wages for the types of skills that they bring into the country. They make up a disproportionate bulk of the "marginal" persons who chase better economic opportunities and help to equalize economic opportunities across areas. Immigrant flows into the United States thus speed up the rate of wage convergence across regions and improve labor market efficiency.

**Blanchflower, Levine, and Zim-**

**merman** use data from the 1993 National Survey of Small Business Finances to determine the extent to which minority-owned small businesses face constraints in the credit market beyond those faced by white-owned small businesses. First, the authors show that black- and white-owned firms report similar concerns about the factors that may affect their businesses, but that blacks are far more likely to report problems with credit availability. Second, they estimate that black-owned small businesses are almost three times more likely to have a loan application denied than white-owned small businesses. Even after controlling for the differences in creditworthiness and other factors that exist between black- and white-owned firms, blacks are still about twice as likely to be denied credit. Third, the authors conduct a similar analysis regarding interest rates charged for approved loans and find that black-owned firms pay higher interest rates. Finally, they point out that even these results are likely to understate differences in credit access since many potential black-owned firms are not in operation because of lack of credit and those in business may be afraid to apply for credit. These results indicate that the racial disparity in credit availability is probably caused by discrimination.



## Program on Children

The NBER's Program on Children, directed by Jonathan Gruber of NBER and MIT, met in Cambridge on November 7. They discussed the following papers:

**Steven D. Levitt**, NBER and University of Chicago, "Juvenile Crime and Punishment" (NBER Working Paper No. 6191)

**Anne M. Piehl**, NBER and University of California, Berkeley, "Problem Solving and Youth Violence: An Evaluation of the Boston Gun Project"

**Julie B. Cullen**, NBER and University of Michigan, and **David N. Figlio**, University of Florida, "Local Gaming of State School Finance Policies: How Effective are Intergovernmental Incentives?"

**Michael Kremer**, NBER and MIT, and **Paul Glewwe** and **Sylvie Moulin**, World Bank, "Textbooks and Test Scores: Evidence From a Prospective Evaluation in Kenya"

**William Harbaugh**, University of Oregon, "Children's Contributions in Public Good Experiments: The

Development of Altruistic and Free-Riding Behavior"

**Frank J. Chaloupka**, NBER and University of Illinois, **Rosalie L. Pacula**, Rand Corporation, **Hoyd Johnston**, and **Patrick O'Malley**, University of Michigan, and **Matthew C. Farrelly** and **Jeremy W. Bray**, Research Triangle Institute, "Do Higher Cigarette Prices Encourage Youth to Use Marijuana?"

Over the last two decades, violent crime has grown almost twice as quickly among juveniles as among adults. **Levitt** finds that changes in relative punishments for juveniles and adults can account for 60 percent of that differential: juvenile offenders are at least as responsive to criminal sanctions as adults. Sharp drops in crime at the age of majority suggest that deterrence (and not merely incapacitation) plays an important role. However, there does not appear to be a strong relationship between the punitiveness of the juvenile justice system faced by a generation and the extent of criminal involvement for that generation later in life.

**Piehl** discusses the Boston Gun Project, a problem-solving policing initiative aimed at reducing homicide victimization among young people in Boston. The Project began in early 1995 with the creation of a working group representing a variety of law enforcement and social service agencies. In early 1996 the group implemented an intervention (now known as "Ceasefire") which focused enforcement efforts on gun trafficking, strategically responded to gang violence, and emphasized communication of the strategy in order to generate deterrence. "Ceasefire" is associated

with a 60 percent decline in youth homicide victimization. Similar, though smaller, declines were experienced in gun assaults (with victims of any age), calls to police reporting shots fired, youth gun assaults in the Roxbury section of the city, and adult homicide victimization.

**Cullen** and **Figlio** test the extent to which stronger fiscal incentives to classify students with special needs lead to higher rates of student disability. They combine school-level and district-level data for the years 1987-8, 1990-1, and 1993-4 with detailed information on state school finance formulas in each of these years. They then use the data to gauge the degree to which more aggressive labeling is accompanied by changes in the allocation of resources to special education. As fiscal incentives to classify marginal students increase, the relative quality of learning-disabled classes appears to decline in those school districts whose states have binding tax limits, although it improves for districts in other states. This suggests that constrained districts may behave strategically by reassigning students to special education for fiscal gain.

Although there is intense debate about the effect of increased expen-

diture on education in developed countries, there is widespread consensus that provision of textbooks can increase test scores in developing countries substantially. **Kremer**, **Glewwe**, and **Moulin** evaluate a program through which a Dutch non-profit organization provided textbooks to 25 rural Kenyan primary schools chosen randomly from a group of 100 schools. After one school year, average test scores did not differ substantially between program and comparison schools. However, for those students in the top quintile of the distribution of initial academic achievement, the program raised test scores by at least 0.2 standard deviations.

In economic experiments on the voluntary provision of public goods, adults are more altruistic than a narrow definition of self-interest would predict. **Harbaugh** asks whether the same is true for 6- to 12-year-old children. In the aggregate, he finds, the level of altruistic behavior of children is similar to that of adults. In repeated experiments, though, the pattern over time is different. Younger children's contributions tend to increase in later rounds of the experiments; the contributions of older children, like those of adults, tend to decline.

Demographic and family variables do not explain differences in altruistic tastes across children, but a measure of group attachment does. He concludes that the taste for altruism found in adults is formed at a young age.

**Chaloupka, Pacula, Farrelly, Johnston, O'Malley, and Bray** examine the contemporaneous rela-

tionship between the demands for cigarettes and marijuana among a nationally representative sample of eighth, tenth, and twelfth graders from the 1992 through 1994 Monitoring the Future Project. They show that higher cigarette prices will not increase marijuana use among youths. In fact, higher cigarette prices, in addition to lowering the demand for

cigarettes, have a negative effect on the prevalence of marijuana use. A 10 percent increase in the price of cigarettes would reduce the probability of using marijuana between 3.4 percent and 7.3 percent and decrease the average level of marijuana use by regular users between 3.6 percent and 8.4 percent.

## Public Economics

The NBER's Program on Public Economics, organized by James M. Poterba of MIT, met in Cambridge on November 12-13. The program was

**Richard J. Arnott**, NBER and Boston College, "Neutral Property Taxation"

Discussant: Harvey S. Rosen, NBER and Princeton University

**B. Douglas Bernheim**, NBER and Stanford University, "Bequests as Signals: An Explanation for the Equal Division Puzzle, Unigeniture, and Ricardian Nonequivalence"

Discussant: Louis Kaplow, NBER and Harvard University

**William M. Gentry**, NBER and Columbia University, and **John Penrod**, McGill University, "The

Tax Benefits of Not-For-Profit Hospitals" (NBER Working Paper No. 6435)

Discussant: James R. Hines, NBER and University of Michigan

**Andrei Shleifer** and **Edward L. Glaeser**, NBER and Harvard University, "Not-for-Profit Entrepreneurs" (NBER Working Paper No. 6810)

Discussant: Henry Hansmann, Yale University

**Ann Dryden Witte**, NBER and Florida International University; **Magaly Queralt**, Florida International University; **Harriett Griesinger**, Wellesley College; and **Tasneem Chitty**, Brandeis University, "Unintended Conse-

quences: Welfare Reform and the Working Poor" (NBER Working Paper No. 6798)

Discussant: Leora Friedberg, NBER and University of California, San Diego

**Joel B. Slemrod**, NBER and University of Michigan, and **Wojciech Kopczuk**, University of Michigan, "The Optimal Elasticity of Taxable Income"

Discussant: Austan Goolsbee, NBER and University of Chicago

**Jeremy I. Bulow**, NBER and Stanford University, and **Paul Klemperer**, Oxford University, "The Tobacco Deal"

Discussant: Jonathan Gruber, NBER and MIT

**Arnott** investigates property tax systems (that is, linear taxes on pre-development land value, postdevelopment structure value, and postdevelopment site value) from a partial equilibrium perspective. In particular, he characterizes property tax systems as to their neutrality with respect to the timing and density of development, and he calculates the deadweight loss from non-neutral property tax systems.

In the United States, more than two thirds of decedents with children divide their estates equally among the children. In contrast, gifts made during the lifetime are usually not

equal. **Bernheim** and **Severinov** develop a theory that accounts for this behavior, based on the notion that the division of bequests provides a signal about a parent's altruistic preferences. Their theory also can explain the norm of unigeniture that prevails in other societies. When bequests signal parental altruism, redistributions between parents and children, including those resulting from government fiscal policies, have real effects.

**Gentry** and **Penrod** investigate three special tax provisions for not-for-profit (NFP) hospitals. First, NFP hospitals are exempt from capital

taxes, both income and property taxes. Second, they issue tax-exempt bonds so that lenders pay no income taxes on interest received. Third, donors deduct charitable contributions to the hospitals from their income tax bases. The rationale for these policies is that the NFP hospitals provide community benefits. For 1995, the aggregate value of the exemption from income taxes was \$4.6 billion; the median hospital receives benefits of 1.8 percent of total assets. For the property tax exemption, estimated aggregate value is \$1.7 billion. Only 19.7 percent of NFP hospitals had outstanding tax-exempt debt in

1994; there is an annual aggregate benefit of \$354 million from using tax-exempt bonds. Roughly 4 percent of hospitals receive 71 percent of the charitable contributions; lost tax revenue from these contributions is estimated at \$1.1 billion in 1994.

**Shleifer** and **Glaeser** derive conditions under which completely self-interested entrepreneurs opt for not-for-profit status, despite the fact that this status limits their ability to enjoy the profits of their enterprises. When entrepreneurs have a taste for producing high-quality products, the incentives are even softer; moreover, nonprofit status can serve as a signal of that taste. Even in the absence of tax advantages, unrestricted donations would flow to nonprofits rather than to for-profit firms because donations have a more significant influence on the decisions of the nonprofits.

**Witte**, **Queralt**, **Griesinger**, and **Chipty** use data on 2,791 working poor families from March 1996 through February 1997 to examine the impact of the early stages of welfare reform on families who do not receive cash assistance. They find that the simultaneous October 1996 implementation of welfare reform and a federal minimum wage increase lowered the earnings of the working poor families in their sam-

ple by approximately 6 percent. This decrease in earnings is an unintended consequence of welfare reform stemming mainly from a large influx of former cash recipients into the low-income labor market over a relatively short period of time. As part of welfare reform, Congress and state legislatures also provided increases in funding for child care subsidies. This policy led to a significant increase in the earnings of working poor families. On net, the increase in earnings attributable to increased funding for child care subsidies and the decrease in earnings caused by the 1996 changes cancel each other out. The representative family in this sample experienced a change in monthly earnings estimated at between -\$18 and \$68, with a \$25 earnings gain being most likely.

The optimal progressivity of the tax system depends on the elasticity of taxable income with respect to the net-of-tax rate. **Slemrod** and **Kopczuk** formalize this notion using an example in which elasticity is determined by the choice of how broad the income tax base is. In their example, a larger tax base implies a higher degree of progressivity, and vice versa. Indeed, more egalitarian societies will have a broader income tax base, a more progressive tax sys-

tem, and lower taxable income elasticities. The Tax Reform Act of 1986 (TRA86) broadened the tax base and removed some loopholes in the law, such as tax shelters, arguably reducing the elasticity of taxable income. The authors raise the possibility that the base-broadening provisions of TRA86 actually reduced the true taxable income elasticity.

**Bulow** and **Klemperer** analyze the major economic issues raised by the 1997 Tobacco Resolution and the ensuing McCain Bill. By settling litigation largely in return for tax increases, the Resolution was a superb example of a "win-win" deal. The taxes would cost the tobacco companies about \$1 billion per year, but yield the government about \$13 billion per year, and allow lawyers to claim fees based on hundreds of billions in "damages." Only consumers, in whose name many of the lawsuits were filed, lost out. The authors show that alternative taxes would be considerably superior to those proposed, and they explain problems with the damage payments required from the firms and the legal protections offered to them. The legislation's marketing restrictions were the most sensible part of either deal, they claim.



## Corporate Finance Program Meeting

Members of the NBER's Program on Corporate Finance met on November 20 in Cambridge. At the meeting, organized by Program Director Raghuram Rajan of the University of Chicago, the following papers were discussed:

**Randall S. Kroszner**, NBER and University of Chicago, "Is It Better to Forgive Than to Receive? Repudiation of the Gold Indexation Clause in Long-Term Debt During the Great Depression"  
Discussant: Stewart C. Myers, NBER and MIT

**Tarun Khanna** and **Krishna Palepu**, Harvard University, "The Future of Business Groups in Emerging Markets: Long-Run Evidence from Chile"  
Discussant: Andrei Shleifer, NBER and Harvard University

**Douglas Diamond**, University of Chicago, and **Raghuram Rajan**, "Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking"  
Discussant: Patrick Bolton, Princeton University  
**Peter Boone**, Brunswick Warburg

**Alasdair Breach**, Russian-European Centre for Economic Policy, **Eric Friedman**, Rutgers University, and **Simon Johnson**, MIT, "Corporate Governance in the Asian Financial Crisis, 1997-8"  
Discussant: Luigi Zingales, NBER and University of Chicago  
**Malcolm Baker**, Harvard University, and **Paul Gompers**, NBER and Harvard University, "How You Get There Matters: The Path Dependency of Corporate Governance in Closely Held Firms"  
Discussant: Per Stromberg, University of Chicago

**Kroszner** examines the consequences of large-scale debt relief during the Great Depression. When the United States went off the gold standard and devalued the dollar with respect to gold, the government declared that the courts would no longer enforce gold indexation clauses which had been part of virtually all long-term private and public debt contracts up to that time. If the gold clauses had been enforced, the debt burden of borrowers would have increased by the extent of the devaluation, 69 percent. In response to the Supreme Court's decision to uphold this effective "debt jubilee," equity prices rose. But, more surprisingly, the prices of corporate bonds (all of which contained gold clauses) also rose. In contrast, the value of government bonds with gold clauses fell. This suggests that the benefits for private firms of eliminating debt overhang and avoiding bankruptcy more than offset the loss to creditors of some chance of trying to recover the additional 69 percent. Further, the stock and bond prices of firms closer to bankruptcy rose more than those prices for other firms.

In a study of Chile during 1988-96,

**Khanna** and **Palepu** demonstrate that the extent to which firms benefit from their affiliation with business groups varies. In the beginning of the period, the net benefits of diversification were positive if the diversification exceeded a threshold level. These threshold effects occur in other emerging markets, but not in the United States. Toward the end of the period, as the state of Chile's markets improved enormously, the net benefits of diversification approached a pattern seen in the United States. The authors also find that firms benefit significantly from other aspects of group affiliation, and that these non-diversification-related benefits decline through their sample period (while remaining positive) as Chile's markets develop. Institutional context thus constrains the costs and benefits of diversification. They conclude that the current wave of deregulation sweeping the world's economies need not lead to the proximate decline in the importance of business groups.

Both investors and borrowers are concerned about liquidity. Investors desire liquidity because they are uncertain about when they will want

to stop holding a financial asset. Borrowers are concerned about liquidity because they are uncertain about their ability to continue to attract or retain funding. **Diamond** and **Rajan** argue that financial intermediation can resolve these liquidity problems that arise in direct lending. Banks enable depositors to withdraw at low cost and buffer firms from the liquidity needs of their investors. The bank must have a somewhat fragile capital structure, subject to bank runs, to perform these functions, though. A number of institutional features of a bank are therefore rationalized in the context of the functions it performs.

According to **Boone**, **Breach**, **Friedman**, and **Johnson**, the "Asian crisis" of 1997-8 has affected almost all the "emerging markets" open to capital flows. Measures of corporate governance, particularly the effectiveness of protection for minority shareholders, explain the extent of depreciation and stock market decline better than do standard macroeconomic measures. In countries with weak corporate governance, worse economic prospects result in more stealing by managers and thus



a larger fall in asset prices.

Establishing and committing to corporate governance mechanisms is arguably most important when a firm first raises capital from dispersed investors. However, there has been comparatively little study of executive compensation in firms completing initial public offerings (IPOs). **Baker** and **Gompers** consider two theories for the evolution of CEO compensation. Agency theory predicts that CEO salary and ownership are forward looking, chosen to mini-

mize expected agency costs at the time of the IPO, and thereby maximize the proceeds from a public offering. Path dependency theory predicts that CEO ownership is an outcome of a firm's financing history. Using new data gathered from 1,306 prospectuses, the authors look at the determinants of CEO ownership, salary, and IPO equity sales. Their results are consistent with the path dependency theory. The authors also consider the role of venture capitalists. While venture capitalists dilute

CEO ownership, they reduce fixed salary, marginally increase the sensitivity of CEO wealth to firm value, and reduce the dispersion in ownership, which may represent an improvement if both very low levels of equity ownership (low incentives) and high levels (entrenchment) are undesirable. Finally, they find that asymmetric information limits the adjustment of equity stakes at the time of an IPO.

## Market Microstructure

Members and guests of the NBER's Market Microstructure Project met on December 4 in Cambridge. Their agenda, organized by Bruce Lehmann of University of California, San Diego, and Andrew W. Lo of NBER and MIT, was to discuss these papers:

### **Matthew Rhodes-Kropf,**

Columbia University, "Price Improvement in Dealership Markets"

Discussant: Eugene Kandel, Hebrew University

**Michael J. Barclay,** NBER and University of Rochester, **William Christie,** Vanderbilt University

**Jeffrey Harris,** Ohio State University, **Eugene Kandel,** and **Paul Schultz,** University of Chicago, "The Effects of Market Reform on the Trading Costs and Depths of Nasdaq Stocks"

Discussant: Allan Kleidon, Cornerstone Research

**Jennifer Lynch Koski,** University of Washington, and **Roni Michaely,** Cornell University, "Prices, Liquidity, and the Information Content of Trades"

Discussant: Robert McDonald, Northwestern University

**Peter Christoffersen,** McGill

University, and **Francis X. Diebold,** NBER and University of Pennsylvania, "How Relevant Is Volatility Forecasting for Financial Risk Management?"

Discussant: Robert F. Engle, NBER and University of California, San Diego

**Reena Aggarwal,** U.S. Securities and Exchange Commission, and **James J. Angel,** Georgetown University, "Optimal Listing Policy: Why Microsoft and Intel Do Not List on the NYSE"

Discussant: Robert Battalio, University of Notre Dame

**Rhodes-Kropf** examines the strategic behavior of market makers facing price improvements, adverse selection, and changing market conditions. He finds that negotiation, which is forced on dealers by customers with market power, widens spreads but leaves dealers unaffected; this implies that wide quotes are not sufficient to infer excess profits or collusion. Even when price improvements function as a type of price discrimination and dealers choose improvements (without collusion), profits may not increase. Eliminating price improvements allays negotia-

tion costs, improves the equality of execution, and enhances the market transparency.

On January 20, 1997, the Securities and Exchange Commission began implementing a series of reforms that permit the public to compete directly with Nasdaq dealers by submitting binding limit orders. In addition, superior quotes placed by Nasdaq dealers in private trading venues began to be displayed in the Nasdaq market. **Barclay, Christie, Harris, Kandel,** and **Schultz** measure the impact of these new rules on various measures of performance, including

trading costs and depths. Their results indicate that quoted and effective spreads fell dramatically without adversely affecting market quality.

**Koski** and **Michaely** investigate the effect of asymmetric information on prices and liquidity by analyzing trade, quote, spread, and depth series. They hypothesize that the information content of a trade increases with its size and the degree of information asymmetry of the trading period. Their results show that absolute price effects are positively associated and liquidity is negatively associated with information content as measured by

both trade size and the information environment of the trade. These associations are stronger for purchases than sales. The authors also show that quoted prices are better measures of information effects than transaction prices, because they control for bid-ask bounce. Spreads increase and quoted depth decreases in response to asymmetric information. Finally, trades that are known a priori not to contain information have no impact on prices and liquidity, even when they are very large.

Volatility forecastability varies with horizon, and different horizons are relevant in different applications. Moreover, existing assessments of volatility forecastability are plagued by the fact that they jointly assess volatility forecastability and an as-

sumed model; the results vary not only with the horizon, but also with the model. To address this problem, **Christoffersen** and **Diebold** develop a model-free procedure for assessing volatility forecastability across horizons. Perhaps surprisingly, they find that volatility forecastability decays quickly with horizon. Volatility forecastability, although clearly relevant for risk management at short horizons, such as trading desk management, may not be important for risk management more generally.

According to **Aggarwal** and **Angel**, many Nasdaq-listed firms that could list on the New York Stock Exchange (NYSE) have not done so, despite Nasdaq's traditionally higher bid-ask spreads. Firms face a trade-off between the low transaction costs of an

auction market (NYSE) and the marketing advantages of a dealer market (Nasdaq). The largest firms prefer a dealer market in which institutional investors can bypass the high spreads that motivate broker-dealers to market the stock to retail investors. The authors also explain why firms may have positive price reactions when they switch from Nasdaq to the American Stock Exchange (AMEX) and also when they move from AMEX to Nasdaq. Further, their analysis is consistent with the curious fact that closed-end funds, unlike operating firms, overwhelmingly list on exchanges, and that brokerage firms tend to list their own stocks on exchanges even while bringing other firms public on Nasdaq.

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## Bureau Books

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

### Social Security and Retirement Around the World

*Social Security and Retirement Around the World*, edited by Jonathan Gruber and David A. Wise, is now available from the University of Chicago Press for \$62.00.

This volume addresses the problem, seen in nearly every industrialized country in which the population is aging rapidly and individuals are living longer, of strain in the financial viability of these countries' social security systems. This financial strain is compounded by the fact that workers are leaving the labor force at increasingly younger ages. One explanation for the striking decline in labor force participation is that social security programs actually provide incentives for early retirement.

This volume includes papers on social security systems and labor force participation patterns in Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom, and the United States. It should be of broad interest, especially as the Clinton administration begins to tackle the U.S. Social Security crisis.

Gruber is Director of the NBER's Program on Children and a Research Associate in the Public Economics, Health Care, Labor Studies, and Aging Programs. He is also a professor of economics at MIT. Wise is Director of the NBER's Program on Aging and a Research Associate in the Labor Studies and Health Care Programs. He is also the John F. Stambaugh Professor of Political Economy at the John F. Kennedy School of Government at Harvard University.



## Labor Statistics Measurement Issues

*Labor Statistics Measurement Issues*, edited by John C. Haltiwanger, Marilyn E. Manser, and Robert H. Topel, is now available from the University of Chicago Press for \$60.00.

Rapidly changing technology, the globalization of markets, and the declining role of unions all have led to dramatic changes in working conditions in the United States. Yet little attention has been paid so far to the difficult measurement problems underlying analysis of the labor market. This volume helps to fill the gap by exploring key theoretical and practical issues in the measurement of employment, wages, and workplace practices. The papers in the volume consider what is needed, what is known, and what can be learned from existing data, and the needs not being met by available data sources. Other papers examine how the answers to important questions are affected by the alternative labor market measures used.

Haltiwanger is a Research Associate in the NBER's Programs on Economic Fluctuations and Growth and

Productivity and a professor of economics at the University of Maryland. Robert H. Topel is a Research Associate in the NBER's Program on Labor Studies and a professor in the Graduate School of Business at the University of Chicago. Manser is assistant commissioner for employment research and program development at the U.S. Bureau of Labor Statistics.

## Learning by Doing in Markets, Firms, and Countries

*Learning by Doing in Markets, Firms, and Countries*, edited by Naomi R. Lamoreaux, Daniel M. G. Raff, and Peter Temin, is now available from the University of Chicago Press for \$65.00 for the hardbound and \$22.50 for the paper edition.

*Learning by Doing* is a companion volume to two books published earlier by the University of Chicago Press: *Inside the Business Enterprise* (1991), edited by Peter Temin, and *Coordination and Information* (1995), edited by Naomi R. Lamoreaux and Daniel M. G. Raff. All three volumes set out to integrate economic history with business history.

The two previous books essentially asked, "what goes on inside firms?" They found that business leaders have been preoccupied with the management of information flows and asymmetries (situations where one party in a relationship has more or better information than another). Collectively, the essays showed that many characteristic features of modern business organizations may be understood in terms of the scarcity and value of information. *Learning by Doing* focuses on learning processes, asking how firms, industries, and even nations can learn to overcome uncertainty. The essays show that organizations—like people—learn different things in different ways and that this variation has implications for competitive outcomes.

Lamoreaux, Raff, and Temin are all Research Associates in the NBER's Program on the Development of the American Economy. Lamoreaux is also a professor of economics and history at the University of California, Los Angeles; Raff is a professor of management at the Wharton School of the University of Pennsylvania; and Temin is the Elisha Gray II Professor of Economics at MIT.

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